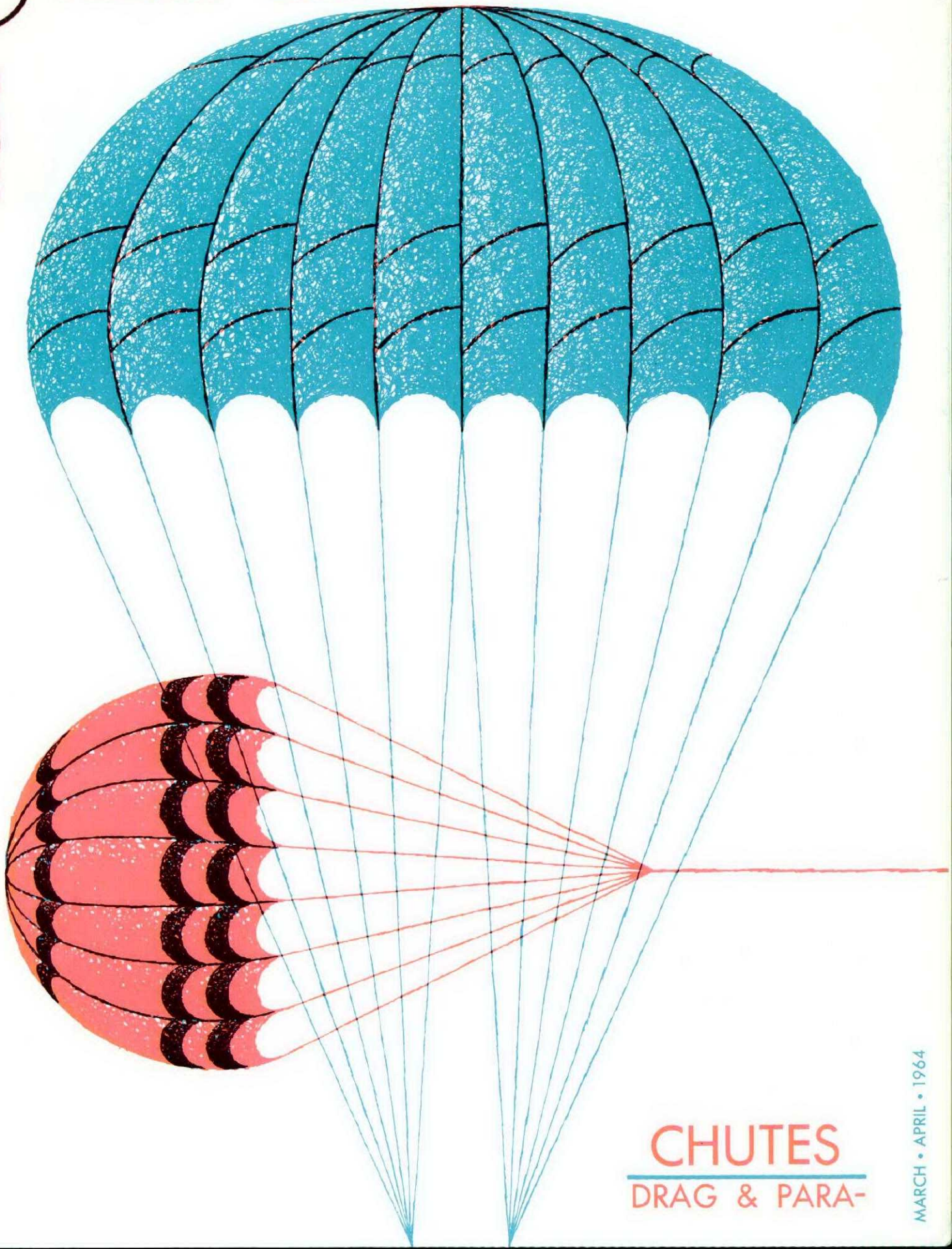
RCAF FLIGHT COMMENT



CHUTES
DRAG & PARA-

MARCH • APRIL • 1964

FLIGHT COMMENT

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ROYAL CANADIAN AIR FORCE
DIRECTORATE OF FLIGHT SAFETY

ROGER DUHAMEL, F.R.S.C., Queen's Printer and Controller of Stationery, Ottawa, 1964

S/L WA SMITH

PILOT ERROR. Every pilot is familiar with the term and most can cite instances where, in their opinion, the cause of an accident was erroneously attributed to this factor. Many whose responsibility it is to establish the cause of an accident profess that there is no harm in being, on occasion, overly critical and laying the blame on the pilot if no other cause factor is immediately apparent. Their reasoning is that at least it does no harm and more probably it does some good. If nothing else, so they claim, it at least makes other pilots try that much harder to be perfect.

We all know of the story of the pilot of a single-seated aircraft who encountered a serious emergency while airborne but of a nature that did not require his immediate landing. This hypothetical pilot, since he had lots of time, figured this is one accident where they would not be able to pin the blame on him. Consequently he requested the presence of the CO, the Flight Safety Officer, and all other technical and aircrew officers (who later may sit in judgement) in the tower to give him advice. These officers in their wisdom, but with some hesitation and disagreement, made all the decisions for this pilot. The pilot followed them to the letter but on his landing roll deployed his drag chute at 165 knots instead of 160 knots. As a consequence it tore off and he ran off the end of the runway at slow speed causing slight damage. Since the drag chute was not part of the emergency and had not been previously mentioned, the cause of the accident was, of course, pilot error!

We in the flight safety business make much of professionalism on the part of our pilots and agree that the piloting of our modern sophisticated aircraft is indeed a profession. As a corollary, a pilot like any other professional person is held responsible if he practices his profession without an "ordinary and reasonable degree of care and skill". This, as the courts have ruled in the case of an engineer (Chapman vs Walton, 1883), is the care and skill which would be exercised in similar circumstances by the average person in the branch of the profession in which he is engaged. A pilot, like any other professional, does not guarantee perfection any more than a lawyer guarantees the winning of a case or a doctor to perform a cure.

But what has all this got to do with preventing accidents? If we blame a pilot a little unfairly for causing an accident surely it does no harm? Other than to the particular pilot as an individual this is probably true in almost every case. But once in a while there is an exception.

Three years ago we had a case in the RCAF where the canopy of a T33 was lost in flight because the external canopy jettison handle was pulled by the slipstream. Fortunately the pilot was able to land the aircraft safely, but the cause was assessed pilot error because it was alleged that he had neglected to ensure on his external check that the cover was properly closed. Last year we had another T33 canopy jettison under similar circumstances. In this case the wind blast slammed the pilot's head back against the head rest rendering him semiconscious. In the confusion he thought the aircraft had exploded and he ejected. He was uninjured, but the aircraft was destroyed. The investigation into this accident proved that it was possible for the handle to be sucked out by the slipstream and jettison the canopy, even with the cover properly attached. A modification was quickly forthcoming to prevent future occurrences. But if we had not been so glib at blaming the pilot in the first instance, we would have saved an aircraft.

The above example proves the necessity for complete, thorough investigations. The investigator and supervisor must be careful not to label an accident as pilot error simply because he, the pilot, was there. There are many examples of materiel failure and inadequate design such that anything less than a perfect pilot might not be able to cope with a set of circumstances that could occur. And let's face it: if a pilot is human, he cannot be perfect.

WHY ALL THE CHATTER

Several articles have been published recently underlining the stress and strain which the air traffic controller is subjected to in the course of his work. However, the job can be accomplished with a minimum of stress if we could eliminate the unnecessary words and the lengthy transmissions that saturate our system. While the controllers are feeding traffic to the runway in a safe, orderly flow, they can achieve greatest efficiency if the pilots would anticipate control instructions (to a degree), ie, information to previous aircraft, sequencing in pattern, field conditions and other data. And most important, if they would return the queries and statements rapid-fire, much like a ping-pong match.

To stand back and watch, or listen to a controller smoothly handle a continuous flow of traffic for as long as forty-five minutes to an hour, with diversified types and classes of aircraft, departing, arriving and remaining in local traffic, is an education in traffic control and pilot technique. The cause for control agency saturation soon becomes evident. Pilots can improve the efficiency of traffic flow by improving their microphone techniques. As the traffic picture develops, as the traffic stream increases, the pilot, too, should reduce his transmission time, helping to reduce the strain and tension.

Picture four C119 transports in closed traffic, touch-and-go, two heavies for departure, and three utility aircraft in three directions from the field approaching to enter the pattern. Traffic is at a brisk pace, control is positive and sure, instructions are brief and concise.

"Trenton Tower, Trenton Tower, this is Air Force 1532, over".

"Air Force 1532, Trenton Tower, over".

"Aw, roger, Trenton this is Air Force 1532, we're about fifteen miles or so west of your station, at two thousand feet, visual flight rules, for fifteen minutes passenger stop, requesting your runway in use and landing instructions, over".

Couldn't this transmission be improved, reducing mike transmission time?

Why not - "Trenton Tower, Air Force 1532, over"; and when answered - "Air Force 532, fifteen west, two thousand, VFR, landing".

CAP 342 Vol I expressly defines terminology for each traffic control situation under which a controller may operate. Control phraseology is standard and the controllers do their best to comply with standardized phraseology. But what of the pilot's mike technique and phraseology? Limited coverage is allotted in the FLIPs and associated publications for air-to-ground transmissions. For situations not clearly defined, when standard phraseology is not known or does not apply, the general rule is for the pilot to use plain language to make himself understood.

Periodically, however, we are faced with problems of control when we are saturated with R/T traffic, the saturation being caused by poor mike technique, lost time in extraneous transmissions, long-winded speeches, interspersed with aw, roger, this-is, over, etc. To eliminate this load on the system, the pilot must not only plan ahead for his approach, departure, or other phase of flight, but also plan ahead for each transmission. Give a little extra thought to some simple, clear-cut phrases and they will soon become part of an airman's smoothly-polished vocabulary, free of hash that brands one as a jabber-jaw.

Look at the picture in the past year, at major civil airports controlled by a DOT-operated control tower. You know the rule - everybody, practically everybody in the area, is on the R/T. Go IFR and you've got lots of traffic on your frequency; work a sector in a high-density area and you can hardly get a word in edgewise. More and more pilots, both military and civilian, are doing more and more IFR flying. Most air carriers, including ATC are flying strictly IFR; there is a big increase in executive flying and general aviation light-twin and single-engine stuff. Due to this increase in the single-channel simplex method of communicating, it is becoming increasingly important for pilots to improve their mike technique.

Initial transmissions are to ground control or to the tower for taxi instructions. Pilots sometimes give their message of intent with their first call and fail to get any response. Then they repeat the call, again give their message and again fail to receive a reply. It would save a lot of trouble if we make sure that we're on the proper frequency and capable of receiving before giving our message.

Even though most of our equipment today is crystal controlled, eliminating the necessity for hand tuning, we may not hear any transmissions because we have: (1) a dead receiver, or, (2) the volume is improperly adjusted. If we can hear the tower, (or ground control), then we're ready to transmit. On start-up, if nothing is heard when we are ready to transmit, give a preliminary call only, let the tower answer you, then give your message. We haven't blocked the frequency with wasted transmissions. If we don't hear the controller, either we don't have a working receiver or business is light. Since we can hear the controller, we eliminate the preliminary call. To illustrate:

"Ottawa ground, Air Force Jet 353", would be extended had we been sure of adequate reception from the facility, to:

"Ottawa ground, Air Force Jet 353, taxi from jet flight for local VFR".

In some cases it may be mandatory to include briefly what your proposed flight is, for example "VFR Ottawa". Also, some stations have local procedures to include other bits of information the tower wants to know. These local procedures are probably not applicable at other airfields so don't let it become such a habit that you give it everytime you request taxi instructions regardless of where you are. Many pilots are in the old habit of requesting "radio, taxi, time and altimeter". This is seldom necessary because the tower should automatically include it with the taxi instructions.

Stay on ground control until advised to change to another frequency or until ready for takeoff. Could be that ground control wishes to query you about some additional information requested from Ops, or wishes to have you retard power to allow passage of other aircraft behind you, or desires to have you change your longitudinal direction to prevent your wash blowing across the active. Unless otherwise instructed, stay with ground until ready to go, then switch to tower.

When ready to go, first face the runway with your aircraft, then state that you're ready. If they have room for immediate departure, you may not have time to get into position and roll if you've got more than a single ninety-degree turn to make to get on the runway. Simply state, "Air Force 532 ready on one-five". Specify the runway, always; this is sometimes vital. Could be that tower has traffic holding short of two or more runways. The controller

may not be certain of your specific location, so, to prevent a loss of time while he queries your position, give the runway with your call.

Let's go back a little... how to acknowledge instructions. To put it simply, when the controller can immediately and readily see that you are complying, the single word "Roger" will do. When you are coming up to a live runway enroute to your run-up position, or heading back to the ramp and you are instructed to hold short, acknowledge "Hold Short"; that controller is going to hold his breath until you trundle up to the solid yellow line and s-t-o-p. Or if cleared to move into position and hold, acknowledge - "Position and hold", don't just say "Roger", because again he's going to eyeball you extra carefully (he may have lots of other traffic to look after) while you manoeuvre the monster out of run-up area, onto the runway, line up and reset brakes.

When airborne and planning to go to the practice area, no need to give the tower your mission profile. Just make the normal traffic pattern exit but stay on their frequency until departed from the area, or until they have given you specific permission; "clear tower". Eliminate "Air Force 1532 is leaving your area for a little while and we'll be calling you again to shoot a few landings after we do some air work". If you want to work departure radar while still in the traffic area, request change to departure control.

While enroute, phraseology is pretty well standardized, but pilots will still make too many lengthy transmissions even though most reasons for communicating are for the position report. Counting call signs, times, and altitudes as only one word each, we can still make most position reports to the centre with but nine words, so why all the chatter?

Adapted from Aerospace Safety
at the suggestion of RCAF Stn Bagotville

FEAR

CAN SAVE YOUR LIFE

It is extremely easy to develop a very unhealthy attitude toward propellers. Ask yourself these questions. How many times have you looked at a propeller and NOT thought about what would happen if it suddenly started to turn? How many times have you NOT made a special effort to walk around the prop arc while working around an aircraft? How many times have you walked between the engine and the fuselage of an aircraft and NOT thought about how effectively the propeller could chop you up into tiny pieces if it were turning? And how many times have you pulled a prop through by hand and NOT given a thought to the fact that it could possibly start turning on its own?

Every time you perform one of these acts, harmless as they may prove to be at the time, you are subconsciously giving yourself reason to NOT fear and respect the world's best sausage making machine. You are developing the subconscious habit of NOT fearing and respecting the propeller. This habit can KILL you!! During a moment of tension, at a moment when you are busy, when you are trying to hurry a little to secure an aircraft, at a time when you least expect it, the fact that you DO NOT fear, the fact that you HAVE NOT developed a habit of caution and respect for the propeller can cause YOU to put your head down and walk a straight path directly into a whirling death trap.


LAC AJ WARREN


SGT JE McGINNIS


LAC E FELKER


LAC BT ROWLEY

A possible major accident was averted at Cold Lake by the vigilance and quick action of two airmen, LAC AJ Warren and Sergeant JE McGinnis. LAC Warren noticed a CF104 taking off with the aft electronic compartment door open, reported it to the sergeant who in turn notified the tower.

The aircraft was recalled and landed without incident. Neither of the pilots was aware of this situation until advised by the tower.

The alertness and the immediate response to an inherent emergency, of these airmen is very commendable and Flight Comment is pleased to include them in our "Good Shows".

LAC E Felker, a ground technician at Station Moose Jaw was doing a BFI on a visiting T Bird. Transient jets have been refuelling there since the completion of the longer runway. The station, although not officially open for jet traffic, has tried to provide turn-arounds for them with the personnel and equipment available.

As he was performing the BFI, LAC Felker noticed that one of the upper fuel pump fittings in the plenum chamber area, appeared to be damp. Entering it through the lower access doors, he made a further check of the pump and confirmed by touch that it was in fact wet with fuel. As the exact position of the leak was difficult to find, the engine was started and a re-check of the pump revealed severe leakage around the aluminum squash washer. The aircraft was shut down and a major entry was made in the L14.

LAC Felker is to be congratulated for his conscientious performance in discovering a potentially dangerous unserviceability. Had the fuel leak not been found it is probable that a very serious fire would have occurred while airborne. Flight Comment is pleased to include LAC Felker in the "Good Show" column.

While assisting on a supplementary inspection on Hercules 10302, LAC BT Rowley discovered a major crack in the centre wing forward spar web. As a result of this, a special inspection was raised and a similar fracture was found in the same place in Hercules 10301.

This airman had only been on the unit about three months and consequently had limited experience with the Hercules. Because of this and because he is keen and aggressive, he used every spare minute examining and improving his knowledge of the aircraft. It was during such an examination that the crack was discovered.

Because of his keeness and initiative, LAC Rowley possibly prevented a very serious accident. In recognition of this display of devotion, Flight Comment is pleased to award him a "Good Show".

"WHATEVER HAPPENED TO OLD CHARLIE?" .....

by F/L Paul Nyznik
408 Squadron

Charlie is 33 years old. He's been a navigator for thirteen of those years and has over two thousand hours in the air. Charlie is physically fit and has never had any difficulty in maintaining his A3B medical flying category. He has smoked since the age of 17 and, at the time he gave up the habit a month ago, Charlie was smoking thirty to forty cigarettes a day. He drinks in moderation. Charlie has a friendly manner and a fair share of self-confidence. He has always been a competent navigator. So much for the man himself.

A short time ago, Charlie was scheduled for a 6-hour low altitude mission over some of the roughest terrain in the Canadian Arctic. Visual contact was to be maintained within the limits of safety and the coast-crawl would include visual investigation of bays, inlets and fjords. Aboard the aircraft to help him in his navigation were a radar altimeter, APs 42B radar, two radio compasses, two Kolsman sextants and a N-1 gyrocompass.

Although he was somewhat restless, Charlie says he had a good nights sleep, had had no alcoholic beverages the evening before and consumed his usual breakfast of juice, toast, bacon and tea prior to the flight.

After met briefing, he neglected to complete his flight plan, intending to do this in the aircraft prior to takeoff. This would later prove to be the first link in a chain of events which could have all but shattered Charlie's aircrew career.

When they boarded the aircraft, the flight plan Charlie meant to complete was entirely ignored. In fact, the actual route flown by the aircraft was shown in Charlie's flight plan all right - but in reverse order!

On reaching cruising altitude, as Charlie later put it, "I glommed onto the APS and completely forgot about everything else. I felt I was doing a wonderful job of navigation and never felt better in all my life". As it turned out, unfortunately, two of his initial fixes were incorrect and by failing to check his ground speed (in any one of three different ways), he did not detect this initial error.

Charlie continued to read the radar, pass alterations of heading to the captain and position reports to the R/O, and felt he was in positive control of the situation. (A re-plot showed that at this particular moment the aircraft was flying a route which was similar in configuration to that planned, but eighty-five miles or more to the east of the area they intended to cover).

Five and one half hours later during which time their altitude ranged from 700 feet to 5,000 feet, in and out of cloud layers, the captain obtained a pinpoint. When this did not agree with the navigator's estimate of the aircraft's position, the captain altered heading and homed in on the destination radio beacon and landed without further incident.

It should be noted here that this particular navigator, from analysis of his previous navigation trips, was considered to be competent, a steady and conscientious worker, certainly not lazy, a man well-versed in all navigation techniques and yet, in over 5-1/2 hours he

- plotted one sun position line - which was 20 miles in error;
- plotted one radio position line - although there were at least two beacons "booming in" at all times;
- took only three heading checks - although he had reason to suspect that the N1 gyrocompass was precessing;
- though presumably map-reading by radar, not one ground speed check was computed in over two hours. This action alone would have alerted him to the fact something was wrong and is a standard navigation procedure;
- failed to log heading alterations for well over an hour and did not compute one wind velocity on the entire trip;
- felt so confident that all was going well that he continually assured the captain he had the aircraft's position firmly fixed by radar and was ready to monitor a let down, through cloud, in an area where a number of peaks reach 2500 feet above mean sea level!

When the trip was re-plotted and reviewed with Charlie, he was thunderstruck! He simply could not understand how he would turn in an effort unworthy of a basic navigation student and yet, there it was! He carefully retraced his actions previous to and during the flight to see if there could possibly be any reasonable explanation for the events that followed--but again he came up with a great big "zero"..... "A good night's rest?" - check; "No alcohol?" - check; "A normal breakfast?" - check; "The usual cigarette after breakfast?" - check. Nothing.

Because of the far-reaching effect this incident could have had on Charlie's flying career, an appointment was made for him to be thoroughly examined at the Institute of Aviation Medicine in Toronto and after a week of exhaustive tests, the verdict: Charlie had been poisoned - not by anything he drank or had eaten, but by the carbon monoxide and nicotine from his cigarettes!

These poisons had caused "hypoxia", the equivalent to flying at about 15,000 feet instead of 5,000 feet or less. One sign of this is euphoria (a sense of extreme well-being and confidence) and this was certainly how Charlie felt on the day of the flight.

Now that the real culprit had been isolated, a nervous tremour ran through Charlie's aircrew buddies and they wanted answers to a number of sticky questions. The medical people obliged:

Q Was this incident caused by many years of heavy smoking, or could it happen to an individual who has smoked say for one or two years.

A This would depend on the individual's body chemistry. However, it could happen to a person who has just smoked his first packet of cigarettes!

Q What are the danger signs?

A Any of the signs of hypoxia. That is, any of the following symptoms, in any combination: euphoria, nausea, inability to concentrate, dizziness, inability of the eye to accommodate to changes in light intensity, drowsiness.

Q The dangers are obvious - what are the alternatives?

A The obvious solution is to quit smoking. Adequate rest prior to flight, moderation in smoking, and if the situation is suspected, application of oxygen, are other alternatives.

Q If Charlie gave up smoking entirely, would this be positive protection against a repetition?

A Definitely yes.

Q Was Charlie's case an isolated incident, or could the average smoking aircrew member expect to be affected in a

similar way at one time or another?

A Although much research has yet to be done in this particular field, at the moment IAM feel that Charlie's experience was unusual. However, they point out that even though this incident may have been an isolated one, the smoking aircrew type - and especially the heavy smoker - definitely runs an additional risk of hypoxia.

.....and Charlie's story should certainly serve to stress what that could mean.

NEW SERIES OF USAF FILMS ASSAULTS PRIMARY CAUSE OF ACCIDENTS - PERSONNEL ERROR

The US Air Force's most concentrated assault on the primary cause of all accidents - personnel error - has been skillfully recorded in a series of five colour films called "Man and Safety". These films should now be available at RCAF Film Libraries.

The basic theme, "Accidents are not inevitable - they can be prevented", analyzes three major areas where greater attention is mandatory - communications, supervision, and the understanding of man's limitations.

Months of research into flight, ground, and missile incidents have been converted into a dramatization of man's physical, physiological, and psychological safety limitations.

A novel approach through thought-stimulating animation is used in each of the five productions. Artwork supplements live action in the films, which re-enact the actual sequence of events leading to incidents and to the prevention of accidents.

Each of the "Man and Safety" films is a complete script, or all can be shown consecutively during training courses.

The five half-hour films were shot at ten Air Force bases and one Navy facility in five states, using a cast of nearly 300 personnel, both military and civilian. Locations included Williams AFB, Ariz; Cannon AFB, NM; Carswell AFB, Tex; KI Sawyer AFB, Mich; and in California - Norton, Vandenberg, March, Castle, and Edwards AF Bases, Mira Loma AF Station, and the Long Beach Naval Shipyard.

Titles, USAF film numbers, length of films, and selected quotes from each of the five productions follow:

TF 5522a "Man and Safety: Communications" (27 minutes)

"Man seldom works alone and this brings into focus one of the major sources of human error - communications. Man's great progress and his fantastic material achievement depend on his ability to convey his ideas to other men".

TF 5522b "Man and Safety: Physical Limitations" (26 minutes)

"When we look at man as a physical structure we see that he has a remarkably strong, light frame - that he is a mechanical system of levers and balances - flexible, resilient, but in spite of his prowess he has many 'built in' limits."

TF 5522c "Man and Safety: Physiological Limitations" (27 minutes)

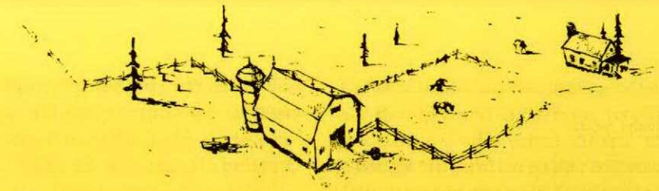
"Man is further limited by his need for fuel, being able to survive about 30 days without food, three days without water, and only three minutes without oxygen. It is indeed a small cage within which man lives - confined by pressure, temperature, and limitations."

TF 5522d "Man and Safety: Psychological Limitations" (26 minutes)

"Each period of learning time is marked by a decreasing rate of errors. The curve gradually smooths out at some level of efficiency less than perfection. When learning has reached an acceptable level, man must still practice to retain what he has learned. Off all the information man receives during a given lesson, he generally forgets half in the first 24 hours."

TF 5522e "Man and Safety: Supervision" (27 minutes)

"The supervisor has a unique role to play in safety and a unique responsibility. There is a good reason why 95 per cent of the recommendations in accidents are directed toward the supervisor."



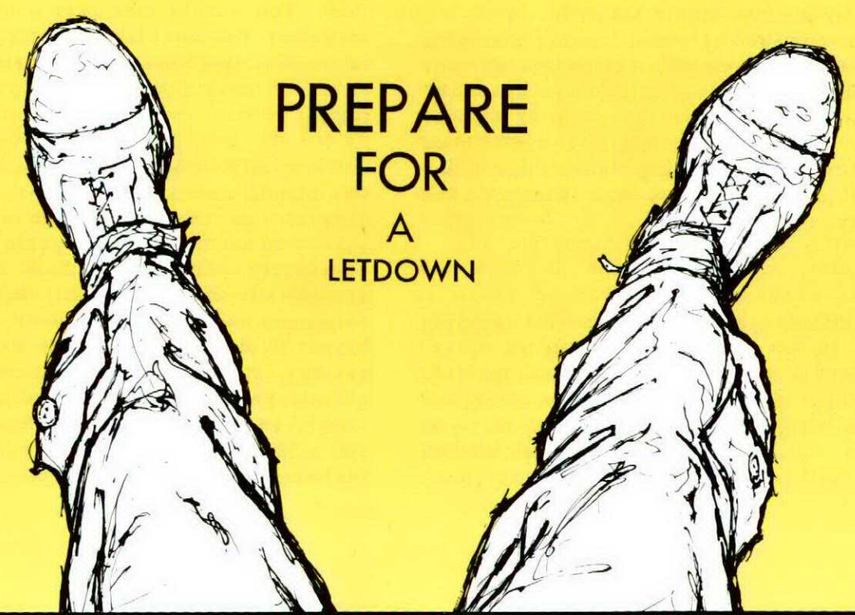
"Suppose at 100 feet in the air you see a barn or a tree coming towards you . . . ."

F/O FA Davidson was flying a F86 on a routine navigation exercise. After 40 minutes airborne and 33,000 feet the controls began to stick, but he could overcome the restriction easily. He discounted ice in the stickwell, although it felt similar. Both the normal and alternate hydraulic systems were indicating the correct pressure. A manual selection to alternate was made, but this did not correct the sticking and finally the controls, both ailerons and elevators froze. He returned to the normal system but the controls stayed locked.

F/O Davidson found that he could control the aircraft to some extent by using throttle and speed brakes for pitch control, and rudder for direction. However, landing in this condition was out of the question. Repeated attempts to free the controls were unsuccessful and finally, with the fuel down to 600 pounds, he pointed the aircraft in the direction of the least populated area and ejected.

In recalling his ejection experience, F/O Davidson found himself in for a few surprises. The roar and flying dirt after the canopy left, and the tremendous power of the ejection seat were all greater than he had expected. Once the canopy was gone, he found that he could not keep his eyes open for even a short time. After leaving the aircraft, the disorientation and inability to think clearly were also worse than he had anticipated. During the parachute descent, he was not sure of the proper way to land. He could see that he was going to hit the trees and debated whether his visor should be up or down.

F/O Davidson suggested that in spite of considerable training he was not fully prepared for what happened to him and that pilots should better prepare themselves for this emergency. This feeling of shock and surprise which is quite natural, can be cushioned to an extent by having a complete mental picture of each step in the ejection descent. His experience indicates the necessity of rehearsing in your mind each sequence and how you should react. Indoctrinate yourself with the feeling of the entire ride; understand what you are up against and



then you will react to the situation automatically.

A few basic facts may help you:

- Before flight make sure all your equipment is connected in the correct manner.
- To recover from tumbling or spinning after you leave the seat, gently extend your arms and legs, either singly or all together; this will eventually bring your body upright and slow the rotation. Avoid rapid movement; it could increase the gyrations. Obviously it is best if you can cease tumbling before the chute opens.
- For the chute opening shock - the best position to aim at is to get your feet pointed to the ground and in an attitude like sitting in a chair. Don't become alarmed if parts of the canopy panels are blown out or torn by the opening shock at high speeds. These holes will do nothing more than speed your descent a little.
- If you find yourself entangled in the shroud lines, it is particularly important that you free yourself before reaching the ground. Serious or even fatal injuries can result if you fail to do so. Free the entangled limbs one at a time and if necessary three or four lines in a row can safely be cut. This is another good reason why aircrew should carry knives.
- If you eject at low altitude, try to beat the auto mechanism by releasing the seat harness, kicking the seat away, and manually pulling the cord.
- Expect some oscillation during the descent but the air escaping through the pores of the canopy and apex will normally provide ample stability.
- You can select your landing (avoiding hazards) to a certain extent by steering.
- Take up a landing attitude at about 100 feet. Feet together, toes pointing towards the ground, knees slightly bent, body erect, hands grasping risers close to the shoulders and elbows well in towards the body.

Oscillations

Oscillations are caused by the air escaping from the lip of the canopy tending to tip it. To prevent oscillating, pull down the high side of the canopy. Pull gently against the swing and let up just as gently. It is essential that you be gentle because quick jerks and sudden releases will induce greater oscillation, perhaps to the point of partially collapsing the chute.

Steering

Above 2000 feet, you can't be sure of your direction because there probably will be one or two wind shifts before you land. However, suppose you wish to avoid a large area, such as a lake. To cause the parachute to slip to the right, grasp the right-hand group of risers, one in each hand, and pull downwards. If you want to go forward, you would pull down the two front risers and plane to the front. Chances are, though, you may not be able to hold the risers for more than a minute since this is a very tiring manoeuvre.

To get an idea of the direction you are drifting at any given time, place your feet together and sight from your feet to an object on the ground. In this way the apparent movement of your feet along the ground will indicate wind direction.

Turning

Perhaps you're under the impression that you can't turn your chute. It's difficult but not impossible. During the descent, if you have time, experiment with turning. Bear in mind that you stand the least chance of injury if you face your direction of drift.

If you grab just one set of risers - say the right front set - and pull them down a couple of feet, you should go into a very slow turn. The direction of the turn may vary either right or left, but regardless of which way you turn you will eventually get into your desired position. You should then very gently release the riser and it is most likely that you will continue facing that direction until you reach the ground.

Landing

Normally, when you reach about 1000 feet you should cease all manoeuvreing and concentrate on landing. At about 100 feet be sure you are in correct posture as outlined previously. Also don't look at the ground, because if you do you will invariably tense your muscles and you'll probably hit the ground hard. If you don't know the exact moment of contact, you'll be more relaxed and consequently you'll go in gently and get up and walk away from it. Under no circumstances should you anticipate the moment of contact. You are far better off to have no idea of when you'll land.

As you approach the ground, it is ideal to have your body facing slightly right or left to the direction of drift, feet together, in order to achieve a rolling fall. This is accomplished by rolling first on the calf of the leg, the thigh, buttock and finally the fleshy part of your back or shoulders, where the muscles come up over the shoulder blades. You will note these are the fleshy parts of the anatomy. No protruding bony parts should touch terra firma.

Suppose you are facing forward with no sideways drift. The tendency will be for you to contact the ground feet first, then knees; and then you will likely reach out and stop yourself with your hands. This will lead to at least some contusions and bruises around knees, wrists, and arms. Whatever you do, and whatever your posture as you approach the ground, keep your arms close to the body, relax and try to make the tumble as fluid as you can, even if you have to twist your body to do this. One technique is to keep your feet together and turn them at right angles to the direction of drift.

Suppose at about 100 feet you see a barn or a tree coming towards you; in this emergency, steering may be attempted. However you should keep up this action until you make contact with the ground, because if you release the risers you will most certainly set up oscillations. This could cause you to hit the ground much harder than if you were only slipping.

One of the worst problems, is landing with a rearward drift. Even among professionals, it is difficult to get away from spinal injuries, coming in backwards. Your feet will hit first, then the base of the backbone, and then your head. Under no circumstances pull your feet up on landing.

If you find that you can't avoid landing in the trees, your arms should be crossed in front of your face between the front and rear group of risers and your face turned to one side. F/O Davidson wasn't sure what to do with his visor. He decided to leave it up because it might break in his eyes. This is incorrect. It should be down because it is quite strong and affords protection from the branches.

Once you're on the ground, your next problem is to collapse the chute. The easiest way is to release the parachute with the quick release box. But if you are being dragged before you can use the quick release, you can try to get back on your feet and run around the canopy if the wind isn't blowing too hard. Above 20 miles per hour, your chances of doing this are pretty slight. If you are lying on your back, you can reach up and get the two risers on the ground or those two lying closest to the ground. Pull them down to you. The nearer you get them in your direction, the less wind the parachute will be able to catch and you will thus be able to collapse it.

If you are sliding forward on your face, still seize the two risers closest to the ground and pull them. This will pull the bottom of the chute towards you and spill the air from the canopy.

Well that pretty much takes you through the entire descent. If you understand what you are up against and how to handle the descent, the bail-out should be successful. Keep drilling it in your mind until you have the letdown, picture pat, and you'll be prepared to meet any emergency.

THE CASE OF THE $60,000 WRENCH

Our title sounds like a Perry Mason mystery and, in a way, this is appropriate.

On the day of the crime, low-hanging clouds and a cold drizzle made a perfect setting. Perhaps you were there. If so, you would have been listening to the smooth, piercing whine of a jet engine being run up.

Suddenly the whine changed to a series of explosions, terminated by the screech of tortured metals as the widely vibrating engine wrenched free of the aircraft and crashed to the ramp. After the smoke and confusion subsided, the bits and pieces of the murder weapon were removed from the dead carcass of the victim. It didn't take a Perry Mason to find that the weapon was once a one, each, wrench, four inch, adjustable.

The victim? Sixty thousand dollars worth of jet engine, now only worth its weight in scrap metal.

The mystery? Quite simple. Who owned the wrench? Who left the d... thing where it would be gobbled up by the ever-hungry engine? Minor maintenance was done on the engine just prior to the fatal runup. How did the wrench escape the eagle-eyed inspectors? More important, what are YOU doing to keep an accident like this from happening around YOUR base?

TAC ATTACK

DRAG CHUTES

Faulty design, packing and installation of drag chutes have caused over 100 failures in the RCAF during the past year.

Blossoming drag chutes have become a familiar sight at RCAF airports employing the CF101 and CF104. They add a spectacular finishing flourish to an already eye-catching sight - a "century bird" landing. Drag chutes are now standard fixtures on most new jets and they're going to be around for some time to come - so let's learn to live with the problems they have created.

Why have drag chutes? Well, the CF104 must have the chute; landing the 104 in less than 10,000 without a drag chute can be a most unpleasant experience for the pilot. The Voodoo requires the chute to a lesser degree. The Starfighter's stub wings cannot provide the aerodynamic braking which can be so effectively exploited by the Voodoo in its very nose-high landing attitude.

Without going into the details, drag chutes basically offer these advantages:

- They increase the safety factors in landing these jets by reducing the landing roll, the need for excessive braking, and a barrier engagement if runway conditions are poor.
- They enable braking mechanisms to be smaller and lighter (as in the 104), and reduce the wear of expensive tires and brakes.

It is obvious from this that drag chute failures may lead to disaster and damage, not to mention the unpleasantness of angry aircrew and hostile supervisors!

If a chute fails to open when the pilot pulls the handle, what are the causes?

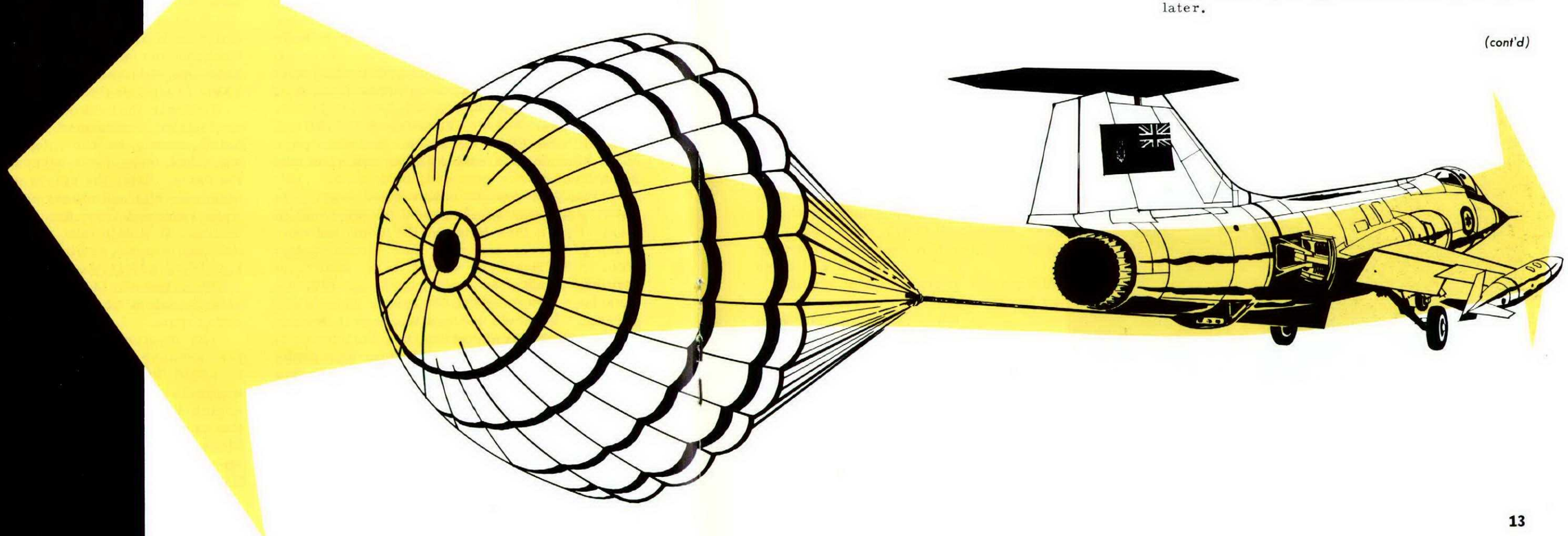
- Design - new aircraft may require modifications to airframe and equipment to achieve the 100% reliability desired.
- Maintenance - worn parts, poor cleaning, FOD, have all proven to be prime causes.
- Recovery and stowage - chutes left in rain, sun, oil, tar and rocks shorten the chute life-span and reliability; pickup vehicles sometimes have sharp corners and snags which damage stitching and material.
- Installation - incorrect coupling and cocking, incorrect cable tension, and the ill-fitting "rammed home" pack all show up in RCAF records.
- Packing - SE Techs in a well-run, properly equipped shop produce good work; this helps ensure that none of the details are overlooked and good team effort is possible.

That's the situation....what can the aircrew, supervisor and man-on-the-job do about it?

AIRCREW

Have you noticed that some drag chute release handles are stiffer than others? Report it in the L14. A stiff handle will probably get stiffer and later jam - just when you need it. Write up a handle that doesn't "feel" right. Also, chutes that are carelessly released to drop into mud, snags and water may fail you later.

(cont'd)



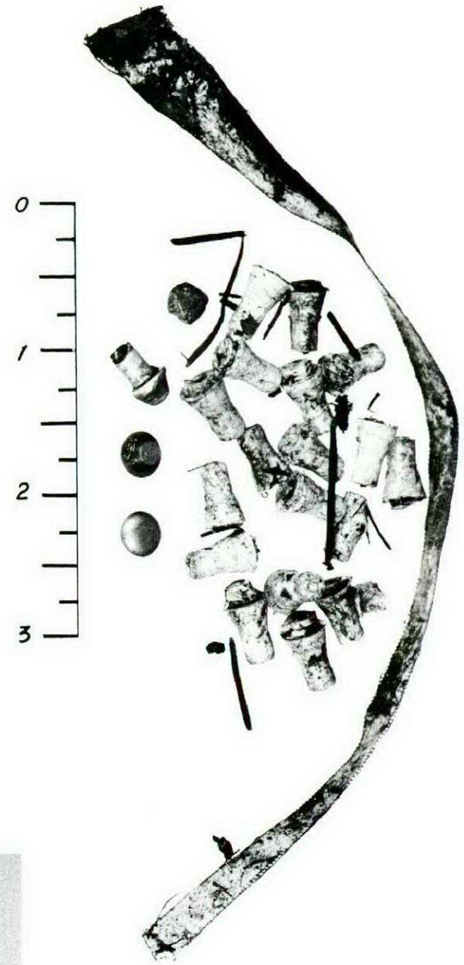
SUPERVISORS

It's the old story of men and machines. Look around your shop - does it look like the place for an over-10,000 chute deployment record to be made? Crowding, poor lighting and improper tools all take their toll. Is the chap out there on the line installing the chutes for disciplinary reasons? Would a running total of consecutive chute deployments on a large display board make your men - and the squadron - proud of its record....?

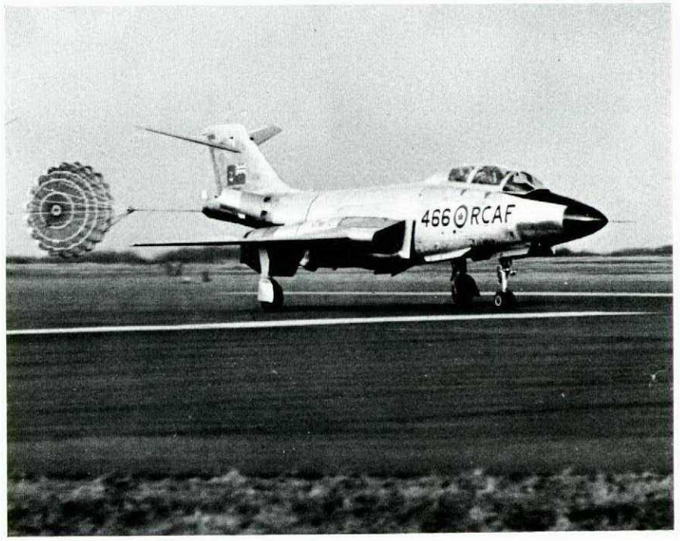
SE TECHS

No need here to go over the instructions for proper packing and installation of drag chutes; you've heard it all before. Now's the time to take a close look at the details. Are procedures being followed to the letter? If not, who's to blame? Be aware that it's sometimes tough to repeat operations over and over, and still tackle the job with the interest, care and attention these drag chutes deserve.

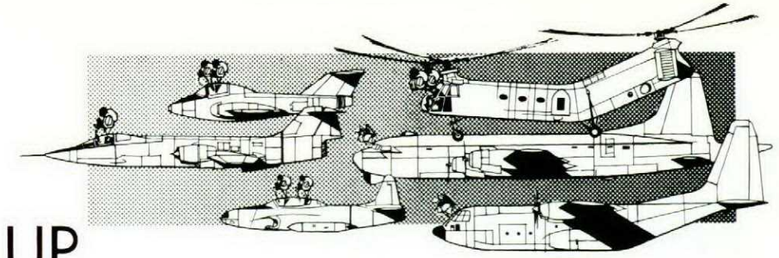
Records of over 10,000 consecutive successful chute openings have been established. The personnel involved have attributed attention to detail as the secret of success; and remember, there's quite a few vital details between rack to pack and back!



Foreign objects found in drag chute compartment.



The kinetic energy of a Voodoo on landing is equivalent to a 50 ton locomotive travelling over 100 miles per hour!



HEADS-UP

F/L OV STEVENSON and F/O RF PANE

F/L OV Stevenson was captain and F/O RF Pane was first officer on a Cosmopolitan service flight heading for Montreal out of Goose Bay. F/O Pane was in the left seat doing the actual flying. While completing a pre-descent check, a loss of hydraulic fluid was noticed. For the landing at Montreal, the captain decided he would lower the undercarriage by the free-fall method, use the emergency hydraulic system for flaps and brakes, and also emergency air brakes if required.

After a short distance however, other troubles appeared. The starboard oil pressure started fluctuating slightly and eventually fell below 60 psi. The low pressure warning light came on and the rear bearing temperature increased. As the situation was worsening, the captain feathered the starboard engine and declared an emergency. He decided it would be better for him to stay in the right seat rather than change seats especially since they were now over the city.

In lowering the undercarriage, the port wheel failed to indicate "safe". Positive "G" was applied to no avail. A circuit approach and landing was made, the port gear going to safe indication just at touchdown. Emergency hydraulic pressure was used to bring the aircraft to a full stop.

During this emergency the captain ensured that all passengers, equipment and crew were properly secured in the event of an undercarriage failure.

Flight Comment is pleased to include this crew in our column "Heads-Up Flying". The captain followed the correct procedures and showed good judgement in leaving the first officer at the controls in this emergency. A moment's loss of control in a seat changeover may have spelled disaster. The first officer did an excellent job of flying and landing the aircraft under difficult circumstances.

F/O SE CLARKE

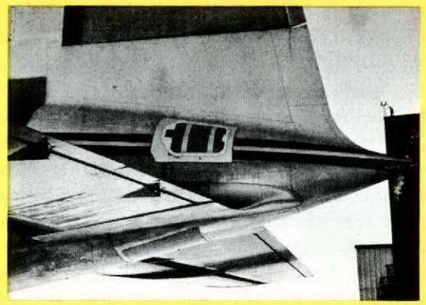
The T33 touched down normally, but shortly afterward it began fishtailing and the pilot, F/O SE Clarke, noticed a wheel veering off to the left. His port main wheel had come completely off! F/O Clarke quickly assessed the situation and kept the aircraft to the right side of the runway until finally at about 30 knots it swung to the left and suddenly came to a stop with the port undercarriage deeply embedded in the soft mud.

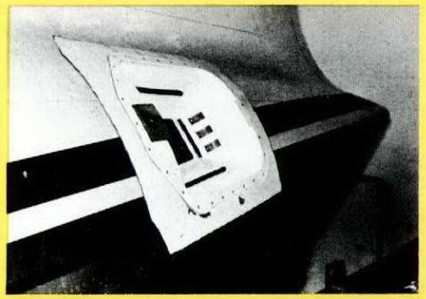
It was later determined that the port main wheel had been installed using a nose-wheel outer bearing instead of the proper main wheel inner. It is hardly fair to criticize the technician who did the installation because the bearings are nearly identical in appearance and since it was packaged as a main wheel bearing, he naturally assumed it was the proper bearing. The real culprit in this case is the one who packaged the bearing improperly. Since the bearing was packaged on the station, the cause of the accident was assessed "Maintenance Error", but the individual responsible could not be determined because it could have been anyone of several who regularly pack the bearings.

For the cool professional skill with which F/O Clarke handled the situation, Flight Comment is pleased to award him a "Heads-Up". Had the undercarriage stub dug into the ground at high speed the consequences might have been far more serious.

The captain had only time to transmit "Mayday, Mayday" —and then silence.
The large airliner had crashed into the sea and sank to a depth from which it could never be recovered; there were no survivors.
What an advantage it would be to have a device which would survive the crash, transmit a radio signal, and record all that happened on the airliner for the last thirty minutes of flight!
A Canadian company has developed just such a device.

CRASH POSITION INDICATOR
ACCIDENT DATA RECORDER





In a recent five-year period, there were 197 searches for downed aircraft in Canada. Over 25,000 aircraft hours were expended and 17 of the 197 aircraft were never found. One hundred and forty-five persons are either dead or still missing. In the calendar year 1961, the Civil Air Patrol in the USA searched for a total of 1,374 persons on board 719 lost aircraft. Of these 838 were found alive, 405 were found dead, and 131 people were never located at all. This shocking testimony proves the need for some device to assist in locating missing aircraft.

Also, there are many aircraft crashes each year where there is no difficulty in locating the scene of the crash but since the break-up is so catastrophic it is impossible to determine the reason for the crash. TCA's DC8 which crashed near Montreal last November killing all 118 persons on board is an example of this. If the reason for a crash goes undetermined, corrective action to prevent future occurrences cannot be taken. Consequently the need is established for not only a device which will indicate the scene but also one which will survive the crash and tell what went wrong.

In response to this need a Canadian firm, has developed, after considerable research, a combined Crash Position Indicator - Accident Data Recorder (CPI/ADR). The main difficulty in designing such a device is to develop one which will survive a crash when the aircraft is almost totally destroyed. The solution decided upon employs the "tumbling aerofoil" concept. A very light transmitter and the tape of a data recorder were packaged in thick tough plastic foam forming a solid mass and shaped into a high lift aerofoil. Such a tumbling aerofoil fulfills several functions simultaneously. It serves as a case for the radio transmitter, antenna, batteries and tape which are embedded in the plastic foam. By suitable placement of the centre of gravity, the device can be made to rotate rapidly after release, and thus slow down quickly so that a safe landing speed is reached in a very short distance. Tests have shown that it will slow down from 300 kts to 26 mph in 50 feet. In addition it generates an average lift which curves it away from the wreck. The blanket of plastic foam on all sides protects the components inside from crushing on landing and also acts as an excellent thermal insulator making it possible to keep the batteries above ambient temperature. By keeping the mass loading down to about two pounds per square foot, the device not only performs well in air, but can land safely and operate on any type of terrain, snow, or water. It floats 85 per cent above water and so maintains its internal antenna clear to radiate. It is approximately 20 inches square, 8 inches deep and weighs 4.75 pounds. The shape can be varied so that it will fit the original contours of the aircraft. Thus when fitted to an aircraft it does not cause any additional aerodynamic drag.

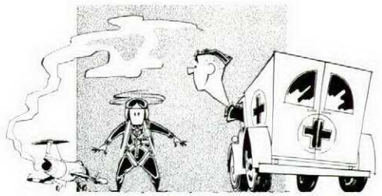
The unit is normally flush-mounted in the tail area of an aircraft and is held in position by a permanent magnet with a bucking coil release. The bucking coil is connected in series with a number of detectors, such as inertial switches, frangible switches, fire detectors, etc. This electrical circuit carries a 10 milliamp circulating current which, if broken as a result of a crash, operates the bucking coil and allows the aerofoil to be ejected into the airstream by means of a spring. The circuit has a very small time constant so that release occurs within milliseconds of detection. If an aircraft were to fly into a mountain at high speed, the unit would be released by the time the nose of the aircraft had crumpled back as far as the cockpit.

The Crash Position Indicator consists of a very lightweight transmitter crystal controlled to operate on 243 mcs. Assuming the altitude of the search aircraft is adequate it has a range of 30 to 50 miles. The unit is powered by a nickel cadmium battery and will operate about 100 hours pulsed transmission, or 50 hours CW. The battery is constantly trickle-charged from the aircraft source until the time of release. Once released the beacon automatically starts transmitting.

The Accident Data Recorder is part of the aircraft and stays with it in the event of a crash. Only the tape is housed in the tumbling aerofoil. The recorder operates any time power is applied to the aircraft and records all radio or interphone transmissions made or received by the pilot. This occupies one channel of the four-channel tape. Each of the other channels can measure up to 32 parameters making a total of 96 in all. The parameters measured vary according to the type of aircraft but include such things as altitude, speed, attitude, acceleration, rpm, engine temperatures and pressures, etc. The tape holds only 30 minutes of information but is continuous so that the last 30 minutes of flight is always on the tape regardless of the time airborne. In the event of an aircraft power failure, the recorder operates for 20 minutes from its own power source. Thus if a CPI/ADR fitted aircraft should crash, not only will locating the scene be greatly facilitated, but also the last 30 minutes of flight will be accurately recorded so that the reason for the crash can be determined.

The RCAF is currently planning to fit all Yukon aircraft with the CPI/ADR and flight trials have already been completed. It is hoped that eventually all high-performance RCAF aircraft will be so equipped. When a new aircraft first comes into service there is always a period of time until all the "bugs" are eliminated. A CPI/ADR should prove a valuable asset in the Tutor program. The Crash Position Indicator is also available without the Data Recorder at considerably less expense. This could be a great boon in locating small civilian aircraft that get lost and crash far from their intended flight path.

No aircrew member looks forward to the day when he may become the victim of an aircraft crash, but it would be comforting for him to know that his chances of survival would be greatly increased by a small radio transmitter that could withstand the crash and lead rescue agencies to him in the shortest possible time. Even if there are no survivors, the recorder tape will most likely reveal what went wrong so that action can be taken to prevent future accidents of the same nature.



NEAR MISS

F/L "Gord" Smith's account of a recent Voodoo sortie from the forward alert base at Val d'Or, tells in stark detail what can happen when too many things go wrong. F/L Smith had the presence of mind and the competence to land his aircraft safely in a snowstorm when all the "aids" had packed up.

The salient feature of this Near Miss is that the pilot's familiarity with the surrounding terrain was his salvation. Since the Voodoo must cruise well above 200 mph and has, at this "slow" speed, a very limited manoeuvreability, the chances would have been remote that the runway could have been sighted in time for a safe approach by someone less familiar with the local landmarks.

In an area where power failures are commonplace, the grossly inadequate capacity of this station to respond to such an ever-present threat, raises some obvious questions.

EVERYTHING WENT WRONG

The scramble for ALPHA HOTEL 03 and 04 came through at approximately 1005 hrs - airborne at 1010 hrs - snow showers forecast to start at 1000 hrs, and down to 1-1/2 miles in snow by 1100 hrs - no sign of them yet - the exercise was on; it felt great to get flying again - have to watch these upper winds, 290/100 plus - target heading and track can be quite different - first run a splash, fuel remaining 8,500 lbs - second run, splash, fuel remaining 6,500 lbs.

DUSTBOWL (North Bay) AH03 - 6,500, RTB (return to base) THIS TIME - we are just over 100nm from base, 03 must be about the same distance as he splashed a target just a few minutes earlier - DUSTBOWL AH04 HAS TIME FOR ONE MORE RUN - this will give 03 time to start recovery and save me having to hold - AH04 DUSTBOWL HAS A TARGET 40 NORTH, YOU ARE PAIRED - perfect, we are heading westerly - this will put us in a good position for a tacan 2 - with runway 18 in use we can go straight in - DUSTBOWL AH04, LATEST BASE WEATHER - just in case there has been a change - AH04 DUSTBOWL, LATEST BASE WEATHER 80⦶100⊕15 (8,000 ft scattered cloud, 10,000 overcast ceiling, visibility 15 miles) - no sweat, let's get this one - third run completed with a bit of a stern chase but in the right direction, 210° - DUSTBOWL, AH04 SPLASH, FUEL REMAINING 4,500, RTB THIS TIME REQUEST CLEARANCE - tacan reads 200/68nm - AH04 DUSTBOWL, YOUR CLEARANCE: VO (Val d'Or) CLEARS 04 TO THE TACAN 2 IP (initial point) TO DESCEND TO AND MAINTAIN 21,000, VO ALTIMETER 30.01 - let's head down slowly and check that weather with VO approach - VO APPROACH, AH04 IN DESCENT TO 21,000, REQUEST LATEST WEATHER - AH04 VO APPROACH, THE LATEST SEQUENCE IS 80⦶100⊕15, WIND SSE 15, YOUR EAT (expected approach time) IS 36, THE PRESENT TIME IS 26 - that's odd, I wonder what the hold-up is? - 03 should be almost down by now - maybe TCA is just off Rouyn - weather holding good, though - by the amount of crab to hold this 189 radial, winds must still be strong from the west - VO APPROACH, AH03 IS BY THE IP OUTBOUND AND OUT OF 20,000 - my gosh, they are late; no sweat though, the weather is holding; no need to divert or I would have to leave now - 4,200 lbs can just comfortably make OW - we're by the IP at 27 - start my holding; have to waste nine minutes - one pattern will do - if we have to hold much longer can do a cloud penetration and come in VFR - AH04 VO APPROACH, YOU ARE CLEARED TO 20,000; THERE MAY BE A SLIGHT DELAY IN YOUR EAT - damn, they always want so much separation - I'll extend this leg another 30 seconds and get back to the IP about 37 then get down by other means if necessary - tacan reads 180/45nm; back we go - even 10° crab wasn't enough - AH04 VO APPROACH, IT HAS JUST STARTED TO SNOW: SPECIAL AT 20 is 80⊕ 6OS (snow) - wouldn't you know it, and another three minutes to the IP; could maybe squeak OW - YB is out because of the freezing drizzle forecast - AH04 VO APPROACH, YOU ARE CLEARED TO THE AIRPORT FOR A TACAN 2 WITH GCA, SNOW IS GETTING THICKER, VIS DOWN TO 1-1/2 MILES NOW. WILL GET A PIREP FROM 03 AS SOON AS HE CHECKS IN FROM GCA.

There we are by the IP at 38, not too bad; down we go, 3,100 fuel - we are committed - AH04 VO APPROACH, 03 REPORTS GROUND VISIBLE FROM 4,000, VIS 1-1/2 MILES IN SNOW, BRAKING ACTION GOOD, YOU ARE CLEARED TO GCA - GCA AH04 IS 16 MILES DESCENDING, STEERING 190 - ROGER 04, GCA HAS GOOD CONTACT - ADVISE LEVEL 3,000 AND COCKPIT CHECK COMPLETE - GCA AH04, LEVEL 3,000 COCKPIT CHECK COMPLETE, RANGE 12 MILES - hell, why don't they answer - there's the ground; vis is poor, though - speed back to 210 knots - try them again; may have to do a tacan on my own - tacan just broke lock; try tower on 243; no joy - a power failure, just our luck, fuel 2,800 - I'm going down to 1,800 indicated; that's about 800 above ground - vis a bit better, about 1 to 1-1/2 miles - there is the lake north of town with the mine on it - maintain 190°; it was a good heading before the tacan packed up - now, find the town and the road to the airport; it's the only way in - where is the hospital? - it should be a good landmark - there's the town, the road heading south but no hospital - gosh, everything looks so white you can't pick out anything - we are west of the town; better fly south a bit further - turn left now, heading 100° - there is the fire ranger's tower; the airport should be on the nose - there it is; we are right over the button of 36, never hack a right turn to try and land downwind - the vis is too poor to keep the field visual and no landmarks to the south, either - fly east a bit further; now turn north - there's the Sullivan mine; watch for the road to town - AH04 VO TOWER HOW DO YOU READ ON 243? - well, they are back on the air - AH04 VO TOWER WE ARE ON AUXILIARY POWER BUT NO GCA, NO TACAN; WILL TRY TO GIVE YOU APPROACH AND RWY LIGHTS: NO OTHER TRAFFIC, YOU ARE CLEARED TO THE AIRPORT - there is the road, a 180 turn should do it - 1,800 lbs left - can try one more quick circuit if I miss on this one - cinch my chute tighter in case we have to eject - maybe better to go just north of town; more open ground and farms there - there's the town, now find the hospital and the road - damn ADF won't help much this close in; if I remember, the antennas are way west of the station - YOU SEE THE HOSPITAL, NAV? - right, got it and there is the road we want - we're almost there, now - flaps down and kill my speed - must have time to see and act - not too slow, though, or I won't be able to turn this thing if I have to - I think I have the runway - there, the approach lights just came on - AH04 VO TOWER, THE LIGHTS ARE ON NOW, I THINK - VO TOWER AH04, ROGER WE HAVE THE FIELD VISUAL, REQUEST LANDING CLEARANCE - touch it down easy - drag chute now - aerodynamic braking - nose down - nose wheel steering - quite a bit of snow on the runway but braking action is good - AH04 VO TOWER, YOU ARE DOWN AT 50, CLEARED TO THE RAMP - OUT.

CROSSED LINES

The Dakota was signed out ready for airtest after a 250-hour inspection. The pilot checked all items serviceable in accordance with the Dakota checklist. At the completion of the pre-takeoff run-up, oil temperatures were: port 70°C, starboard 75°C. As this is within limits, the captain went ahead with the take-off.

During the climb, both oil temperatures climbed steadily until the port read 95°C and the starboard 98°C. At 1000 feet the captain decided to abort the remainder of the airtest and obtained clearance to land on the nearest available runway.

The temperatures stayed very close to 100°C and at low cruise, the oil pressure began to fall. Just prior to landing, the port had fallen to 40 psi and starboard 50 psi. After landing, the aircraft was shut down and towed to the hangar. Technical investigation revealed that the oil lines (input and output) to the thermostatic control valves were crossed and connected incorrectly so that there was no flow of oil to the cooler. This was an extremely serious error because if the aircraft had taken off in IFR weather conditions, both engines might have seized before a safe landing could have been made. The technician responsible was disciplined.

The old "Dak" has been around for a long time and there have been few (if any) occurrences of this nature. However, the consequences of such an error could be catastrophic and extra care is warranted. Although the EO does not specifically state that the oil lines must be tagged when they are disconnected, it just might be a good idea anyway.

ARRIVALS and DEPARTURES

"Profit by the mistakes of others—
there is no need to make them yourself."

CF101B, FIELD REPORT A CF101B was being flown from its alert base to home plate on a routine mission. A normal RAPCON (radar approach control) vectored descent and GCA was made at home base. The ceiling was about 300 feet, with $\frac{3}{4}$ mile visibility in rain.

A diversionary fuel load (6000 lbs) was carried necessitating an approach speed of about 185 kts. The 90° cross-wind from the starboard was 9 mph.

The pilot saw the runway lights and took over visually around GCA minima. He stated that while glancing down to position his hand on the drag-chute handle, the aircraft picked up a port drift. The tire marks on the runway showed that the aircraft touched down 37 feet from left edge of the runway and proceeded on the landing roll in the same line as the flight path. The pilot was unable to control the direction of the landing roll and ran off the port side of the runway. The aircraft carried for approximately 4000 feet on the grass sustaining slight damage when the port wing leading edge struck a runway distance marker.

It was after the aircraft had slowed to taxi speed that the pilot attempted to return to the runway. In the soft rain-soaked ground near the runway's edge the nosewheel dug in and broke off. The Voodoo came to rest with its nose perched on the edge of the runway.

The Board concluded that the pilot employed "poor landing technique" in permitting the aircraft to drift on round-out. Further, in the attempt to return to the runway the aircraft sustained damage to the nosewheel strut, the underside of the nose section, both ailerons, and several other items.

This accident points out strikingly that in landing an aircraft on a wet runway, pilots must be prepared for moments of loss of steering and braking due to "aquaplaning". (See Flight Comment Jan-Feb 1964). The pilot showed the presence of mind, however, to ensure that the aircraft was held straight during the landing roll preventing what could have been a very serious crash.

It appears to be "poor landing technique", but had this experienced and competent officer been subjected to other contributory factors associated with an arrival in bad WX from a "stay" at an outpost alert base after irritating delays?

It's worth thinking about.

T33, BANG! A T33 was on a low-level contour profile mission. The student was flying on instruments under the hood receiving simulated radar information from the instructor. The first two legs of the exercise were uneventful. On the third leg, running in on the target, at the push up point, at 420 IAS, 700 feet above the ground, the instructor took control to allow the student to see his progress over the target.

Just as the instructor took over, the canopy inadvertently jettisoned causing his head to slam against the seat head rest, rendering him semi-conscious. The instructor momentarily dazed, thought that the aircraft had exploded and so he ejected. The student in the rear seat, not being able to see due to loss of his hard hat, and not knowing why the instructor ejected, slowed the aircraft down, climbed to 3000 feet and also ejected. Both pilots landed successfully and were picked up by helicopter and flown back to base.

The investigation revealed that the external canopy jettison rescue door inadvertently opened in flight. The very high airspeed and dynamic pressure pulled the jettison handle from its clip on the door causing the lanyard to pull out and jettison the canopy.

As a result of the accident a Flight Safety Bulletin has been sent to all T33 units to ensure that aircrew give special attention to this door when conducting their external check. Also Air Materiel Command have engineered a modification to ensure positive storage of the handle and cable in the door well.

T33, CROSSED WIRES At the completion of the landing roll in a T33, the pilot accidentally touched the "tip tank jettison" button on the control column and was surprised when the tanks actually jettisoned. The arming switches in both cockpits were "off".

Investigation disclosed that in a modification which repositioned the rear cockpit switch, a technician reversed the installation. Thus with the switch cover down and the switch in the off position on the panel, the circuit was closed. To add to this faulty maintenance job, the technician omitted the special instruction to make sure the jettison circuit checked serviceable.

A special inspection has been carried out on all UE T33 aircraft to prevent a recurrence. This incident emphasizes the absolute necessity of conducting functional tests after modification.

T33, CARGO EXPRESS At the end of a flight from St Hubert to the Lakehead, the nosewheel of a T33 did not lower during gear extension. The pilot advised the tower of the emergency and climbed to 3000 ft. He reselected the gear several times at 130 K, then pulled positive and negative "G", and yawed the aircraft at 190 K, all with no result. He then reduced speed to 125 K, and tried the emergency method of lowering the undercarriage. This had no effect either so he flew in the vicinity of the airfield for about ten minutes reducing fuel. With a load of approximately fifty gallons remaining, the pilot landed holding the nosewheel off as long as possible.

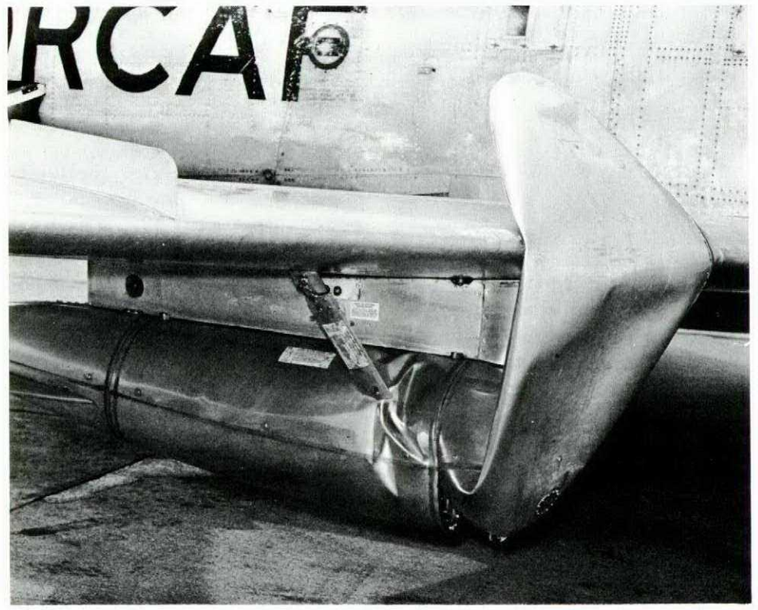
After shutdown the pilot climbed out and unloaded several objects including some helicopter tools which he had been carrying in the nose compartment. These had been loaded at St Hubert for delivery to Cold Lake. They were wrapped in wadding, taped up, and installed on the left side of the nose in the space vacated by the left gun. The pilot supervised the loading and considered the parts to be wedged in safely. During the descent, through turbulent cloud, one part evidently became dislodged and worked its way through the canvas dust cover. When the gear was selected down, it jammed and prevented the nosewheel from lowering. It was discovered in this position and could not be removed manually.

Although the pilot made a very good landing with only slight damage, there was no alternative but to assess the accident as "Pilot Error". However, this accident was caused by the pilot doing something which most other T33 pilots have probably done at one time or another. A luggage carrier should be used when transporting small objects in a T33. If it is necessary to use the nose compartment, it is the pilot's responsibility to ensure that all items are properly stowed and that the dust cover fasteners are secured.

F86, POOR BRIEFING Following a bombing training mission the 4-plane "Lima" section joined up for a formation return to base at low level. During a pull-up manoeuvre in box formation the aircraft on the port collided with the lead. The wingman's starboard drop tank struck the lead's port aileron. Both aircraft returned to base safely.

Primary cause was the overlapping of aircraft in formation, and hence the wingman was at fault. The lead had briefed for $\frac{1}{2}$ wingspan clearance between wing-tips—it was, however, misunderstood and construed as $\frac{1}{2}$ wing-span overlap by the NATO student pilot. Quite a difference.

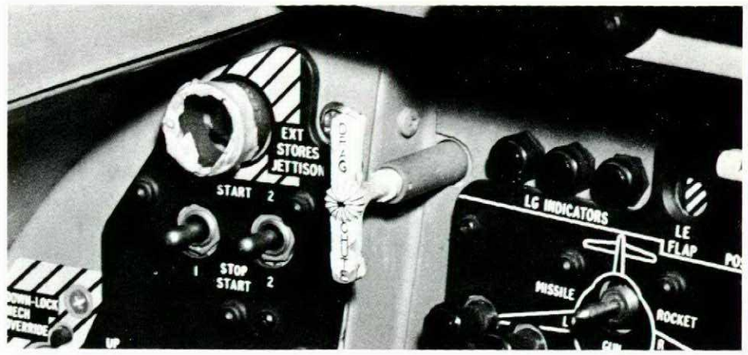
The spoken work is none too reliable at best of times; a picture or diagram would, in this case, have been worth a thousand words.



CF104, PANIC BUTTON On a night landing the pilot reached for the drag chute handle and pulled . . . "A bright flash then illuminated the cockpit and a loud noise was heard".

It appears certain that the pilot, in positioning his hand for the drag-chute deployment, ruptured the nearby "Panic" jettison button paper cover and dumped his tip tanks.

Have you recently conducted a "blindfolded" cockpit test of the aircraft you fly?



C119, FUEL LEAK A pilot in a C119 discovered fuel leaking out of the engine nacelle cowlings aft of the cowl gills and behind the fire wall on the starboard engine, directly in line with its inboard exhaust. Because of a fire hazard he feathered the engine. There had been no fluctuation of fuel pressure or fuel flow so he could not determine in the air exactly from where the fuel was leaking. All unnecessary electrical systems were shut off and the APP started, but the generator was left on stand-by. A gradual descent was made and a normal single-engine landing. After the cowling was removed, it was discovered that the heater solenoid was leaking at approximately one-half a cup of fuel per minute.

The immediate cause of the fuel leak was careless maintenance—the use of an improper connector between the solenoid valve and the filter. The result was damage to threads and subsequent fuel leak. The solenoid valve, fuel filter and supporting bracket had been loosened during the last periodic check to replace a filter outlet fitting and apparently they were not tightened. The use of the incorrect solenoid valve and connecting fittings were apparently not discovered, the former being almost identical in appearance with the proper fitting and the assembly was largely concealed by the mounting bracket. It is conjectured that the tenuous grip between the dissimilar threads of the incorrect nipple and valve was weakened by the maintenance work leading to the thread failure and leakage.

All other units have been inspected and the subject parts found to be correctly installed. Since the basic cause of the incident was probably ignorance of thread characteristic by the personnel at the unit, steps have been taken to refresh the knowledge of all aircraft technicians on thread forms, fittings, etc, by means of a short course on the subject.

C119, WHY CHECK? The crew of a C119 noticed black smoke coming from the number three power recovery turbine (PRT). Oil consumption was not excessive and the flight was completed in normal cruise power.

Following a replacement of the PRT at the base of arrival, a pre-takeoff run-up showed the port engine developing only 1900 rpm. The takeoff had to be aborted for insufficient power from the port engine. The engine seized on shutdown from internal damage; the oil was found contaminated and probably had caused the initial PRT failure.

While materiel failure is the cause, the crewman erred in not checking the filters and magnetic plug associated with PRT changes. The pilot should have regarded the low rpm on run-up as rendering the already suspect port engine as unacceptable.

In the mountainous area of this attempted takeoff, a power failure could well have ended in tragedy; lives and materiel loss is a high price to pay for the "press on" mentality of some aircraft captains.

EXPEDITOR, OVERSHOOT? A pilot instructor was giving dual night circuits to two students in an Expeditor. During a simulated single engine landing with full flap and without lights, the final approach was normal except that the airspeed was slightly low and the rudder trim was not accurately set for the power settings and airspeed.

The aircraft touched down and bounced quite hard. The student commenced an overshoot, and either in haste or in error advanced only the right throttle, or advanced it well in advance of the left. At almost the same time the cross-wind from the right commenced to lift the starboard wing. The instructor took control but before he could level the aircraft, the port wing struck the runway, jamming the aileron. Both throttles were closed and the aircraft landed straight ahead in the infield to the left of the runway.

The primary cause of this accident is "Aircrew". The student was not properly briefed on the correct procedure in case a mislanding should occur during single-engine practice. The instructor should also have been aware of the danger of allowing the student to continue an asymmetric approach at low airspeed and with the aircraft not properly trimmed, particularly at night and without the use of landing lights. In any event he should have also been prepared to take control in time to prevent an accident. It is reasonable to assume that had the landing lights been used during this approach, the pilots could have more easily seen the dangerous situation developing and would probably have taken appropriate corrective action. Instructors are expected to exercise discretion in the number and nature of aircraft emergencies that should be simulated at any one time.

CHIPMUNK, WILL THERE ALWAYS BE A DITCH The takeoff can best be described as a hairy ride . . . "the student attempted to straighten the aircraft . . . with the inherent swing to the right . . . large swing to the right . . . tail came up . . . swing even more . . . full left rudder . . . skidded sideways a couple of times . . . we were heading off the runway at a sharp angle . . .". The instructor took control in the latter phases of the takeoff and decided to get the aircraft airborne.

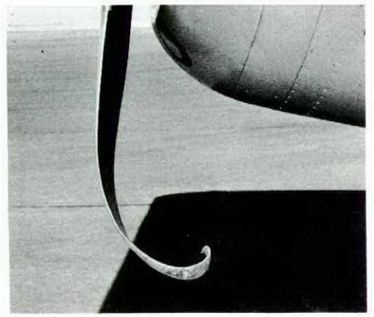
After a prolonged ground run through tall grass, the aircraft finally became airborne, striking the edge of a ditch. The aircraft "was very tail-heavy on the controls"—in fact, extensive damage to the tail-wheel area had occurred at the lip of the drainage ditch. The aircraft was landed safely.

The instructor's inexperience contributed to his permitting this out-of-control situation to develop, but what of the grass and the ditch? Surely it's an axiom by now: "Ditches in airfields will sooner or later be run into".

HARVARD, HEARD THIS ONE BEFORE? A student pilot was taxiing back to the ramp at the completion of a trip in a Harvard. The tower tried to contact him on ground frequency to warn him of a Tutor and a C45 taxiing out to take off. The tower could not contact him on the frequency usually used but finally contacted him on 139.42 at about the same time as the student noticed the Tutor. He applied brakes so suddenly that the aircraft came up on its nose damaging the propeller.

The accident was assessed as Aircrew—poor technique and carelessness. The student pilot was taxiing too fast and not maintaining an adequate lookout for other aircraft. Listening out on the wrong frequency was a contributory cause.

This accident is a reminder that pilots must think ahead and have their aircraft under control at all times.



HARVARD, NEGLECTS FUEL SAFETY FACTOR A student and instructor took off in a Harvard with 80 gallons of fuel. After an instrument trip which lasted for an hour and a half, the student was instructed to solo for one hour and 15 minutes. He was advised to watch the fuel as there was about 35 gallons. This the student confirmed on pre-takeoff check.

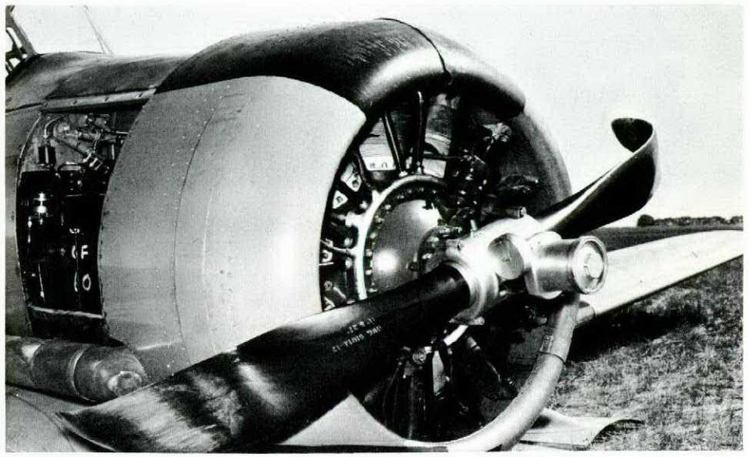
The student took off and practised upper air work for about 40 minutes. During the trip his fuel had been selected to reserve and coming back it registered about 10 gallons. He switched to the right tank which was registering between 12 and 15 gallons and joined the circuit for some practice touch-and-go landings. During his fourth circuit when he did a downwind check he saw that the fuel in the reserve was about 10 gallons and in the right approximately 6 gallons. He decided to do one more touch-and-go, so he left the fuel on the right tank, intending to use the reserve tank for the final landing.

The approach and touchdown were normal and on overshoot he had reached a height of about 20 feet and

his wheels had just indicated up and locked when the fuel low pressure warning light came on and simultaneously the engine stopped. He had enough time to declare an emergency—shut off his mag switches and fuel, and land straight ahead. The aircraft stopped about 100 feet off the end of the runway with the wheels up.

The cause of the accident was assessed as Aircrew-poor airmanship and judgement on the part of the student. The instructor was also criticized for allowing the second trip without adequate regard for the fuel safety factor. A contributory factor was an unreliable fuel gauge on the right tank which read approximately five gallons when empty.

Corrective action has been implemented to preclude such accidents. Instructors are to make doubly sure that all students know the minimum fuel requirements for landing and are made aware of the possible errors in fuel gauge indications. They should also drill the correct action to take when the low fuel pressure light illuminates. Although it might not have helped in this case, subsequent questioning revealed the student did not know that switching fuel tanks is the first action to take.



LETTERS TO THE EDITOR

Dear Sir:

Your "Fire In the Hole" inset in the Nov-Dec issue is the "C5" and not a North Star. Correct?

S/L JC Reid
CO RCAF Stn Pagwa

Correct - Ed

Dear Sir:

I must share with F/L Dick Ainsley, some mild embarrassment at the results of your "Letters to the Editor" column in the Nov - Dec issue.

Seeing G/C before my name made me rush immediately to collect back copies of green sheets, thinking that I may have overlooked an important entry. Having by now strained my eyes to the limit, I am convinced that this must have been a typographical error,

As a final thought, to prevent having to publish a correction, would you care to speak to Personnel?

still a W/C,
GW Reid

The above letter was addressed to the Editor, Roundel, and was minuted to us with the terse remark that Roundel does not make such mistakes! We checked with Personnel Branch about promoting W/C Reid and they bluntly stated that they cannot promote anyone to the rank of Group Captain who does not know the difference between Roundel and Flight Comment.

We have no choice, then, but to publish a correction-Ed.

THE HAPPY HOMING BIRD - DOG

This bird is not confined to one type alone for by skilful cross-breeding has scattered its homing instincts to various species. Its most significant feature is its long needle-like nose that points in the direction to which it goes. Being a timid creature it becomes confused during storms and other circumstances and will often follow its nose until exhausted; finally seeking rest, it thunders down collapsing most anywhere with an ungainly disarray of feathers.

CALL: NEEDLEONNOSE NEEDLEONNOSE IDON'TGIVEADAMNWHERETHEAIRCRAFTGOES

Contributed by: S/L TR Wheler

MIGRATIOUS!

Their vacations over, the birds will soon return to Canada—bringing with them the BIRD STRIKE problem. This year will see a stepped-up campaign by the RCAF to keep birds away from our airports. Most stations will be using one or more of these techniques:

- brush and marsh areas eliminated
- bird frighteners—distress calls
- noise makers—shotguns, etc
- insect, worm and food control

Birds are here to stay—but our airfields are definitely not strictly for the birds!

- ▶ don't attempt a takeoff with birds on—or near—the runway
- ▶ don't attempt to out-manoeuvre a bird during critical takeoff speed regions
- ▶ don't attempt to dive below a bird's line of flight—the bird will normally dive, too.