FLIGHT COMMENT

ROYAL CANADIAN AIR FORCE

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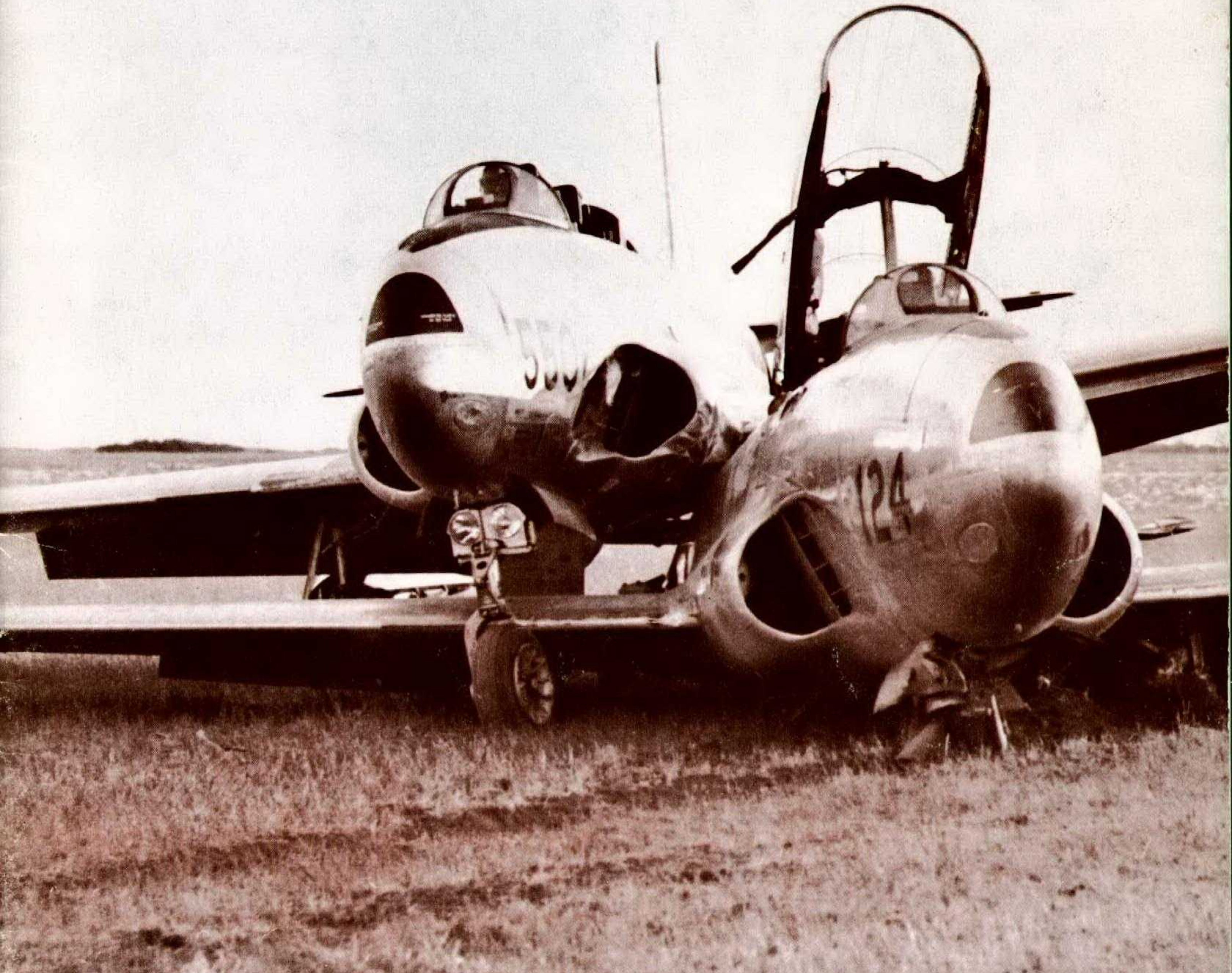


MARCH • APRIL • 1960

WOULD YOU FLY THIS AIRCRAFT?

An aircraft is in for inspection or repair and you have been given a specific job to do. This job starts with checking the appropriate forms to determine exactly what has to be done.

Then comes the technical operations; open it up, clean it up, inspect it, select the right tools, repair or replace it, adjust it, check it, lock it up and leave it clean. Next comes the operation that will contribute the most to flight safety— checking the whole job through again to make doubly sure that everything is up to "specs" and clean.

It's a good job so you pack up the tools. You make sure you have not left a single foreign object behind. To finish the job you write it up. This is part of the job. In the long run, it will save much time and trouble, may even prevent an accident.

The aircraft is rolled out and is ready to fly. Your moment of truth has arrived. Would you fly it?

LAC J. H. LAWRENCE

LAC J.H. Lawrence was detailed to carry out a primary inspection on a North Star. His inspection was thorough and, as a result, he discovered a hair-line fracture in the main landing gear latch assembly.

By being alert to the smallest detail of his job, LAC Lawrence undoubtedly averted a serious accident.

LAC A. J. KNIGHT

It was Sunday and a T-33 was cruising at 37,000 feet one minute west of Neepawa. The pilot in the rear seat had only 15 hours on type and had not been properly briefed on the new series 600 ejection equipment. While making himself more comfortable, he accidentally blew the canopy.

The captain contacted Portage tower and declared an emergency. Flying and navigating were difficult and the assistance from Portage, given in a calm, confident manner, was most welcome.

When safely on the ground the T-33's crew found that all crash services had been alerted and were standing by and that nothing that could have been done to ensure their safe arrival had been neglected.

The man they thanked for this assistance is LAC A.J. Knight, ACOp, who was Duty "B" Stand in the tower when the incident occurred. With no controller immediately available, LAC Knight had assessed the situation and taken all possible action to help.

A "Good Show" to LAC Knight for calmness, commonsense, thorough knowledge of emergency procedures and his ability to take immediate action when it was required.

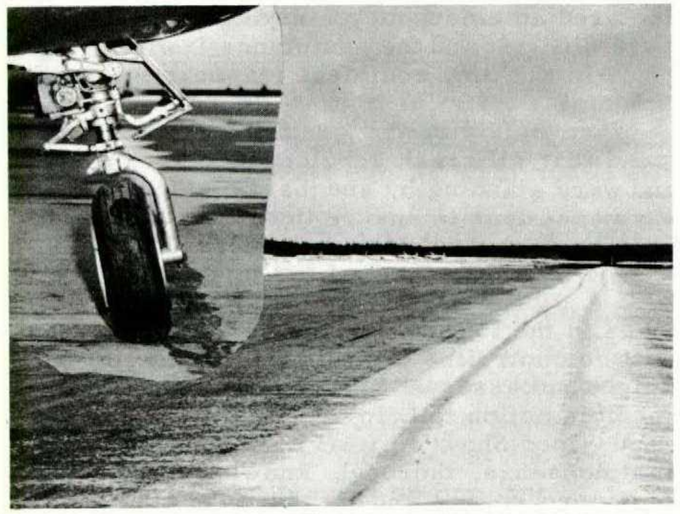
TO FOAM OR NOT TO FOAM

by S/L G. L. Sheahan

When an aircraft makes a forced landing it is news. When a foam strip has been laid down on the runway before the aircraft lands it's even bigger news. Publicity has glorified the technique of using foam out of all proportion to the proved value that is derived from its use.

Analysis of the limited available data indicates that the benefits derived from the use of foam are to some degree conjecture. To evaluate the technique it is necessary to apply the small amount of test data, the result of USN testing, to analyze impact behaviour from actual forced landings where foam has and has not been used, and to relate the use of foam

The undercarriage was unserviceable so the aircraft was landed wheels-up on foam.



Length of runway or wind condition dictate where to start the foam.

for this purpose to its known qualities as a fire extinguishing medium.

There are three reasons why foam is used: one, to reduce the fire hazard; two, to reduce the risk of injury to the crew; and three, to reduce the damage to the aircraft.

The RCAF has experienced 93 cases in which a jet aircraft landed with either all wheels up, nosewheel unsafe or cocked, or nosewheel down and one or both main gear unsafe. In 81 cases foam was not used; in 12 cases foam was used. It is important to note that in all 93 cases there was no injury to the aircrew.

Of thirteen aircraft landed with cocked nosewheels: six landed without foam, 3 T-33s, 2 Sabres and 1 CF100, and the damage categories were 1 major, 2 minor and 3 incidents; seven aircraft, 2 T-33s, 4 Sabres and 1 CF100 landed with foam and the damage assessments were 3 minor, 3 incidents and one not damaged.

There were 40 landings in which the nosewheel would not lock down and the aircraft landed on the main gear. Thirty-seven aircraft were landed without a foam strip and 3 aircraft with a foam strip. Of the 37 aircraft that did not use foam, 8 suffered major damage, and 29 suffered minor damage. The three landings in which foam was used, all suffered minor damage. There were 3 cases of fire when foam was not used, but the fires were easily extinguished.

In 12 landings one or both main gear were unsafe and the aircraft were landed on the nose gear and one of the main wheels. In one landing the nosewheel only was locked down. The results were 3 cases of major damage, 8 of minor, and one incident. There were no fires.

There were 27 wheels-up landings. Some of these landings were unintentional, but for purposes of comparison the results can be used. In all cases but one, foam was not used. In the one case where foam was used minor damage resulted. The 26 other landings resulted in 8 majors, 17 minors, and one incident. The one "A" category damage that resulted was caused by a heavy landing, due to a control seizure just prior to touchdown. Two small fires resulted but they were extinguished easily.

As a result of this survey two factors are predominant. In all cases where the aircraft suffered "A" or "B" category damage, landing technique was poor. When one aircraft had hydraulic failure the pilot did not deboost and the controls seized just prior to landing. In many cases the pilot held the nose off too long and when it dropped to the runway extensive damage resulted. This points out that it is better to lower the nose of the aircraft to the runway before control is lost. The remainder of the major damage cases were the result of heavy landings.

In all cases where a good approach and touchdown were made in any configuration the damage was kept to a minimum.

While the number of cases where foam was used is small, it would appear that a combination of good technique and a foam strip helps to reduce damage. There is one primary consideration; under no circumstances should a foam strip be applied to a runway surface if time or physical conditions prevent an adequate supply of foam being available before the landing is attempted. As pointed out earlier in this article, in 93 landings, fire resulted only in 5 cases. While the fires were small they were easily extinguished because foam was available to fight the fire. If foam had not been available, in all probability the small fires would have become conflagrations.

When foam is used there are several factors that must be taken into account:

(a) The time element. There must be time to lay the foam strip and recharge the vehicle. If not, do not use foam.

(b) The weather conditions. If the runway is wet and it is raining, foam does not add too much. In laying a foam strip the foam is used as a trapping agent to hold the moisture in the landing path. If it is raining, the moisture is already present. In freezing conditions "set-up" foam will not provide any lubrication or fire protection. In such conditions the use of water may be considered.

(c) The fire hazard. From all that is known of the fire suppression quality of foam, it is clear that a foam coated runway would reduce the friction spark hazard but would have no appreciable effect on the fire hazard of spilt fuel if there is a source of ignition above the foam blanket.

(d) The length and width of the strip. The length of the strip is difficult to determine from the data available. The USN gives a rule of thumb, one half the distance for a normal landing. In one case, however, an aircraft is known to have skidded 4500 feet. As to width, the wider the better. When the nozzles of our present equipment are modified, a strip 6 feet wide can be laid in one run down the runway. Six to twelve or eighteen feet wide is a good guide for jet aircraft. For multi-engined transport aircraft a strip as wide as the outboard engines plus 20 feet is recommended.

(e) Where to start the foam strip. Again a rule of thumb. If the runway is under 6000 feet, start the strip 500 feet from the landing end. If the runway is over 7500 feet start the strip 1000 feet from the end of the runway, otherwise consider the wind conditions. It is important to note that when landing wheels-up there is a longer float than normal occasioned by the added ground effect.

(f) The braking action. From what is known to date there is no significant effect on normal braking action. The estimate is a loss of 3%.

(g) Nature of the emergency. The actual nature of the emergency whether the aircraft cannot lower the main gear, whether one gear is down and cannot be retracted, whether one or more tires or wheels have been damaged, whether the nosewheel is cocked, or a combination of these circumstances dictates whether foam should be used or not. It has been found that if the aircraft, because of the particular emergency, is going to swing either port or starboard it is impossible to anticipate the swing path of the aircraft. In this situation the value of using foam is lost.

(h) Operational implications. If an aircraft is to be forced landed the laying of a foam strip will not hamper operations any more than a normal forced landing when foam is not used. The aircraft will obstruct the runway in any case. There is one consideration and that is if the aircraft is landing in the wheels-up configuration, it may be feasible to use other than the main runway. The landing run will be reduced and if a shorter or out-of-wind runway can be used the main runway will be clear for normal operations.

In summary, there are four possible benefits to be derived from foaming a runway in the event of a forced landing:

(a) The foam will reduce the extent of damage to an aircraft which is forced to make certain types of emergency landings.

(b) A foam coated runway will reduce the co-efficient of friction and thus decrease the deceleration force imposed on the aircraft and its occupant.

(c) The foam will reduce the friction spark hazard which is known to exist on dry runways and which constitutes a possible ignition source.

(d) A foam coated runway will reduce the extent of the fire hazard in the event of a fuel spill following impact damages to an aircraft's fuel system.

FUEL FOR FLIGHT

by S/L A. C. Drolet

Much has been said and written over the past few years on the subject of aviation fuel and its relation to safe flight. It cannot be over-emphasized, however, that aircraft fuel is the "life-blood" which provides energy for our aircraft. Without this materiel an aircraft isn't going to fly, and if the fuel is contaminated a decrease or even a complete loss of power will result. The consequences may be fatal.

Our handling of fuel has progressed from the barrel, hand pump and chamois lined funnel, to the modern fuel tender, huge storage tanks, pit and hydrant systems with their elaborate valving, metering, water separation and filtration devices. The procurement of and proper handling of aircraft fuel within the RCAF is really big business. The annual cost is many million of dollars; therefore, we must approach fuel handling with more than five cents worth of thought.

With the tremendously rapid technological progress made in recent years, especially since the advent of jet aircraft and relevant turbo fuels, it is logical that all concerned with the manufacture and handling of aircraft fuel should be constantly obliged to improve quality and devise better handling methods and procedures. Experience indicates that a much closer liaison between manufacturers of the product, quality control personnel, storage personnel and the user is needed if the desired standard of purity is to be met.

The standard of cleanliness desired by the RCAF to ensure good performance and maximum flight safety is:

- Solids—particle size, 5 microns (1/5000 of an inch) and maximum weight of solid materiel per gallon, 2 milligrams. (Tap water contains approximately 500 milligrams per gallon.)
- Water—the fuel must be clear and free from any suspended water, other than dissolved.
- Filter Performance—filter must be capable of retaining 97%, by weight, of all solid particles up to 5 microns in size.

To ensure that this standard is achieved and maintained, three requirements are essential: one—trained and alert personnel, properly and constantly supervised; two—clear, correct, complete, and enforced orders and instructions; and three—adequate and well maintained storage facilities and delivery equipment.

Aircraft fuel handling at RCAF units is the responsibility of four individual sections:

- Supply - responsible for the procurement, receipt, storage, quality and quantity checks at bulk compounds, operation of pumphouse and filtering equipment, dispensing of fuels to refuelling tenders.
- Construction Engineering - responsible for the maintenance of bulk compound, pipe lines, pumphouse, filtering and dispensing equipment.
- Mobile Equipment - responsible for the operation and maintenance of refuelling tenders, including tender filtering and water-stripping system.
- Aircraft Maintenance - responsible for the refuelling and defuelling of aircraft and the operation and maintenance of aircraft fuel systems.

The techniques and procedures used by these four agencies must be co-ordinated if safe and efficient operation of aircraft fuel handling systems is to be assured. This is accomplished by assigning responsibility to officers at Air Force Headquarters, Command Headquarters and at each flying unit to ensure enforcement and control of aircraft fuel requirements. The terms of reference for officers performing these duties are sufficiently comprehensive to enable them to watch over every step in the long and complicated process.

To keep instruction on handling modern aircraft fuels available and up-to-date, the RCAF formed a POL Handling School at Station Saskatoon under the supervision of Training Command Headquarters. The first course commenced on 20 May 1958. Approximately 600 students of all ranks have graduated from this school to date. Arrangements are now being made to extend the course given by the school at Saskatoon to include all aircraft fluids. To supplement training at Saskatoon, a planned training program at unit level is essential. This program should emphasize the need for constant care, correct maintenance, and proper operation of equipment. This training might fit in well with trade advancement arrangements.

To avoid confusion between the various trades concerned with POL handling it is essential that all orders and instructions on the subject be complete, correct and free from conflict between trades. Detailed orders and instructions for each trade concerned should be contained in the medium appropriate to that trade. If overlapping of duties or procedures cannot be avoided entirely, the relevant CAP or EO must be referred to without elaboration in the orders or instructions of the secondary trade or trades.

Where it has not already been done, it is strongly recommended that a POL Handling and Quality Control Handbook be made up and made available to all personnel at CHQ and flying stations associated with POL handling. The handbook should contain the relevant RCAF orders and instructions, complemented by manufacturer's manuals appropriate to the equipment in use. Any supplementary instructions issued by CHQs and units should be added to the handbook.

Not only do we have to worry about clean, dry fuel, but we must remember all petroleum products are dangerous. We must strictly observe all safety rules in handling to prevent explosions and fires. Although aircraft fuels are highly combustible, the fire hazard involved in their handling can be largely eliminated if proper precautions are taken. The hazards involved in the handling of gasoline are common knowledge, however, it should be remembered that handling and storing of turbo fuel presents equal danger. For example: the explosive power of one pound of Nitro is 3,200 BTU; of TNT is 6,500 BTU; of dynamite is 2,500 BTU; and of gasoline is 19,000 BTU. The explosive power of one gallon of gasoline or turbo fuel is equal to 85 lbs of dynamite—212,500 BTU.

Is it not reasonable then that fuel should be treated with respect?

All personnel in the RCAF who handle aircraft fuels must be familiar with the proper operation and use of fire fighting equipment. Fires are classified into three principle groups according to the combustible material burning. Personnel must know the proper extinguisher to use to combat each type of fire effectively and safely. In addition, personnel must exercise caution to safeguard against health hazards resulting from inhalation of vapours or skin contact with petroleum products.

DON'T FORGET!

The most reliable engines, the strongest airframes, the best trained pilots and the most skillful navigators are not going to complete the mission unless they have clean, dry fuel in the tanks. Filling the tanks with such fuel is a multi-million dollar business. Give it more than five cents worth of thought.

TOO MANY RADIOS

Home and portable radio receivers are often capable of transmitting as well as they receive, and unintentionally too. In World War II unknowing radio listeners on merchant ships at sea sometimes provided U-boats with useful bearings while tuned to the World Series. Now, according to a FSF Bulletin an airline reports it has experienced interference with its VHF nav gear, traced to a passenger's portable radio, and has cautioned its cabin personnel to be on the watch for such radios in use.

(See CAP 100, Article 105.23).

USN: Approach

THIS IS MY LIFE

by
Sikorsky Helicopter 9601
As told to S/L T. Wallnutt

Most notable characters, when they feel they have reached a venerable position in life, contribute to posterity by publishing their memoirs. I, Helicopter Sikorsky 51, RCAF designation H5, registration number 9601 have attained this position. My memoirs will provide a word to the wise (pilots). You see, I am the oldest helicopter in the Service, mainly because I was the first one owned by the RCAF. Most important though, I have the longest accident record of any helicopter in the RCAF.

At this moment one of the Inspectors of Accidents at DFS is closing my sixth accident file, no incidents mind you—all accidents—and some involving extensive damage. The latest one was caused by my pilot trying to squeeze me down into a narrow clearing in the woods and whacking my rotors unceremoniously against a dead tree. My injuries were given Category "D"—all my rotor blades were replaced and my engine was changed.

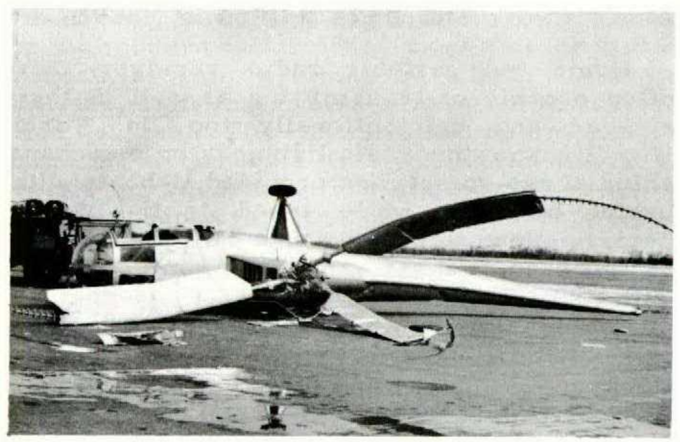
Actually, my life in recent years has been quite peaceful; this was my first accident in seven years—the last one happened in June 1952. On that occasion my pilot simply let me get out of control on takeoff, and I immediately crashed suffering Category "C". After takeoff he neglected to let me hover for a moment to ensure control before assuming forward flight.

When I look back over my twelve years of life I see that my real misfortunes took place in my youth—the first four years of my life were the hectic ones. In fact, at some time in every one of those terrible years I was being repaired and rebuilt following a major catastrophe.

My first accident occurred no less than one month after I left the Sikorsky factory at Bridgeport, Connecticut, in February 1947. My pilot ferried me across the Canadian border to Trenton. For several weeks I was the centre of interest. I was beginning to like Trenton and to trust my pilot. Then, on a practice autorotation he flared me a little too much and my tail rotor blades touched the ground and flew to pieces. Without my tail rotor I lost directional control and spun violently until I crashed. It was years before I could forgive my pilot's error in judgement. For awhile I thought I was doomed to the scrapheap. (I have some pictures here.) However, thanks to the wise engineers I was spared.

The following year I suffered another accident during a practice autorotation landing. This time the pilot, after flaring me, applied coarse collective pitch to break the descent, but he erred in retaining the cyclic pitch control in the aft position. The result was a loss of rpm and a condition known to all pilots as "power settling." I hit the ground hard getting thoroughly shaken; my nosewheel was damaged too.

In my third year of life I was damaged during a landing accident in bush country. My port wheel dropped into a depression on a gentle slope. The pilot applied power to prevent my toppling, but my somewhat protruding tail tangled with a tree.



1st accident, March 1947.

4th accident, August 1950.

Finally, I completed the trials of my youth with my second major accident, and once again I faced the prospect of being written off. The year was 1950 and to add insults to my injuries I was subjected to the indignity of crashing in an air show in front of hundreds of eager spectators. This time my pilot landed with drift in a crosswind and to avoid drifting into the crowd he forced me on to the ground on one wheel. I toppled over beating the ground furiously with my rotors as if to stave off the crippling disaster. When the dust settled and the silent crowd resumed its murmur, there I lay, battered and torn.

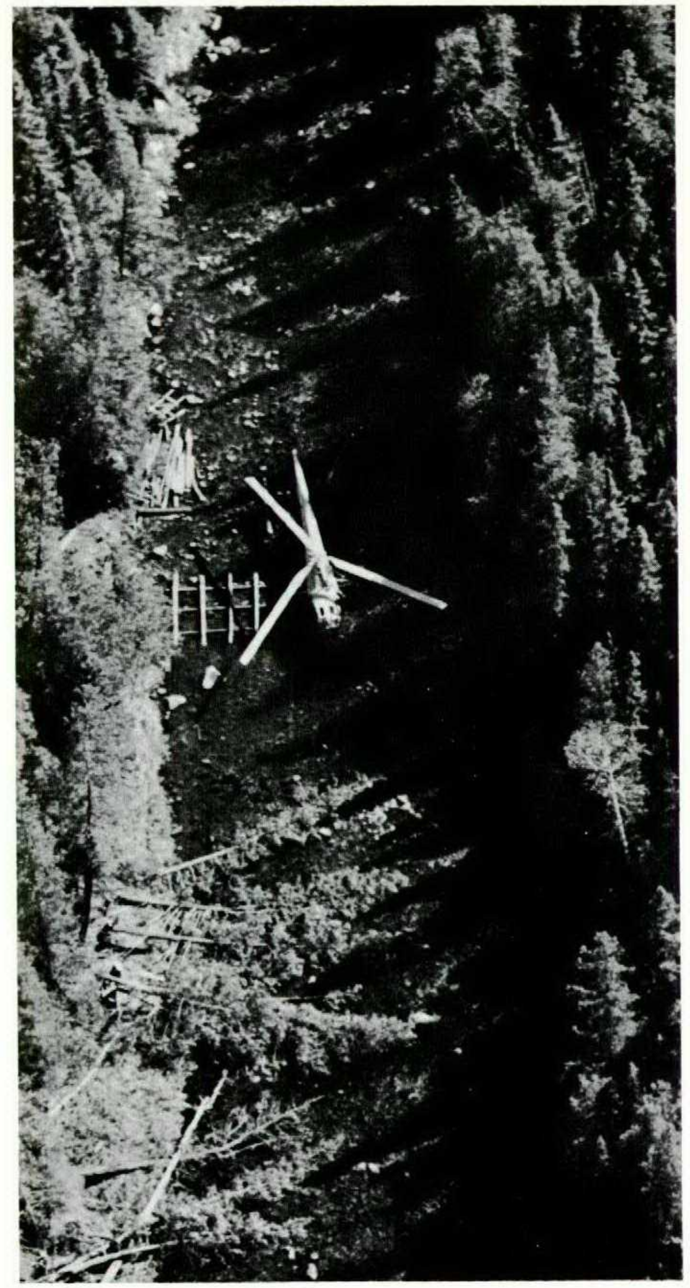
That is my life. Six accidents—five during landing and one on takeoff. Mind you, my yearly accident rate has declined throughout my life. As someone once said, "The first four years are the worst." This surely applies to me. Maybe the twilight of my life will be free of catastrophe, and I will continue to escape the clutches of the scrap dealer.

What are my odds? Well, let us glance at the overall "egg-beater" accident picture in the RCAF. I see it is a little shattering. The helicopter accident rate is approximately twice the rate for jet aircraft and three and one-half times the rate for reciprocating aircraft. Similar to jet and reciprocating aircraft, pilot failure accounts for over 50% of the helicopter accidents.

Now, I am loathe to point the proverbial digit, but as a patriarch among helicopters I feel it is my duty to implore the pilots to be kinder to us. Mind you, it is with no rancour that I speak of pilots. For them I have the greatest affection since without them I could not break the clutch of gravity and sail off into the blue. Nevertheless, they are humans and thus have inherent failings which DFS categorizes as "Negligence," "Carelessness," "Error in Judgement," "Poor Technique," and "Disobedience of Orders." These weaknesses can be avoided under most circumstances; after all the pilot is highly trained to conquer them. There are only a very few exceptions—when adverse conditions are compounded against the pilot, or he fails because of physiological or psychological conditions (Human Factors) over which he has no control or means of correcting.

I appreciate we helicopters are difficult machines to control, even tougher than the jets, since our lifting surfaces are in constant motion during flight. All the more reason, my beloved pilots, to adhere to the strictest personal discipline in flying at all times. Above all, acknowledge your inherent weaknesses and be on guard against them, especially when you take us whirlybirds in hand. I am an old egg-beater—qualified this year for the CD Medal—I would like to enjoy my superannuation.

5th accident, June 1952.



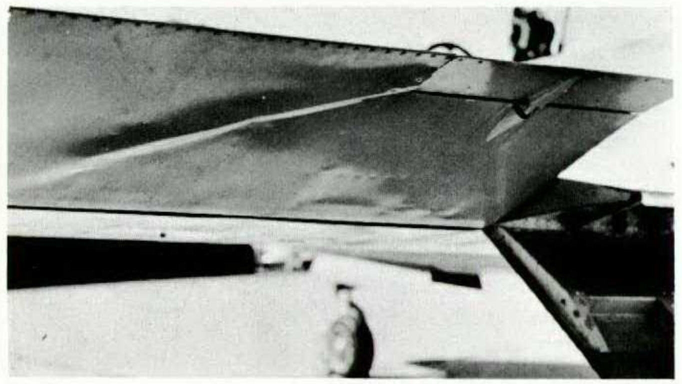
6th accident, September 1959.

Easy on the aileron

by S/L Thomas Wallnutt

One of the most persistent failures and sources of accidents in the T-33 is ailerons. We bend an average of nearly 60 ailerons every year. Mind you, some ailerons are creased during ground handling, but it is estimated that approximately 40 of the 60 are damaged by the pilots themselves. Since few ailerons suffer sudden gross failure, only a fraction of the total number we bend are reported as accidents on the D14. Usually the ailerons begin to look wilted and our keen maintenance personnel replace them and send the old ones off to repair before they have a chance to collapse in the air.

Photograph 1 shows a typical aileron failure caused by overstressing the aircraft. Invariably this type of failure is confined to the port aileron, likely because of the trim. The slightest trim tab deflection during overstressing concentrates the bending forces around this area of the aileron, and the failure usually starts at the cutaway portion and progresses forward.

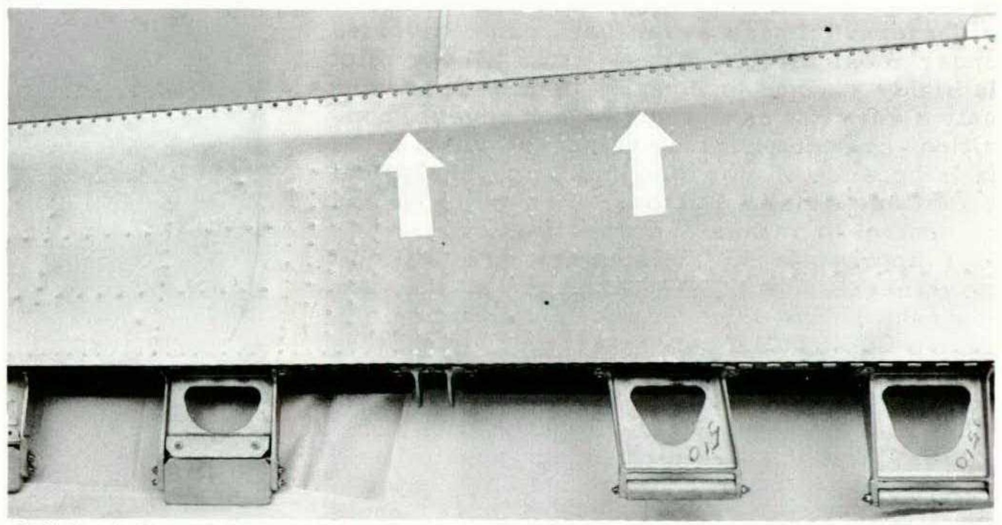


1. Damage caused by overstressing.

The records show that in the last five years 20 accidents have been reported involving 22 ailerons (20 port and two starboard). Nearly all were attributed to pilots overstressing the aircraft beyond the flight envelope or structural design limits or flying in the heavy buffet region. In many cases other damage to the aircraft occurred at the same time.

Now let us examine the rest of the aileron picture to account for the balance of the 40 per year which we placed at the pilot's doorstep. As we said, these cases do not receive the D14 treatment and are usually reported by TFR, hence most T-Bird drivers are not aware that they are contributing to so many aileron failures.

Why are we jockies to blame? Simply by continually flying the aircraft at or near the maximum permissible airspeed and acceleration limitations. We are all familiar with the effects of compressibility—trim changes, aileron flutter or "buzz" and airframe buffeting. Although the limiting Mach is .8 these compressibility effects, especially aileron "buzz", may occur at or before .8, even as low as Mach .75. Now, if we apply some acceleration in recovering, even a modest load factor at higher altitude, we will induce further compressibility. Then, if we have on some aileron and possibly aileron trim to counteract the rolling tendency the loading forces on the ailerons begin to mount. Finally, if the air is turbulent, gust loading must also be added to swell the forces on the aileron. Thus, although we may not be exceeding the "book limitations," the accumulative effects of all these factors may be considerable at any one time.



2. Failure believed to be caused by aileron buzz.

Now, as a grand climax to all this, add in the element of time. Keep repeating this marginal stressing time and time again throughout the life of the aileron and the aileron will become distorted and have to be replaced.

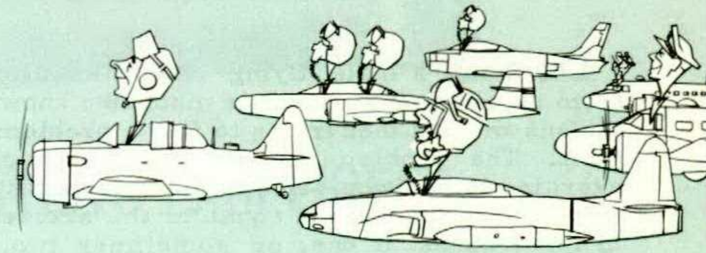
Photograph 2 is a typical failure caused by this kind of attrition, and it is believed that the aileron "buzz", which is a high frequency vibration of the trailing edge of the aileron, is the major damaging force. It will be noticed that this slow type of failure is remarkably different —the damage here is usually confined to a trailing edge crease.

Your reaction along about now might be, let the engineers "beef up" the aileron so the pilot will not be so restricted. This was attempted on a number of ailerons. The trial was unsuccessful as the additional material required to strengthen the aileron destroyed its static balance and rendered it more flutter sensitive.

We would all do well to review the words of wisdom, Part 4, Page 67 of the T-33 Dash One, and become more familiar with the "Flight Strength Diagram" on the following page. Because Mach .8 is the maximum laid down, many of us are of the opinion that we may fly our T-Bird at Mach .8, and that we will not have any trouble as long as we do not exceed it. This is a misapprehension. The figure Mach .8 is merely the pilot's guide—the real limiting factor is compressibility regardless of the Machmeter. The book clearly allows only light buffeting, and at the same time it states that prolonged flight in these conditions should be avoided. Moreover, the Flight Strength Diagram reveals how easy it is to pass from light buffet to the heavy buffet region merely by adding "G", which immediately aggravates the compressibility. This heavy buffet region is prohibited, yet pilots may quite accidentally enter it or verge on it from time to time. The best advice is to keep well inside the Mach and load factor limitations, unless it is necessary to experience light compressibility for training purposes, since the repetition of this marginal stress flying induces these persistent aileron failures.

Overstressing is for the birds not the T-Birds, so:

- Avoid flying for prolonged periods in conditions of aileron buzz and light airframe buffeting.
- Never fly in and of course beyond the heavy buffet region.
- Do not approach limiting Mach and load factor in turbulent air.
- Ensure aileron trim is neutral when approaching M .75.
- Do not exceed 4.88 "G" in a rolling manoeuvre.



HEADS-UP FLYING

GLIDING PRACTICE

F/L G.M. Robinson signed out to air test an Expeditor. Various functions were tested at 3000 feet in the vicinity of the airfield. Then, with climbing power set on the starboard engine, the port feathering button was pressed. As the port engine reached the full feathered position, the starboard engine was noticed to be well into the feathering sequence.

Realizing that unfeathering without generators would likely be impossible, the pilot immediately selected a field for a possible emergency landing. The glide was commenced at approximately 1800 feet.

After gliding for about 10 seconds there seemed to be nothing to lose by trying the starboard engine. The unfeathering was slow but successful. Because the feathering circuits were not reliable the port engine was left "dead" and a successful single engined landing carried out.

Cause of the trouble was due to both feathering switches rotating until the two "S" terminals could short when either button was pressed.

F/L Robinson's handling of this test flight—selection of test area, selection of a field as soon as he was in trouble, then giving it another try once he had prepared for a crash landing—was Heads-Up Flying from start to finish.

It's time you added up

Distilling a little flying safety knowledge from an aircraft accident is much like knowing the answer and then trying to find a problem to fit it. The problem usually resolves into an exercise in addition—adding up numerous little items until the sum is equal to the accident. In most cases if one, or sometimes two, of these items had been corrected the accident would not have occurred.

A case in point concerns a T-33 that crashed just after takeoff. The Board's findings were: primary cause, the pilot failed to make the proper decision; contributing cause, an incomplete external check. But what are the little items behind these findings?

The first is the pilot himself. Evidence produced indicated that he was an average pilot who was at times somewhat over-confident. He would work to pass his examination, etc., but may not have kept his training up between times. So we'll say that the pilot's personality—although who can prove anything about another's personality—was one factor.

A second factor was short cuts. According to the evidence, there were elements in the manner in which the flight was authorized that were not exactly "in channels". What has this to do with the accident? Nothing, really, but it is indicative of lack of personal discipline—an absolute necessity in the flying game.

The third factor is hurry. From the time the crew arrived to check out their aircraft in the morning until their final takeoff it was all hurry. Many witnesses attested to this fact.

Now we come to the contributing cause, the incomplete external check. The aircraft had made a fuelling stop and the crew had taken the flight lunches out of the armament compartment. After eating their lunches while waiting for their aircraft to be serviced, the crew returned to their aircraft and prepared for their final takeoff. The Board re-enacted the sequence of events prior to taxiing, and although the witnesses said "two or three minutes" the Board's run-through gave the pilot one minute and ten seconds to complete his external check. Here we might mention that the EO says that the pre-flight is done "before entering aircraft". (That is, each time you enter the aircraft). And we might also say that quick externals at strange airfields are dynamite. But then the pilot was in a hurry, so...

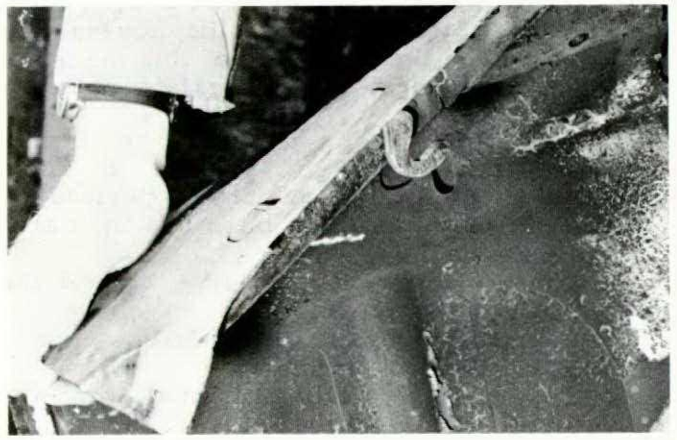
The final item, wrong decision, enters the picture just after takeoff. The T-33 was nicely airborne when the port armament door opened. What action did the pilot take? He pulled the nose up and cut the power. Power was applied again after two or three seconds but by then it was too late. The aircraft and two men were destroyed.

That is the sum of the items, the total—total destruction. Now we can second guess: if he had taken the correct emergency action; if he had checked the armament doors; if he had not been in a hurry; if he had boned up on the T-33 before the flight; if the crew had not had to change aircraft because the radio of the aircraft originally assigned for the trip was unserviceable.

With this second guessing we may make a few assumptions: Passing examinations does not make a good pilot—it's the work done between examinations that really counts. Short cuts, if followed long enough, eventually lead to a hole in the ground. The slogan, "Hurry Kills," applies just as aptly to flying an aircraft as driving an automobile. There is no substitute for complete knowledge of emergency procedures. When we checked our statistics, each assumption proved to be true.

You have heard all this before, but have you ever thought about the size of the job you are doing? Here are some comparisons that may give you an idea: When a technician is tuning the engines of an Argus he is playing with 14,800 horsepower—about the equivalent of 42 Cadillacs. The fuel required to fill an Argus is sufficient to last the family Volkswagon over twenty years if it is driven ten thousand miles a year. On an instrument approach that 500 feet between the cloud and the deck is shorter than many of DiMaggio's home runs. When overtaking another aircraft at a rate of 300 mph and that aircraft is only one mile away, you have about 16 heart-beats of time to decide what to do and do it.

When the power and speed of modern aircraft are compared to the ordinary things of everyday living we realize that this flying game is strictly for the professional. Anything less is not acceptable. Anything less will add up to an accident.



T-33 armament door lock.

DAKOTA HYDRAULIC SYSTEM FAILURE

by F/L H. E. Bryant

It is a long time since the Dakota began to stamp its way into the pages of aviation history. It won general recognition in 1934 during the days of the England to Australia air race, and by the time of the Second World War it was "tried and trusted" on the air lines of North America and many other countries. By the end of the war it was a familiar friend to thousands of pilots, engineers and service men the world over.

In some ways perhaps it was too trusted, too tried, and too familiar. Certainly the "old girl" had given splendid service in the trials and tribulations of war, but she had already begun to show signs of "hardening of the arteries" before the war ended. Artery trouble manifested itself as a noisy, chattering accompaniment to operation of the hydraulic system.

Unfortunately, reluctant acceptance gradually gave way to ready acceptance of the noisy operation of the hydraulics as a normal characteristic of the old girl's advancing years.

This gradual acceptance of noisy hydraulic systems was aided by the fact that an easy remedy, though only temporary, was available. Crews soon found that by making a change in the valve selections on the hydraulic panel they could stop the chatter and by so doing save the wear and tear on their own nervous systems too. In many cases the remedy was so tranquilizing that many crews completely forgot about hydraulics—even forgot the L14 entries they should have made against the hydraulic system.

Over the years the combined results of vibration and chattering in the system, crew apathy, general acceptance of noisy operation, delayed maintenance, and belated reports on the situation all played a part in setting the background for the hydraulic system failures which have occurred within the past few years.

While some failures have been due to faulty hydraulic components, the majority of hydraulic system failures have occurred in the plumbing, particularly in the flared ends of the hydraulic pipes.

In some cases there is cause to conclude that union nuts have been wrenched up so tightly, in an effort to stop leaks perhaps, that excessive stresses were placed on the flanges of the nuts resulting in eventual cracking of flanges or of the sleeves around the pipes. Other cases indicate that the pipes have been disconnected and re-connected so many times in the course of maintenance operations that distortion of pipes has resulted, and with further vibration and chattering the pipes have finally cracked. Also, there have been indications that incorrect or unserviceable flaring tools have been used during unit manufacture of new pipes. Flaring tool marks, which are stress raisers, hasten cracking of the pipes either circumferentially around the base of the flare or radially from the edge of the flare.

What is being done about these failures? In addition to Mod 6B/19, which changes the hydraulic regulator from the old MK 3 to the MK 4, a further modification is forthcoming which will specify replacement of a number of solid pipes with flexible pipes. It will also direct the connection of the outlet of both pumps to the undercarriage up-pipeline to provide speedier undercarriage retraction and greater safety in the event of one engine failure. The modifications plus a general overhaul of the hydraulic systems, to be carried out at 6RD, should provide quieter and more reliable operation. The aircraft on which the prototype modification has been fitted has given trouble free operation up to the date of writing this article.

Until all aircraft are equipped with the modified system the necessity will remain for everyone concerned, aircrew and groundcrew, to do all they can to keep the existing systems serviceable.

SNIPPET

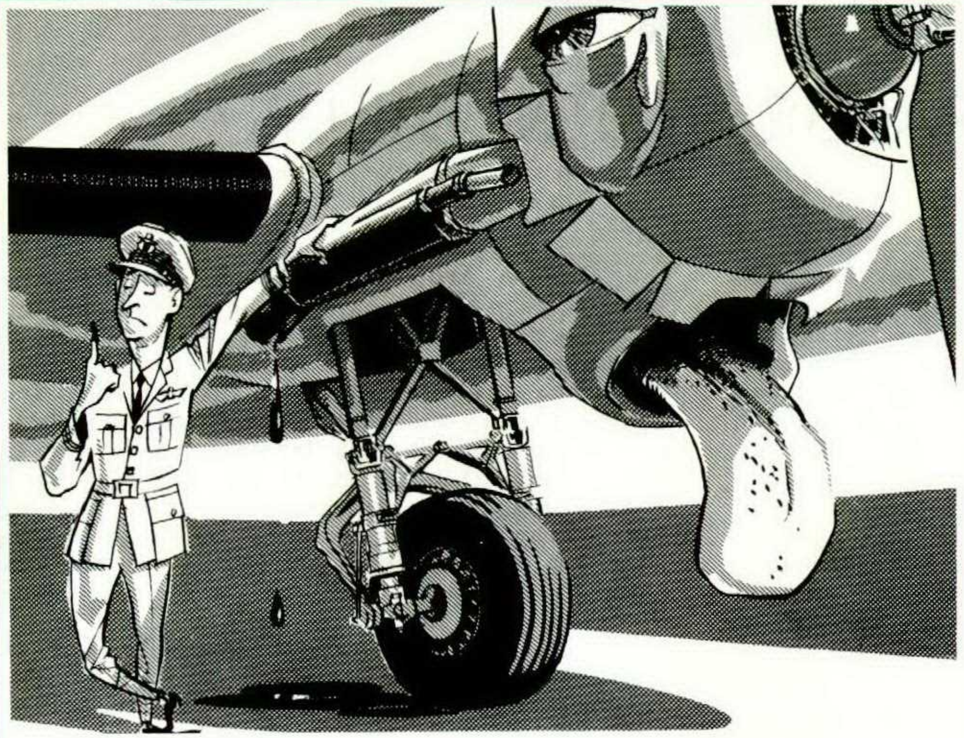
Aircrews must report suspect systems,
And groundcrews must investigate causes
No random replacement of parts.

EO's must direct close scrutiny
To pipes flared at unit resources
For fitting to tees and connections.

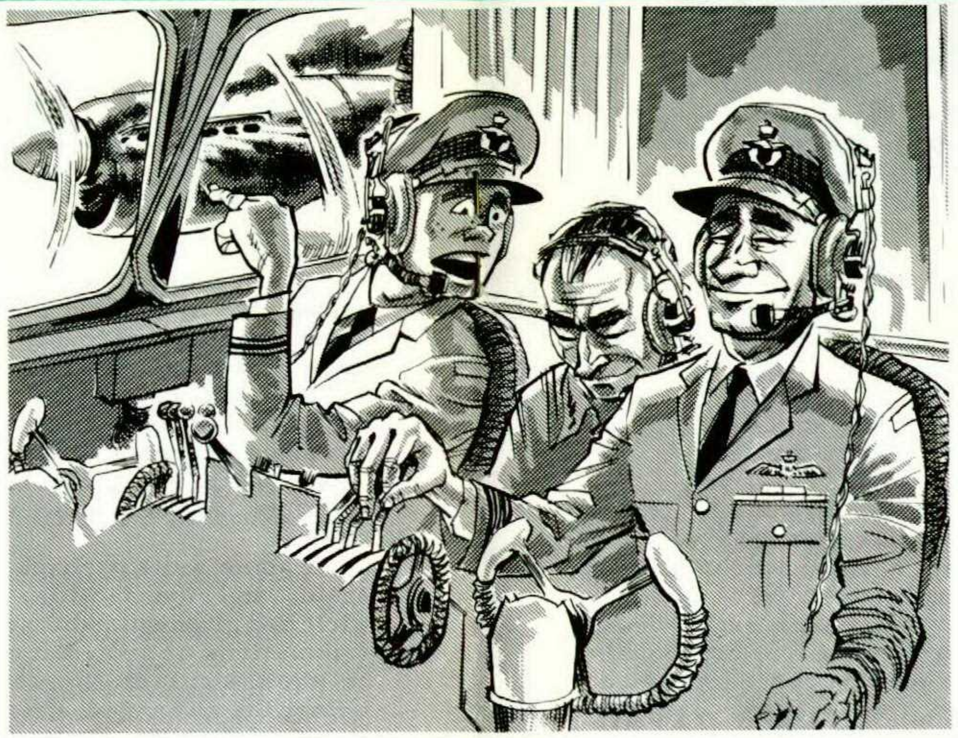
Aircraft with hydraulic malfunctions
Must have their case histories checked,
And for appropriate rectifications

Read EO publications.

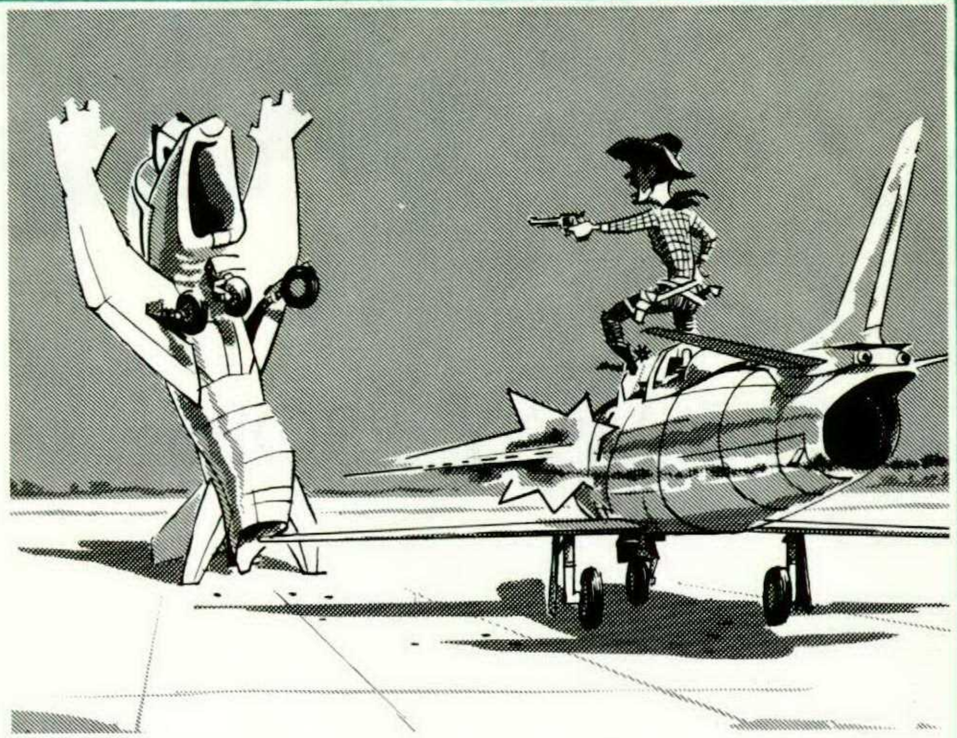
THEN THERE WERE FIVE



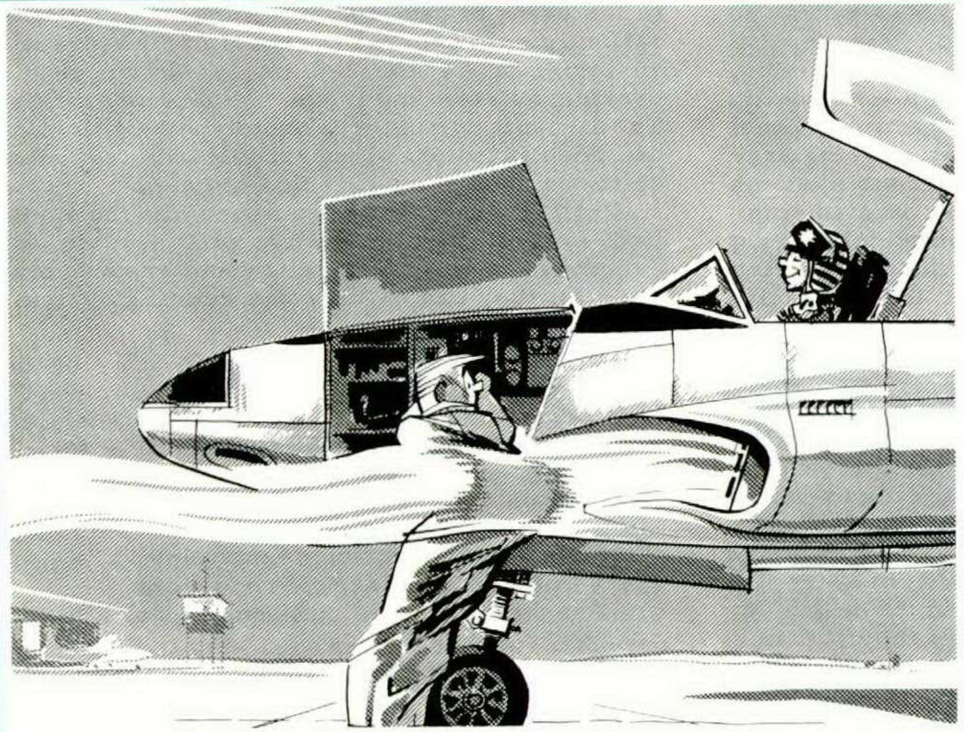
"It's only oil," said the pilot when he noticed a viscous liquid dripping from the exhaust stack of No. 4 engine. He took off and No. 4 engine failed during the climb.



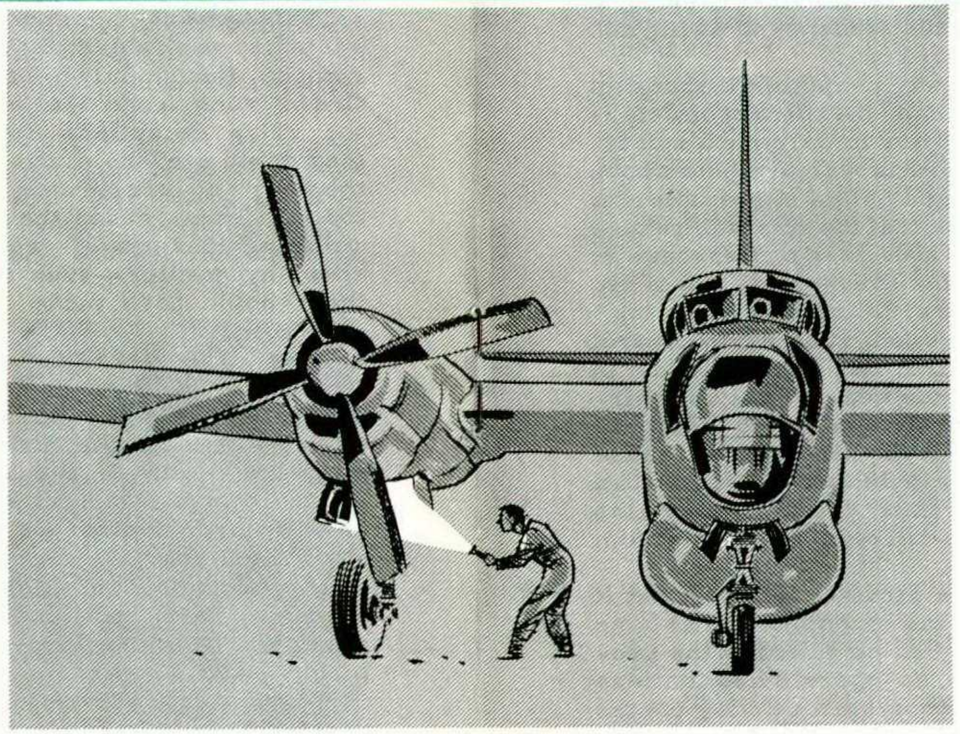
The first officer of a North Star told the captain that smoke was coming from No. 4 engine. The captain continued to taxi and asked the first officer to watch for a definite indication of fire. Sparks were soon dropping out of the rad flaps and the pilot was convinced.



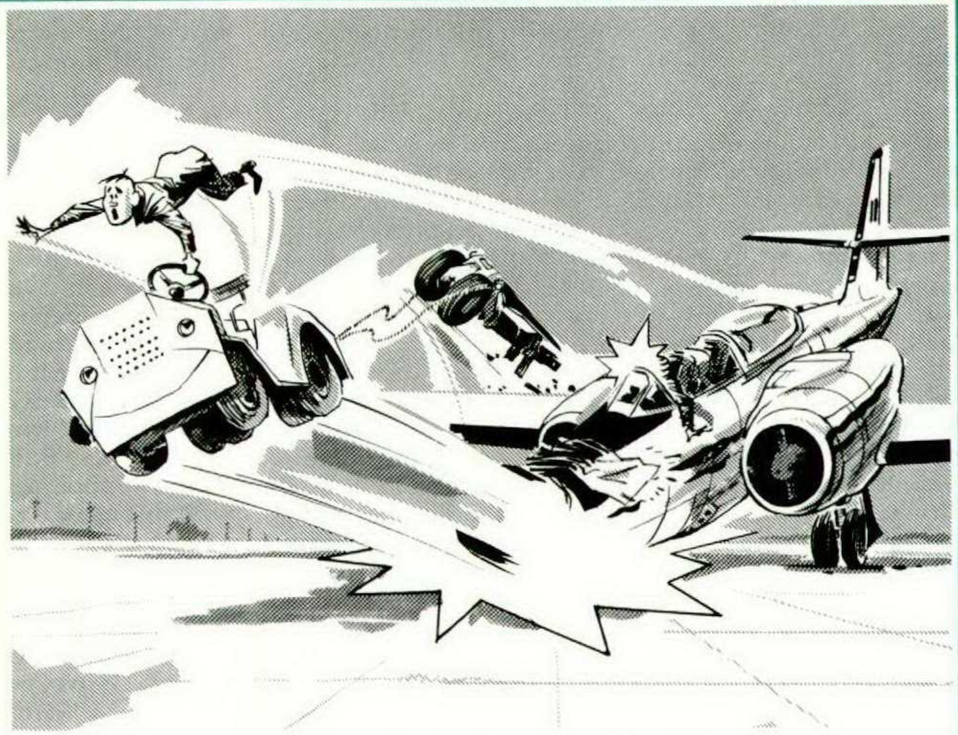
A M&WTech with three days experience on Sabre arming crews set out to arm a Sabre. He armed the port centre gun then entered the cockpit to check. It worked.



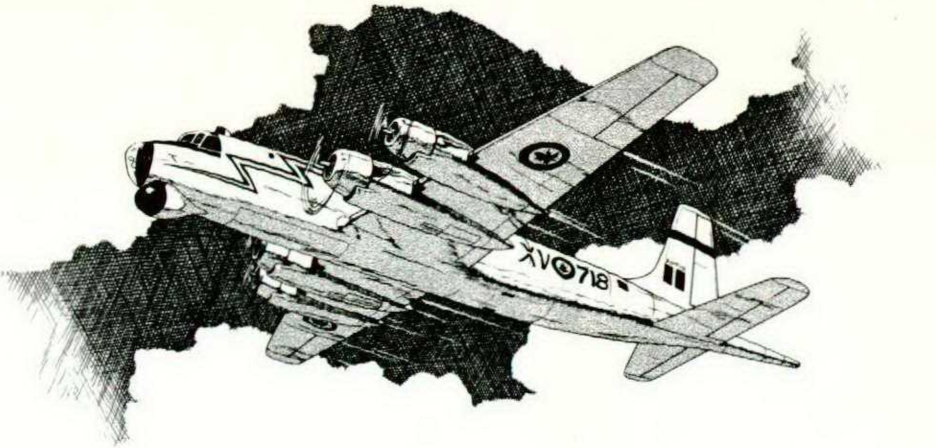
The pilot was in a hurry. He started the T-33 then called for a ComTech(A) to check the VHF channel changer. The T-33 was not shut down. The ComTech(A) did not secure the armament door. The pilot did not check the door. He was in a hurry.



While carrying out night circuits in a Neptune, the pilot had to use "G" to get a locked-down indication from the starboard main gear. One small screw was missing from the downlock switch. The crew were criticized for not catching it on their walk around. And it was night yet!



The CF100 had to be towed with a cable. The towing crew had been told that the nose gear was very delicate and that no slack was to be allowed in the cable. The CF100 began to overtake the tow vehicle. The pilot braked and the tow vehicle leaped forward.



RUNAWAY PROPS

by S/L G. L. Sheahan

When one engine of a four-engine aircraft is lost 50% of the safety factor is lost. If a second engine fails 100% of the safety factor is lost. This sounds pretty good, but unfortunately this applies only if all the other factors remain in your favour.

What happens when one engine is lost and normal feathering procedures do not feather the engine? The 50% safety factor no longer applies, but as the rpm of the engine can be reduced by putting the pitch lever in full coarse a slight safety margin remains. If a second engine fails in this configuration and if it can be feathered, the aircraft will still fly. The increase in drag of the windmilling engine can be overcome by using slightly higher power settings on the remaining two engines. Bear in mind that the windmilling engine is under control and the prop is in full coarse pitch.

Now what happens when a propeller runs wild? The terrific whine will shatter the nerves of the most stout hearted pilot. As to a safety factor, at this point it is gone. After the initial shock SOPs are used; pitch is pulled back; the throttle is retarded and the nose of the aircraft is pulled up to increase the load on the propeller. The feathering button is pushed. Under normal circumstances, the prop should feather. If it does, the 50% safety factor is back. If the propeller does not feather, there is trouble ahead.

The drag from a runaway propeller is tremendous, and at times control cannot be maintained using maximum power settings. For example, the parasite drag expressed in flat plate area for a DC6B is a little over 27 square feet. The flat plate area of a runaway propeller is approximately 14 square feet. If the uncontrollable propeller happens to be number one or number four, it is easy to understand why the turning motion of the aircraft is so great. Also, as power is added to the good engines to offset this extra drag the tendency to swing into the dead engine is increased.

There it is, a runaway propeller that cannot be controlled. Why it happened cannot be determined, but something has to be done about it. First, reduce the speed to a figure just above the stall; second, reduce height if possible. A rule of thumb indicates that the rpm will reduce by 50 rpm for every 1000 feet of decrease in altitude and 200 rpm for every decrease of ten knots in airspeed. Now, is the rpm reducing? If so, is the reduction enough to regain control of the aircraft? If control can be maintained in this way, carry on to the nearest suitable airfield. It is important to watch the airspeed because any increase in the airspeed will cause a corresponding increase in rpm, which in turn will increase the parasite drag. It may also set up a vibration that will tear the engine from the wing.

So far everything is straight forward, but it is possible that all the techniques that have been used so far have had no effect on the propeller. It may refuse to co-operate and continue to scream with the tachometer reading off the clock and neither altitude nor positive direction can be maintained. Continue the efforts to feather, and if this doesn t work there is a last resort. Freeze the engine.

It is very important to realize that this is indeed a poor gamble. However, in a situation where there is nothing to lose freeze the engine. It is impossible to say when to freeze. Orders can not point out what constitutes a last resort gamble; they can only assist the pilot in making this decision by describing what takes place when an engine is frozen.

The factor controlling the decision to freeze or not to freeze is parasite drag. The object is to reduce this drag. When the engine is frozen, one of the following can be expected:

(a) the engine will seize and the propeller will fly off;
(b) the engine will seize and the propeller will stop and remain on the shaft in full fine pitch;
(c) the engine will seize and the propeller will uncouple, but remain on the engine; or
(d) the engine will catch fire before seizing.

How does this affect the drag? If the propeller breaks loose and does not cause further damage to the remaining engines or fuselage, a very unlikely possibility, the drag is naturally decreased to a value less than the drag caused by a feathered propeller. If the propeller uncouples, the drag will be reduced by approximately 65%. If the propeller remains coupled and stops in the fine pitch setting, the drag will increase by approximately 35% over the drag value of a windmilling propeller. (This data was derived from tests and calculations made from a Strato-cruiser that ditched in the Pacific in 1956.) If the engine ignites from the high frictional heat, the resulting fire will be practically impossible to extinguish.

One thing is obvious. To attempt to freeze an engine is a last gasp gamble. If the decision is to freeze the engine the following points should be carefully considered:

- Keep trying to feather even after lubrication has been cut off. If the propeller is slowed down by the added friction, it just might be possible that the feathering pump could overcome the forces and complete the feathering action.
- Depressurize the cabin and move all personnel away from the propeller line.
- If possible, feather the engine beside the bad engine before freezing the bad engine. It might prevent damage to the good engine if the propeller should fly off.
- Turn away from the bad engine during the freezing procedures. If the propeller does leave the engine the gyroscopic action might help it go over or under the fuselage.
- If the propeller uncouples it might at some later time decide to leave the engine. Be prepared to feather the engine next to it.

Who Has The Accidents?

Possibly during the last few months you have been involved in an accident, spoiling an otherwise good record.

Have you for some reason become accident-prone?

Accident-prone drivers have certain distinguishing characteristics which you may have taken on for some reason or another.

Do you decide to do things on the spur of the moment? Tell "tall stories"? Enjoy loud parties? Have quick, unreasonable excuses when your work is criticized? Do you believe you are a physical "giant" compared to others your size? Do you get "sore" easily? And have you ever thought of running away from home?

If you have answered "yes" to any of the above questions you may have become accident-prone. Typical accident-prone drivers are restless, impulsive and make up their minds definitely and quickly, not bothering to consider the consequences. They don't read much and have little interest in intellectual talk. They are usually fond of sports, gambling, and going places in a rush. They are often good mixers and story-tellers, but show a nervous, restless type of tension.

The attitude a person expresses toward any one phase of his activity is usually manifested throughout his whole make-up. A man who takes chances at home will take chances at his work or on the road. A man who takes chances will in all probability raise a family that takes chances.

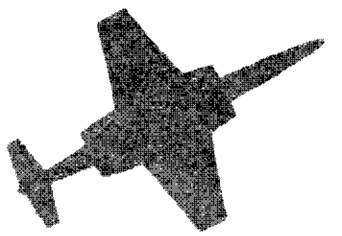
The young get their knowledge from the examples set by the older folks. Not from what they say but from what they do. No matter what you tell them your actions will betray you if you are not consistent.

Take stock.

Does the above apply to you?

If it does—alter your habits, relax, don't bite the kids' heads off if everything doesn't go your way. And by changing your habits become again the safe and dependable driver you once were.

Ontario Fleet Safety



NEAR MISS

VERTIGO

A CF100 pilot with 1300 hours total flying time - 110 hours on jets - developed a mild head cold. He did not report sick but grounded himself for 3 days. On the third day he sneezed and had an immediate feeling of dizziness which caused him to sit down. The dizziness passed in a few seconds.

On the fourth day he test flew an aircraft to 45,000 feet (cabin altitude 23,000 feet) without trouble although on descent he had to use the Valsalva manoeuvre several times (under normal conditions he rarely if ever has to resort to this). He experienced no other disturbance during this descent and had no vertigo.

On the fifth day he made a cross-country trip in the morning, flying at 37,000 feet (cabin altitude 22,000). Duration of the flight was 90 minutes.

On the climb for the return trip at 6000 feet he became aware of his ears popping and an immediate feeling of dizziness. He continued to climb and his ears continued to pop. At 9000 feet he was so disturbed that he had to switch in the auto-pilot. His statement is rather illuminating. "If I hadn't got on auto-pilot I would have had to leave the aircraft." He also stated that the instrument panel was rotating in a horizontal plane but the instrument seemed steady.

The vertigo disappeared in about two minutes. He resumed his climb to 37,000 feet (22,000 cabin altitude) and made an incident free flight, let-down and landing.

This is a further case of vertigo on ascent due to sensitivity to change in pressure. It is further evidence to support the need for close and expert supervision of head colds in aircrew. Perhaps this incident will convince the doubting Thomases.

FOAM IN SEVEN MINUTES

After takeoff, the pilot of a T-33 reported that the nose gear would not retract. A visual check by the controller confirmed that the nose gear had not fully retracted and that the nosewheel was cocked.

It was decided to lay a foam path on the runway.

While the pilot was burning off fuel under GCA surveillance, the weather deteriorated to A5 broken 20 overcast 3R. Precipitation made it imperative that the aircraft land immediately the foam path was completed to avoid undue spreading and dilution of the foam.

A path 4 feet wide commencing at 1500 feet from the approach end of the runway and extending for 3000 feet was laid in 4 minutes. Three minutes later the foam truck was recharged and the pilot was on final approach.

The landing was successful. The aircraft touched down at the beginning of the foam path and the wheel straightened during the landing roll.

EXERCISE COMPLETED

On a routine CF100 training flight at 35,000 feet and Mach .75 my first case of hypoxia occurred.

After about 30 minutes at this altitude I mentioned to my pilot that I felt tired. I thought this was normal as we had flown three trips the day before. A few minutes later I had a cold tingling sensation all over and I found it very difficult to remember the "pidgeons" given to me by the GCI. This is when I felt that all was not normal.

I mentioned the fact to my pilot and he immediately told me to hit the "press to test" button. The amazing fact is that I located it in my condition and the awkward position of the "press to test" button in the CF100. We completed the exercise by my continually hitting the "press to test" button at frequent intervals.

(I wonder if completing the mission was worth the chance this crew took.—ED)

NECESSITY OR NUISANCE

Shortly after touchdown the Sabre's rudder seemed to lock so that no left rudder past neutral could be applied. Brakes were used to keep the aircraft straight and the aircraft was safely stopped at the end of the runway. An inspection revealed that the check list had fallen down and had jammed the rudder bar. The back end of the check list had caught in a crease in the cockpit wall and the front end was up against the rudder bar. This would allow full right rudder but no left rudder at all. The rudders had been used on final approach and no abnormal action was noted.

Steps are being taken to remove this check list from the Sabre Mk 5 aircraft.

(This Near Miss emphasizes the need for a continuous evaluation of our needs, and the wisdom of considering all non-essential items in our aircraft as potential hazards.—ED)

SNEAK RAID

You never know where Near Misses will strike next, but here's one that at least has a little humour.

Two ardent model aircraft enthusiasts prepared their 36 inch wing-span, free flight model for a two minute local flight around a large field on the station. Everything had been working perfectly and two flights had been completed. On the third takeoff the aircraft climbed gracefully, circled the field, then suddenly it levelled off and headed for the open prairies. The hobbyists raced after it by car and on foot, but it continued to fly longer than the flight plan of two minutes. Finally it took up a heading across the airfield and the active runway at about 200 feet. The alert DFCO spotted the unauthorized NORDO aircraft in the circuit and advised an overshooting T-33 to take evasive action. It narrowly missed the model, and the two enthusiasts stood wondering what the court martial charge would be.

The model aircraft drome has been relocated well away from the field so that future flights will not cause an accident.

BE BOLD, PINCH IT

In preparation for a scramble I did an external and left my oxygen mask and helmet on the side of the aircraft by the blast shield. On takeoff and climb to 38,000 I used 100% oxygen and upon reaching altitude I switched to normal. Within 30 seconds I was feeling dizzy and immediately switched to 100% and used pressure breathing. On pressure breathing no blast of air was felt. I inspected the hoses and found a hole in the mask hose. Cause of this fault was determined as groundcrew closing the canopy on the mask and not checking mask or informing the aircrew. The reason for closing the canopy was rain. The mask accordion tube was nearly cut in half.

It is obvious that neither a "press-to-test" check of the mask was done on the ground nor an exhalation "pinch" test when airborne. Skipping such tests or leaving personal equipment where it can be damaged is not good. It's dangerous.

CF100 FUEL JETTISON

On a flight from St. Hubert to Portage the pilot of a CF100 noticed that the port tiptank was not feeding. He decided to land at Lakehead because of a possible shortage of fuel at destination. At 3000 feet in straight and level flight and 220 knots with a clean configuration the tiptank fuel jettison switch was actuated. Fuel appeared to stream normally for four to five minutes from the port tiptank. When it ceased to flow the pilot carried out a right hand break and landing not noticing any wing heaviness although extra power was necessary to maintain the correct airspeed.

During the landing run with the wind from the starboard the port wing was running low and more than normal right brake was necessary to hold the aircraft straight. On examination 185 gallons (measured during de-fuelling) were found to be still in the tiptank although the tip had blown perfectly. The fact that so much fuel remained after jettisoning could, under given conditions, be dangerous.

A possible explanation is that at 220 knots, clean, a slight nose down attitude existed while in level flight. A local order has been issued stating that fuel must be jettisoned with the aircraft in a nose high attitude.

DOWN YOU GO

Landings are the most difficult of all flight manoeuvres to perform. The proportionate number of aircraft accidents that occur during this phase of flight certainly supports such a statement. It would appear that pilots are not treating the landing as the precise manoeuvre that it is since most of the accidents result from poor airspeed and rate of descent control.

Being a precision manoeuvre, landings require understanding and use of flight fundamentals Two of the most important to landing are using the stick to control airspeed and the throttle to control rate of descent. This latter statement should not sound strange to your ears as your flight instructor said it again and again, and your instrument instructor was rabid on the subject. In the next few paragraphs we hope to not only refresh your memory but also thoroughly convince you of this technique.

To reduce the arguments in this discussion we acknowledge that for precise control of aircraft, power and angle of attack are interdependent. However, the point to be proved is the stick is the primary control for airspeed and throttle (power) is the primary control for rate of descent.

First, let's consider the situation of a pilot making a cruise descent at a constant airspeed or Mach number. He reduces power to a given value and starts down. Now what technique does he use in maintaining the desired airspeed? If the airspeed is slower than desired he pushes forward on the stick (reducing the angle of attack) until the proper airspeed is reached. If fast, he pulls back on the stick.

What causes the airspeed to vary with changes in angle of attack? Basically it's the change in drag that produces the change in airspeed. In moving the stick we changed angle of attack and thus reduced drag. By pushing forward on the stick we decreased the induced drag and since the power or thrust was not changed, the thrust temporarily exceeds the drag. Due to this unbalance the airspeed increases until the total drag again equals the thrust where the airspeed stabilizes. The reverse is true when we pull back on the stick (increase angle of attack). This time the drag momentarily exceeds the thrust so the airspeed decreases until we again reach a balanced condition. The stick was used to control the airspeed.

The argument is raised that if power is added or reduced, airspeed will increase or decrease correspondingly. Such is true, but the airspeed changes are a result of the power changes and you take what you get, not control or select it.

Now to the point of using throttle (power) as the primary means of controlling rate of descent. This time assume we are making an approach in landing configuration at a constant angle of attack, airspeed and rate of descent. In the approach we determine we are going to land a little short of our intended touchdown point and the question becomes what action should we take to prevent it. Let's look at the formula by which we compute rate of descent to see what factors are involved.

$$\text{Rate of descent} = 101 \text{ Velocity (knots)} \frac{(\text{Thrust}-\text{Drag})}{\text{Weight}}$$

From this formula you will note the pilot can vary velocity by using the stick, thrust by changing the throttle and drag by changing the angle of attack (stick). We don't want to change airspeed because it's at the optimum. Our angle of attack is at the correct index which we don't want to change, and also any change in angle of attack will change our airspeed. That leaves us with thrust (power) to vary. Adding power will reduce the difference between the thrust and drag and thus decrease our rate of descent. Our glide angle flattens and the undershoot condition is corrected.

The flatter glide does decrease the angle of attack and thus the drag so the airspeed will increase proportionately to the amount of power added. However, a proportionate increase in angle of attack will return the airspeed to the previous value.

You may take issue with the above propositions because you feel the airplane doesn't react that way. What has been said applies to a steady state condition, i.e., the airplane will take a few seconds to react in the manner described. The reaction of the airplane between the time a control is moved until a steady state is reached is referred to as a transient condition.

An example of such is when you pull back on the stick without adding power trying to flatten or stretch your glide. Momentarily the rate of descent is reduced because the lift increases right along with the increase in angle of attack. Then airspeed drops off accompanied by an increase in rate of descent which remains. This is the steady state condition.

You have probably noticed in the above discussion that in attempting to precisely control the aircraft a change in one necessitated a change in the other. This we acknowledged at the beginning. However, the stick is the primary control for airspeed (angle of attack) and the throttle (power) is the primary control for rate of descent. Use them as such and your flying will be more precise.

USN: Approach

SAFETY RECIPE

Every supervisor realizes there is no surefire method for a shop to obtain an accident-free record. Mainly, because we are dealing with employees as human beings; each one possessing a different attitude. We can make our shops and machines safe as humanly possible; but if the employees do not possess the proper attitude, then our accident rate is bound to soar.

Just what is employee attitude? It is what's in the employee's mind when he is performing the job. The success with which he translates these thoughts that are in his mind into actions will determine our accident record.

This adds up to one recipe: A safe environment, plus a safe worker equals a safe shop.

—The Prover

It's Your Aeroplane!

INSPECT IT...
like you were going to pay cash for it - with no guarantee.

START IT...
like an evening on the town - with a careful look around.

TAXI IT...
like you were driving your car during the rush hour - carefully and alertly.

TAKE IT OFF...
like you tried to do on your first solo flight - you've learned how since then.

FLY IT...
like you have been told you should - using correct procedures and in accordance with regulations.

LAND IT...
like you were trying for 1st prize in a contest.

SHUT IT DOWN...
like you were assigned to fly it next period - properly and with care.

WRITE IT UP...
like you were getting paid 10¢ a word.

Flying Safety Quarterly Digest
Jul 59
Typed from the Informer 1 Oct 59

No-Wind Runway

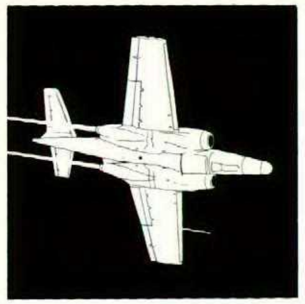
It was recommended that all stations designate a no-wind runway (3 knots or less) which would present the least obstacles to pilots and would not require aircraft to fly over congested or built-up areas on takeoff, thus minimizing the danger to personnel on the ground in the event of a crash.

USN: Approach

Night Flying

As the flare pots are now set in 150 pound slabs of concrete the SEO reported that no flares were stolen by the Bedouins during the last night flying. This is the first time in the last nine months that night flying was held without a loss of at least 15 flare pots.

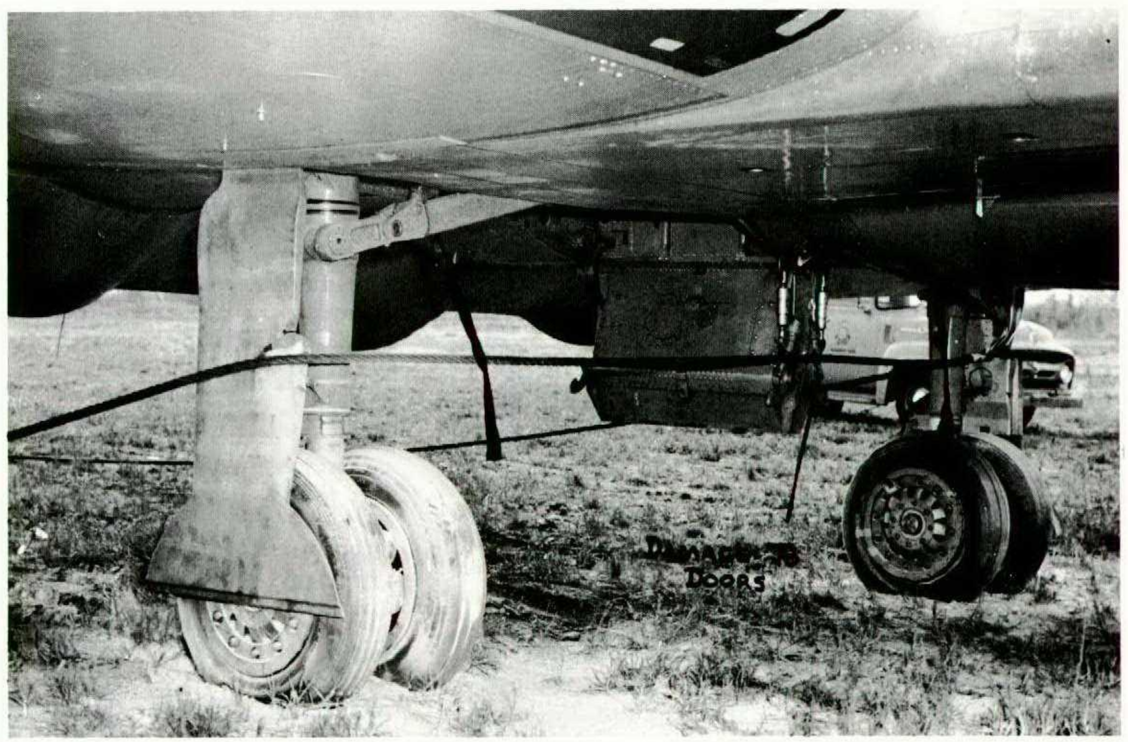
ARRIVALS and DEPARTURES



ARRESTED FOR ENGINE FAILURE

Two CF100s were lined up for a formation takeoff.

"I gave the signal to my number two and we began to roll. I began the takeoff with 75% and increased the power to 95% and everything appeared to be normal. Number two was staying with me. As my speed approached 90 knots I brought the nosewheel off the ground. We became airborne and I was just about to select undercarriage up when I felt and heard a drop in power. There was no swing. I immediately called "one aborting" and at the same time looked at my rpm gauges. The port engine seemed lower than the starboard, but I cannot be sure. I had by this time pulled the power off and began setting the aircraft onto the runway. I immediately stop cocked the engines and began applying the brakes. We had touched back down with around 4000 feet to 3000 feet to go. I knew we would have to engage the barrier so I turned the low pressure cock off and began to pump the brakes. As we approached the end of the runway I began using the hand brake. We had been getting some braking but since we still had a full load on board it was not too noticeable. The speed was approximately 45 - 50 knots when we were approaching the end of the runway so I stopped braking and prepared to engage the barrier. I pushed forward on my seat straps and put my arms in front of me resting on the cover over the instrument panel and waited for the engagement. There was no sudden jolt or jar although I knew I had left the runway. The aircraft came to a smooth and even stop similar to a stop on pavement when brakes are used. Both my navigator and myself felt that the barrier had been designed for such situations and in our case has worked extremely well."



The aircraft came to a smooth, even stop.

Failure of one of the fuel pumps on the starboard engine was the cause of this accident. The aircraft itself suffered only superficial damage.

WRITER'S CRAMP

The pilot of a CF100 checked his flaps for full travel, lowered them to 25 degrees and then checked the flying controls. All were normal. After takeoff he noticed aileron movement was stiff when the flaps were fully retracted. After landing he made a full report, including the configuration that the aircraft was in when the malfunction occurred.

With this report maintenance was able to locate the trouble. The port flap jack down line had been twisted on installation and was fouling the aileron cables when the flaps were fully up.

Several days earlier this same aircraft had been reported for the same reason. The pilot did not make a full report and because the aircraft checked serviceable on the ground the cause was listed as "Obscure" and no corrective action was taken.

Here again is the old problem of aircrew with writer's cramp. A few more lines in the L14 could have saved maintenance hours of unnecessary work and another pilot a few bad moments.

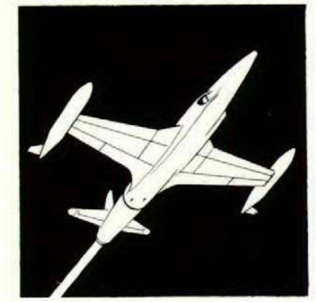
ON RECEIPT OF PARTS

Shortly after a normal landing, the pilot of a CF100 experienced minor brake shudder; then the port oleo twisted and brake control was lost.

Yes, it was our old friend the torque link bolt, part number 1606-109, that failed. And, to make matters worse, there were five modification kits available on the station. This number was not sufficient to modify all the CF100s so there is nothing to say that this particular accident could have been prevented.

It is, however, a very important accident. The D14 explains: "As a result of the subject failure the remaining five kits have been turned over to the Aircraft Servicing Officer in order that the modification may be incorporated as soon as possible." So there you have it. The modification leaflet states "on receipt of parts" and, apparently, the people concerned did not receive the parts because they were decorating a shelf.

The "bottle necks" may rationalize, but the fact remains that the safety of five aircraft was needlessly jeopardized. This, truly, is an expensive way to learn that Safety is Everybody's Business.



GAVE UP TOO SOON

A T-33 was on a mutual instrument exercise to Lakehead and return.

Here is the pilot's story: "While taxiing to the takeoff point at Lakehead on runway 07 vital action and pre-takeoff checks were carried out. Everything was normal. Takeoff clearance was received and full power applied. The initial takeoff roll appeared normal and the aircraft was kept straight by the use of brakes until approximately 50 knots when I changed over to rudders. At this time the aircraft had a tendency to pull to the right which was corrected by the use of left rudder. At approximately 70 knots the control column was brought to the full back position to lift the nose gear off. Normal acceleration continued and the aircraft still had a tendency to swing right. At 115 knots the nose gear was still not off the runway and did not seem as if it was going to lift off. At this time the takeoff was aborted, throttle closed, dive brakes out, maximum brake applied and high pressure cock closed. The aircraft stopped approximately 500 feet off the end of the run-


The pilot gave up too soon.

way."

At Lakehead, runway 07 is 6200 feet long. Measurements taken of tire marks indicated that first brake application was about 3300 down the runway. Approximately 900 feet farther along the port main tire blew.

Subsequent investigation did not reveal any reason for the accident other than aircrew error. It may be that the pilot, used to runway distance markers, misjudged the distance because he did not have the customary points of reference. The investigation also contained rather pointed criticism of the second pilot's "jumping on the brakes." A review of instructor's techniques at the pilot's unit showed "as many types of control column handling on takeoff as there were instructors." Another point of interest is the lack of instruction concerning when and when not to abort a takeoff.

How the control column is handled on takeoff cannot be divorced from a pilot's flight planning. He should know how much weight he has and the takeoff speed for that weight under the existing conditions of wind and temperature. He should know how much runway he has. Then he should know that with normal acceleration—as this pilot had—there should not be any need to abort.

When everything is considered, we have to assume that the takeoff was not well planned and that the pilot—he had over 500 hours on type—gave up too soon.

(The comments on this accident file seem to indicate that some pilots may need to review the takeoff charts in AOI's.—ED)

GONE FISHIN'

After a refuelling stop at Saskatoon we took off, heading for Gimli. While some 50 NM north of Portage la Prairie the engine flamed out.

Portage la Prairie was selected for a possible forced landing and a Mayday call was transmitted on 121.5 mcs. The call was finally picked up by Grand Forks, North Dakota. Grand Forks was requested to alert Portage.

During the landing pattern R/T contact was made with Rivers who advised that Portage was off the air. R/T contact was made with Portage while on the final approach.

(Hmmm? And I've always assumed that range stations kept a listening watch on 121.5 with the volume turned up.—ED)

PIGGY-BACK

Two sections of four aircraft and one section of three aircraft entered the circuit for a stream landing. All went as briefed until No. 2 of the second section overshot because of an "S" turn. No. 3, probably thinking he had lots of room because of No. 2's overshoot, let his aircraft drift to the centre of the runway. This left

The aircraft collided five feet above the runway.

No. 4 of the second section with a choice of sides as far as landing room was concerned. He thought that No. 3 might still drift farther across the runway so he landed on the right hand side. This was contrary to briefing.

The leader of the third section, after completing his final turn, saw two aircraft on the runway in the approximate positions that, from the briefing, he would expect No's. 3 and 4 to be. These aircraft were in fact No's. 1 and 3. So the leader of the third section continued his approach, rounded out and landed on top of No. 4. The picture on the cover shows the result. The moral is simple—stick to your briefed position or overshoot.

Neither pilot was injured. The bottom aircraft suffered "A" category damage, the top "B" category damage.

"G" WHIZZ

A Sabre pilot with 188 hours on type was engaged in an airfighting exercise. He pulled back sharply on the control column, and the aircraft rolled onto its back and entered a spin. When the pilot recovered from the spin he noticed the "G" meter read plus 7-3/4. And to quote: "Control response was normal and I carried on with my fight."

The excessive "G" caused the starboard elevator hinge outboard fitting assembly to break away from the elevator beam, caused damage to the elevator skin, and cracked the port elevator rib assembly through at station 70.

After 188 hours on type, there is no excuse for a pilot not knowing the maximum permissible "G" for his aircraft. Disregard for this or any other safety limit serves only to endanger lives and equipment. Ignorance of published limits is not an acceptable plea.

MULE SHOES

A D-6, with the towing bar attached to the front end, was towing a Lancaster at a walking pace. The D-6 was in reverse gear. When a 40° turn was made the momentum of the aircraft jack-knifed the mule into the port fin and rudder of the aircraft.

At the time of the accident the tarmac had patches of hard packed snow on it. The mule just happened to be on one of these patches. Towing a heavy aircraft with the light end of a mule does not give the best control of the aircraft. Another factor in this accident was the condition of the mule's tires; tires so bald that they could give very little directional control on snow.

LETTERS TO THE EDITOR

First Witness

Attached is a page (photo copy) from an investigation of 30 years ago. The main characters are two fellows named Mahoney and McInnis and it is being passed along by a guy named Hourigan.

"Sgt E.E. Mahoney on being called, states: I am Sgt Mahoney, E.E., employed as fitter in "A" Flight, and temporarily attached to "D" Flight.

Ques: Were you present at the time of the accident to Corporal McInnis in "D" Flight on 26-9-29?

Ans: Yes Sir.

Ques: What do you know about the accident in question?

Ans: At about 1500 hours on the 26-9-29 I was endeavouring to lift the pulley block off the hook in the ceiling of the hangar to which the pulley block was attached. We were using the 16 foot step ladder and to get the block down from the ceiling it was necessary to stand on the top of this ladder. I endeavoured twice to lift the block from off the hook and found it too heavy for me to do so. Corporal McInnis then said "Lookout Sergeant, let me get up there and I'll show you how to get that down." He was standing on the top of the ladder, had lifted the pulley block once and did not get it clear of the hook so made another attempt. This second time he cleared the hook. The weight of the pulley block, which is about 200 lbs, overbalanced Corporal McInnis and he fell off the ladder. I was standing half way up on the ladder when he overbalanced. The ladder swayed sideways and threw me off it but I managed to catch a rope which was attached to the pulley block and strung over a beam to hold the weight of the pulley block after it was loosed from the hook. On getting to the floor and seeing that Corporal McInnis was injured I phoned the M.T. Section for the ambulance which arrived in about three minutes. I then accompanied him to the hospital.

Ques: Was anyone holding the ladder?

Ans: No Sir.

Ques: Do you consider the ladder safe without anyone holding it?

Ans: Yes Sir, I have often stood on it myself without anyone holding it.

Ques: Is there any other way you could have lifted this pulley block off the hook.

Ans: Yes Sir. AC1 Mulligan had attempted to lift the pulley block but had failed. He then climbed up between the ceiling and the roof with the intention of straddling the beam and lifting the block directly from above. AC1 Donoghue was stationed below at the end of the rope fastened to the pulley block and strung over the beam. He was to pull on the rope to assist in the operation and to gently ease the pulley block to the floor after it had been released.

Ques: Do you consider this a safer method?

Ans: Yes Sir."

Was this the origin of "Murphy's Law"?

J. P. Hourigan, F/L
RCAF Records Office

(You'll be knowin' now that Murphy had his hand in the building of the flyin' machine. And it's only to preserve the reputation of a few innocent sons of Erin that I'm after changin' the names in your epistle.—ED)

Information Please

Is there a flight room on any flying unit where you fail to find a discussion concerning flying matters whether they be aircraft handling, flying techniques, or IFR procedures? No. Because, thank goodness, such a stagnant situation does not exist. But what does exist is the situation where a good many of these discussions come to naught due to inadequate information at station level, lack of explanatory publications or any one of a number of other reasons.

I would like to make a suggestion that I think would help to alleviate this lack of available information and add much to the safe flying practices of the RCAF. What about adding a section to Flight Comment entitled "What's Your Problem?," or some such title? Such questions as: "Why do similar aircraft in different commands require different power settings?," or "Why must a holding pattern not exceed two minutes or can it?," are quite often asked. Some people are in a position to know the answers while others are not.

It is conceivable that ensuing discussion might lead to the disclosure of unrealized unsafe flying practices or help to acquaint aircrew with problems of which they are unaware.

If such a suggestion is undertaken and support is received from the field, only a more consistent flying policy and a more knowledgeable aircrew member can emerge.

R. Morris, F/L
RCAF Station Saskatoon

(This is a good idea. Flight Comment is more than willing to help get correct information right into the flight room. So bring on the questions and our staff will try to oblige. And, if the sender so requests, his name will not be published.—ED)

Star Gazer In The Cockpit

Flying is certainly one of the most relaxing activities a man can pursue. But irrevocably associated with the pure pleasure of flying is the obligation to see and to exercise caution in flight. The star gazer, the dreamer, the hypnotized pilot who stares out from his cockpit window into a blank emptiness and sees nothing more than the extension of his own reverie, this man has surrendered his right to fly and deserves to be treated like other contagious individuals or subjects—he should be isolated, if he survives his next flight.

Air Facts

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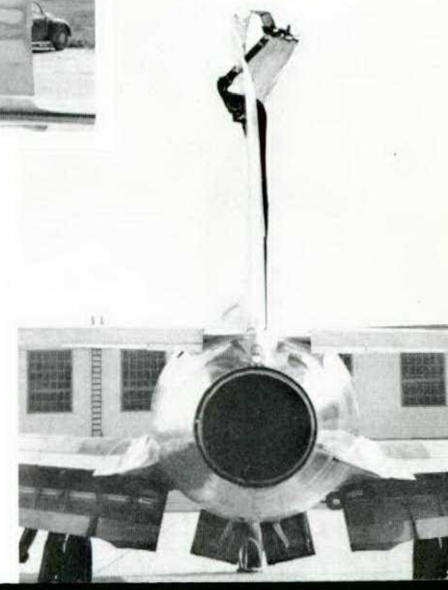
BIRD WATCHERS' CORNER

THE IMPULSIVE IBIS

Until this bird's impulsive tendencies are made manifest he is venerated by the ancients and the fledglings alike. He is very patient when teaching the young ones to use their newly feathered wings. He is, normally, a careful type but at times he forgets that the fledglings must be taught slowly. When leading the flock he impulsively executes a sudden manoeuvre and, of course, the young ones cannot cope. The result is a deflated leader with battered tail feathers and several shook-up and bruised fledglings.

CALL: FOLLOWME! FOLLOWME!



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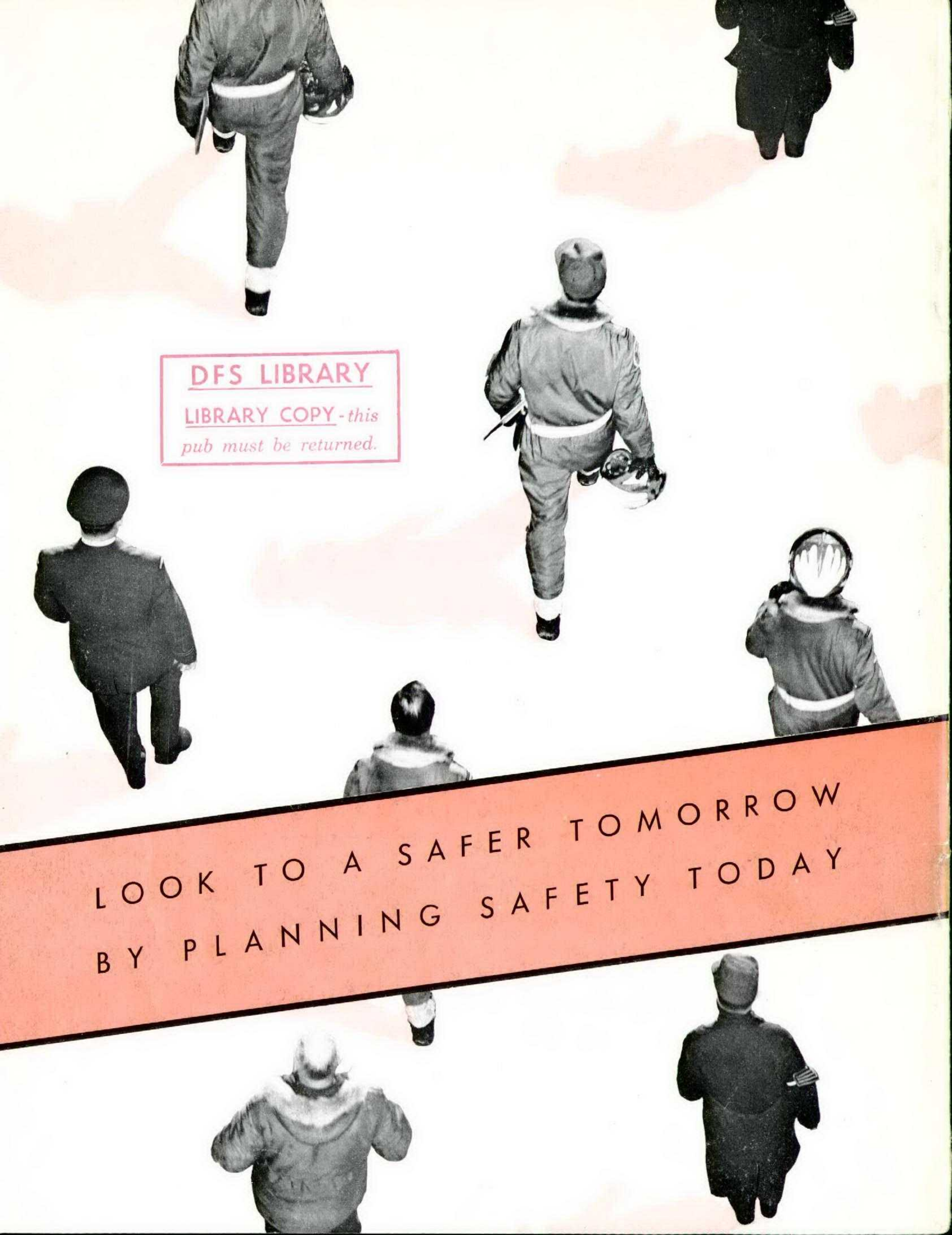
LOOK TO A SAFER TOMORROW
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