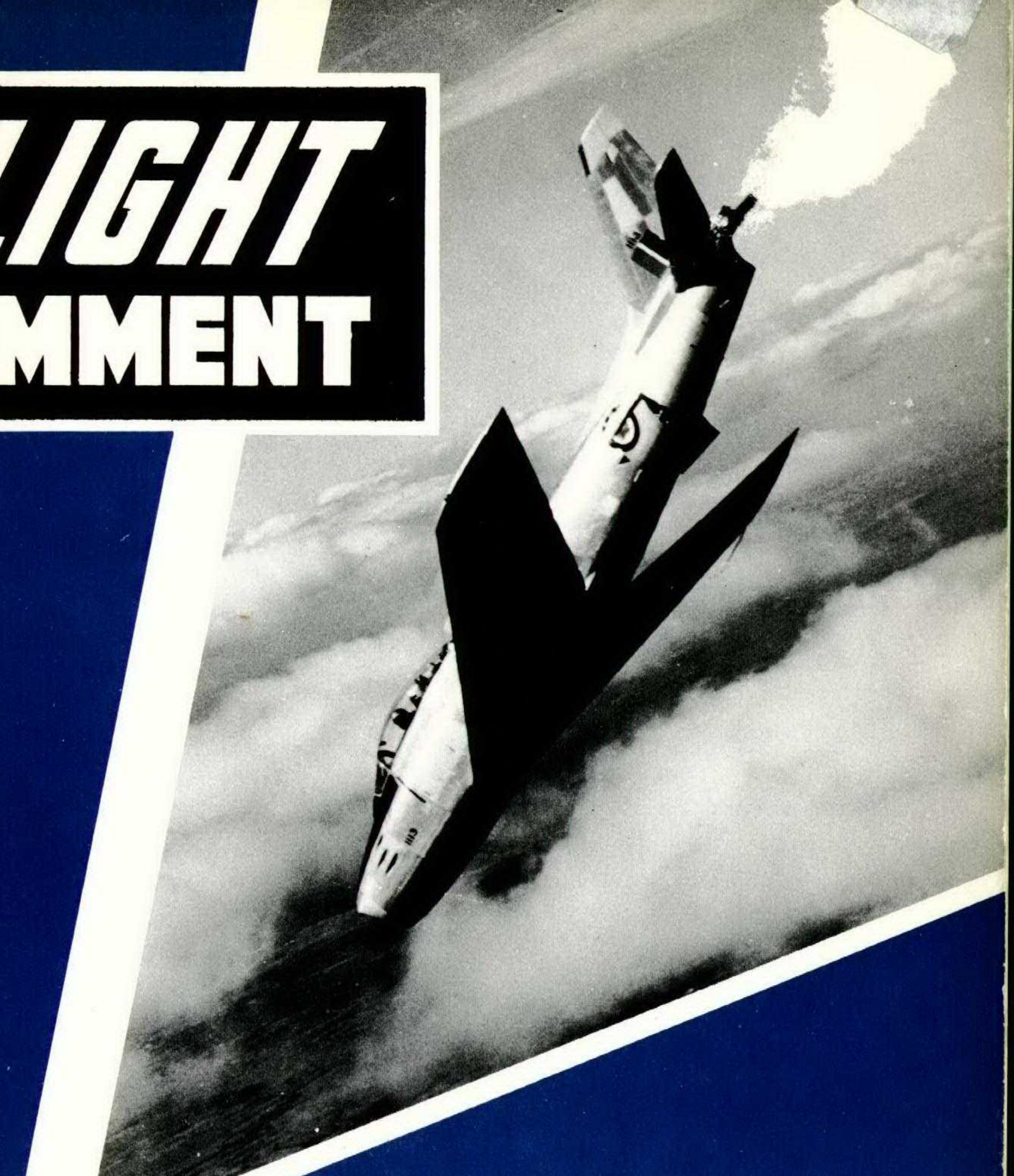
FLIGHT COMMENT



ISSUED BY

DIRECTORATE OF FLIGHT SAFETY
R.C.A.F. HEADQUARTERS • OTTAWA, ONT.
JANUARY · FEBRUARY · 1956

RESTRICTED

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DIRECTORATE OF FLIGHT SAFETY
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JANUARY · FEBRUARY 1956

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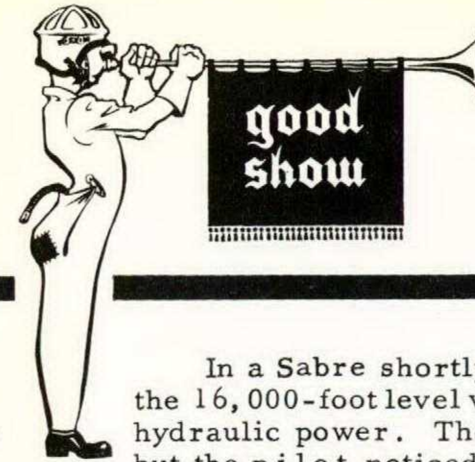
QUEENS PRINTER AND CONTROLLER OF STATIONERY
OTTAWA



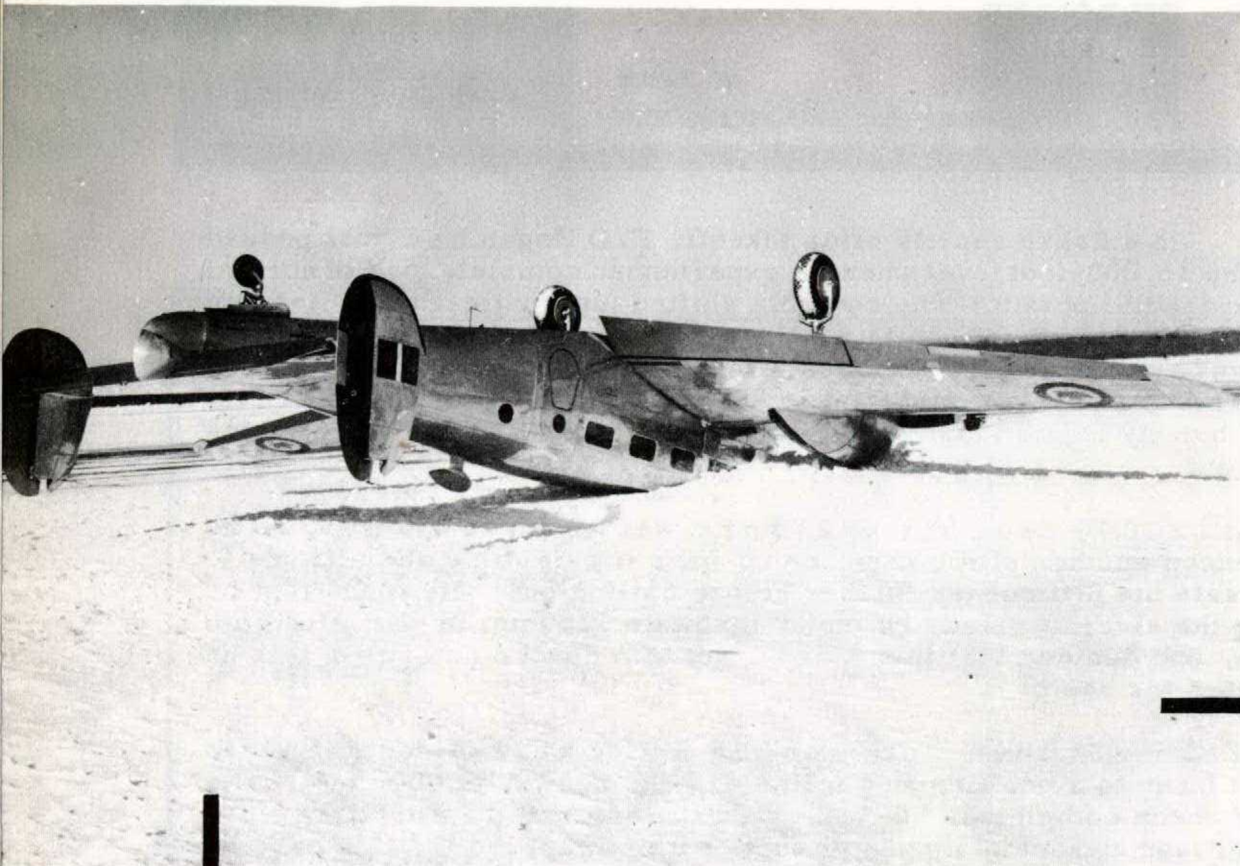
F/O D. C. HOGAN

In a Sabre shortly after takeoff, F/O Hogan had just passed the 16,000-foot level when he experienced complete loss of normal hydraulic power. The controls shifted automatically to alternate but the pilot noticed that the pressure was dropping rapidly in that system. He then selected alternate manually, but this had no effect and the pressure dropped to 800 psi. At this point he called the tower, briefly related his difficulties, and stated that he was electing to bail out.

At 12,000 feet his pressure was down to 650 psi, so he commenced another climb in order to have more time and altitude to investigate his difficulties further before bailing out. He found that by holding the aircraft steady he could maintain 1200 psi in the alternate system, and decided that this would get him down provided that he restricted his use of it.

F/O Hogan then commenced a wide spiral descent which brought him to a position five miles off the runway at 3000 feet. His landing check completed, he then eased the aircraft down fairly close to the ground and maintained 130 knots with power, so that, in case he did suffer complete loss of control, he would be able to flame out and, by using rudder to keep the wings level, attempt a crash landing straight ahead. However, as a result of his well-planned forced landing procedure—and because of his coolness during the final approach—he did not have to use his controls to any extent, and succeeded in landing with 700 psi left in his alternate system. Subsequent investigation revealed that the aircraft had a faulty normal hydraulic pump and a leak in the alternate pump.

Through his decision to attempt a forced landing rather than bail out, and because of a carefully planned forced landing procedure, F/O Hogan saved his aircraft. He is to be commended for this exemplary display of airmanship.



Accident? Or Prang?

When is an ACCIDENT not an accident? We contend most of the time; but in case you think the flow of D14s and D6s has swept some of us in the Directorate of Flight Safety completely around the bend, some explanation may be in order. The good book (AFAO 21.56/01, para 13) defines the term ACCIDENT specifically, but here it will be sufficient to say that it is an occurrence in which an aircraft is damaged while in the hands of aircrew. In our dictionary, on the other hand, the word "accident" is described as an event without apparent cause—unexpected, chance, fortune. Between the two definitions lies a great deal of misunderstanding.

RCAF Accident Assessments

The cause of aircraft ACCIDENTS in the RCAF is assessed as one or more of the following: Obscure, Acceptable, Ground, Briefing, Materiel, Maintenance, Pilot Error and Other Crew Error. Let us examine some of these causes in relation to the dictionary definition of an accident.

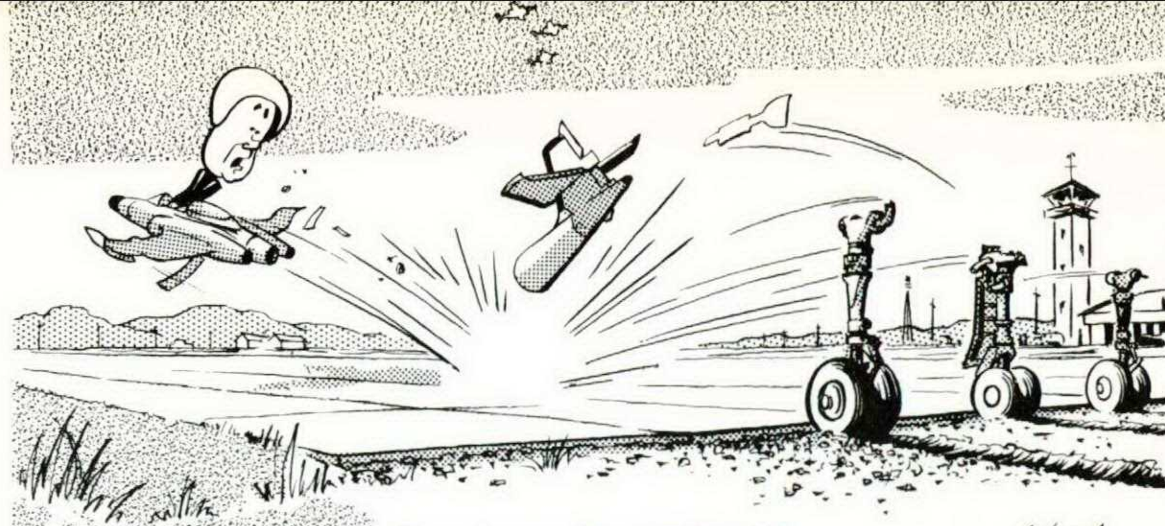
"Acceptable"

Consider the case of a mercy mission to a northern outpost. On arrival over his destination, the pilot observes the water conditions to be abnormally rough. However, in view of the priority of the mission, he accepts the risks and attempts a landing. The aircraft floats are damaged in the rough water—and the occurrence constitutes an "Acceptable" ACCIDENT. The cause is apparent, the damage was not entirely unexpected, and the event could hardly be called an accident according to the dictionary definition.

"Ground"

Under "Ground" assessments may be found those occurrences caused by runway obstructions. One example of such an obstruction (and there have been far too many) is the exposed lip of a runway threshold.

What can happen when one of these hazards gets in the way is demonstrated in the case of a pilot of one of our more expensive jet fighters who misjudged his approach and undershot, the undercart coming adrift when it struck six inches of exposed lip. In the final event the taxpayer had to dig a little deeper in the old sock for a replacement aircraft. Granted our pilot misjudged and undershot—but who in the flying business in this day and age (with runways not quite as long as we would like them) could honestly say that undershooting in jet landings is an unexpected event?



Exposed runway lip - a real hazard

If you have any doubts on the matter, take a look at the wheel marks in the undershoot areas on your nearest jet runway. What happens when over 16 tons of machinery hits an immovable concrete object at roughly 120 knots doesn't need describing here.

Once again the cause of the event was readily apparent, the event itself was not unexpected, and what did happen was bound to have occurred sooner or later. For our money it was not an accident at all but the product of downright inefficiency! A supervisor and the station Flight Safety Officer were not doing their jobs—and sure as fate there was an ACCIDENT.

"Briefing"

Where inadequate supervision is a contributing cause factor, the assessment of the ACCIDENT is "Briefing". Take the case of a student pilot at an FTS who was permitted to take off solo under deteriorating weather conditions. On climbing out of the circuit he entered cloud and lost control of his aircraft, with the inevitable results. Station authorities were aware of the weather situation. Training staffs know very well that an inexperienced student may inadvertently enter low cloud; and what happens when a pilot with no time on the clocks gets into a cloud is old hat. In fact it would have been an accident, fortune, good luck or what have you, if this pilot hadn't lost control of the aircraft. He did—basically because, through inadequate supervision, he was detailed for a flight under conditions far beyond his ability. Sure, there was an ACCIDENT. But the cause was apparent; and, with the exception of the unfortunate pilot, there was no reason for anyone else to have expected otherwise. It wasn't an accident—just the logical outcome of inefficient supervision.

"Materiel"

We will skip an example on "Materiel" failures. Difficulties caused by them are in many cases accidents, and we don't propose to enlarge on the part that good supervision plays in the design, fabrication and assembly of our aircraft.

"Maintenance"

Under "Maintenance" we might look at the case of an aircraft which came down out of control. A missing bolt in the fore-and-aft control rod system was attributed to an error of omission by some technician who failed to replace or secure a nut on the missing bolt. Now the Air Force has had some previous experience in controls being inadequately connected and prescribes in an engineering order that all such work must be inspected by an NCO supervisor. An embarrassingly large percentage of appropriate supervisors were not aware of the order and consequently it was not being implemented. It is not unreasonable to expect an airman technician or anybody else to make a very infrequent error of omission; therefore, under the circumstances, the loss-of-control situation could hardly be labelled "unexpected". It was because such an event was anticipated that an order providing for special supervision was promulgated. The required standard of supervision had not been maintained and so an ACCIDENT occurred. But it was not unexpected. Nor was the cause unknown. Was it really an accident?

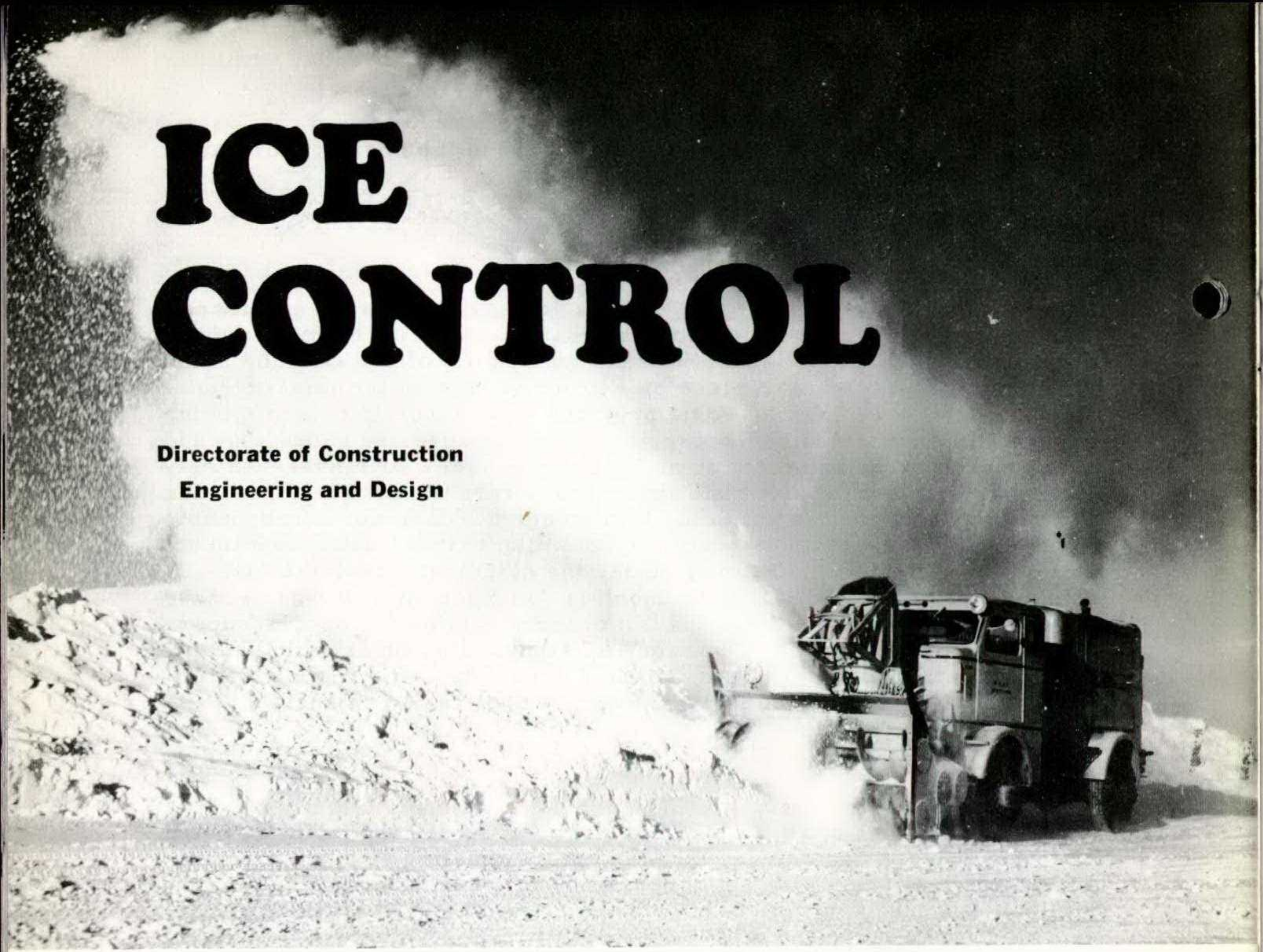
"Pilot Error"

Finally we come to "Pilot Error". What happens in an outfit when the drivers become careless and start wheeling the old airframe around the taxi strip with the nonchalance of a car attendant in a parking lot? It's just a matter of time before someone gets a wing tip. Unexpected? Not on your life!—you couldn't expect otherwise. Without apparent cause? To the contrary: it was blatantly apparent. Unit pilots had developed unsafe habits which unit supervisors had failed to detect and correct before the collision. An ACCIDENT there was—but not according to the dictionary.

*

How can this confusion in terminology be overcome? We have no ready answer other than to suggest there is much merit in that descriptive, precise word used by our friends on the other side of the Atlantic. We have our share of "prangs"; but not many are real accidents.

Inspection by an NCO supervisor



ICE CONTROL

Directorate of Construction Engineering and Design

Several months ago an article was promised on experiments made last winter at Rockcliffe on the treatment of icy runways. The report on the tests has now been received, but unfortunately it will reach the reader rather late in the season. However, separate recommendations have already gone forward to commands and stations.

Dealing with ice

The tests at Rockcliffe showed that a screened and dried sand can be firmly attached to ice to provide a good braking surface, and that the amount of sand required is relatively small compared to the amount normally used. The most successful method of bonding tried was to spray the surface of the runway with water immediately ahead of the sander. From calculations made during the tests it was also discovered that the water requirement need not exceed a depth of 1/100th of an inch and that the amount of ice built up due to this spraying is therefore negligible.

The ideal size of sand we recommend is from 1/16" to 1/8" in diameter. Finer sands are effective for only short periods before they become ice covered. Grains having sharp corners and edges are preferable to the rounded variety; and it is also best to select dark-colored sand, particularly if it is to be spread on thin ice. Incidentally, the granulated slag employed at North Bay is a good substitute.

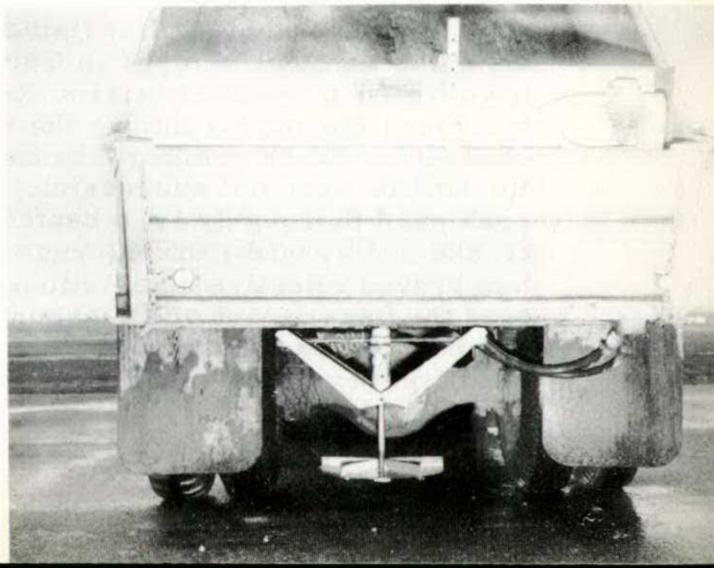
The sand should be purchased as a screened product, minus 1/4", and the source inspected to ensure that the grain diameter is approximately 1/8". It should also be purchased as the product of a drying plant unless the moisture content is uniform and less than 1/2 of 1%. An excellent method of testing for harmful moisture is to place samples (pressed into a tight container) in the freezing compartment of a refrigerator. If the sand continues to run freely at low temperatures without the formation of lumps, then it is satisfactory.

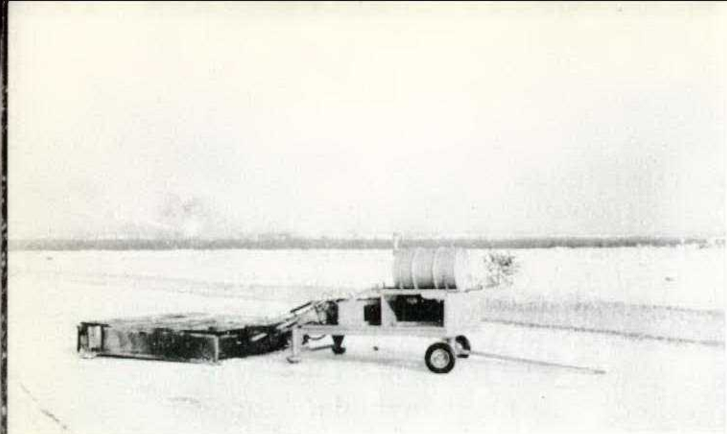
Arrangements have been completed to provide ADC stations with high speed sanders for this winter. It is expected that they will be made available for runways generally next year if, during the coming winter, they prove to be more effective than equipment currently in use. The type of machine now being purchased is the disc type, feeding sand by means of an auger from a standard dump body.

ADC stations are also being provided—on a temporary basis for this winter—with asphalt distributors to be used as water sprayers. The reason for this arrangement is that the spray bars are adequately jacketted and the water can be heated in the tank. In addition, a street sprayer is being used for study and possible modification. It is hoped that street sprayers can be adequately modified, particularly because these vehicles can also be utilized for spraying and cleaning streets and runway surfaces during the summer.

Dominion HY4 sander showing spinner

Asphalt distributor





Trailer flame thrower

Runway surface after sweeping

One of the chief methods of controlling ice on runway surfaces is to remove thoroughly the residual snow after plowing. This snow, by compaction, direct sunshine, or warm jet blast, is changed to ice. Experiments were made with fair success to sweep and blow it away with the sweepers available at present, but there was considerable breakdown of equipment. A stronger prototype is now on order and will be tried out during the 1955-56 winter season.

The worst type of ice seems to be produced by freezing rain; and sanding appears to be the only solution. There is another form of ice that settles like dew, depositing a thin, slippery film on a dry surface. Sanding is probably the only reasonable cure for this condition. The storage of sand itself is important. The method now being adopted is to store screened and dried sand, in a cold condition, between parallel walls on a high or well drained piece of ground and to cover it with tarpaulin. There is some indication that one-day, warm sand storage may be required at some stations. Provision for such storage, if required, is being left to station initiative until the requirement is confirmed.

Alternative methods for the control or elimination of ice are still under review. There has been no progress on the use of chemicals. Our tests indicated that the action of calcium chloride is very slow at low temperatures; and there is still an objection to the use of this salt, even when buffered so that it does not attack iron or aluminum, because it still corrodes magnesium. Alternative compounds have not yet been discovered.

A trailer that applies flame to the runway ice and then covers with sand has been developed in Germany and it is understood that several have been purchased by the RAF. It is intended to investigate these machines thoroughly during the winter of '55-'56 and one may be purchased for RCAF trials. The experiments on flame melting of ice at Rockcliffe were not successful. The usual practice at Chatham is to soak sand thoroughly in a heated box, then load the steaming sand into trucks and spread it on the runway. In Chatham's climate this method has proved effective and stations are invited to try it. At Malton Airport the Department of Transport has been successful in using sand that has been soaked in cold water, but other airports have found that the sand freezes in the sanding machine.

Recommendations

Following its research program of last winter, CEPE prepared an extensive report entitled "Snow Removal and Ice Control" (report No. 1093, issued July 1955). Among the recommendations made were a number dealing with snow removal, so we are including those here, although the earlier portions of this article have dealt almost exclusively with the ice problem. (Obviously, unit methods will be governed by local weather conditions and operational requirements.— **ED**) It was recommended that:

- Intensive research be conducted to develop a chemical having good ice removal characteristics in addition to being inert to metals used in the manufacture of aircraft and paved surfaces.
- Development of heavy-duty power sweepers be commenced immediately so that tests could be completed and any design weaknesses corrected to ensure availability of the equipment for the 1955-56 winter season.
- Radiant heating of runways be thoroughly investigated by heating and runway design specialists.
- Investigation be made of the mechanical removal of ice by steel bristled rotary brooms. (Note: Tests of this nature are to be conducted for the United States Air Force and some valuable information may be available from this source.)
- Care should be exercised in the selection, preparation and storage of sand.
- High speed sanders should be supplied to all flying units since sand is a requirement for ice control.
- A water distributing device similar in operation to the asphalt distributor should be available at all flying units for use in conjunction with sanders for ice control emergencies.
- Mechanically reliable, heavy duty, sand loading equipment be used because of their greater working capacity.
- Emergency flying only be conducted prior to and during snow removal operations.
- Vehicle inter-communication facilities be installed in all snow removal equipment.
- Heated accommodation be provided in all snow removal equipment.

- A more positive method for starting diesel engines be provided.
- High speed plows be recognized as the most efficient equipment for runway snow removal.
- The one way plow be recognized as a practical item of snow removal equipment for road clearance.
- The requirement for baby snow blowers be further investigated and, if found necessary, that additional models be tested.
- Snow rollers be used for snow compaction on the aerodrome areas.
- Personnel responsible for snow removal operations be given adequate instruction on operational techniques, equipment limitations and operating characteristics.

Methods and weather

CEPE's report devoted a separate section to listing recommendations for the best methods of tackling runway clearance in a variety of weather conditions. They are well worth reviewing here in some detail.

Residual snow remaining after plowing operations should be removed by sweeping. (The crosswind runway is best swept from the windward side.) Snow followed by a freezing rain calls for close liaison with the Met section because a two and one-half inch blanket of snow should be allowed to remain as a blotter. Once the rain has stopped and the snow has become saturated, it is time for removal operations to start.

Rain followed by snow requires a change in technique. When rain is not freezing to the runway surface as it falls, and snow later commences falling, sweepers are the best means of removing water and snow. Sand should be put down immediately after sweeping.

If the rain is freezing to the surface as it falls, sand has to be liberally applied (5 sq. ft. per pound) at the first sign of a snowfall. Close liaison with the Met section will again help to establish when this condition is reached. When the storm is past, the snow can be removed be scarifying and sweeping.

Compacted snow is usually the product of frequent snow flurries and/or residual snow remaining on the runway after plowing operations. Traction on this surface is improved considerably by the application of water and sand, but removal should be initiated at the earliest opportunity through the use of a grader equipped with scarifier blades. If power sweepers are available and proper snow removal procedures adopted, this condition should not be encountered.

For emergency flying during a fall of freezing rain on a clear asphalt surface, sand must be applied immediately prior to the flying commitment. In any event, sand should be put down during the last stages of a storm to ensure that a bond is obtained and traction provided. Ice removal is then effected by a patrol grader equipped with scarifying blades—but at any time prior to complete ice removal, traction may be provided for emergency flying by the application of sand and water. Only emergency flying should interrupt ice removal operations.

Prior to removal of wet or dry snow in conditions of no wind, traffic ought to be avoided to the fullest extent in order to prevent compaction. Plowing should be initiated on the "in wind" runway when a snowfall of three inches in depth is reached and when the forecast indicates a minimum additional three-inch fall. Secondary runways may be plowed after the storm is past or when four to five inches of snow has fallen. Correct removal is from the centre line to sides, and sweeping may be done in conjunction with the final plowing operation. To avoid compaction, plowing of the station roads is best initiated after each two inches of snowfall. Where dry snow is falling, accompanied by winds, the depth of snowfall is not the governing factor since drifting will occur. Snow removal from the in-wind runway must be initiated at intervals as required to maintain a serviceable runway. Plowing of the crosswind runway is dependent on the extent of drifting, but minimum traffic will assist in avoiding compaction. The crosswind runway should be plowed and swept starting at the windward side to avoid carry-over of fine snow to the cleared portion of the runway.

(For those of our readers interested in the details of CEPE's research into runway clearance, a study of the report mentioned earlier in this article will prove enlightening. As for the continuing projects on this phase of the problems entailed in winter flying operations, FLIGHT COMMENT will endeavor to keep its readers both informed and up-to-date on important developments as they arise in the course of CEPE's continuing experimental program.— **ED**)

Sicard snow blower, 5 - 7 tons

One-way plow with levelling wing

PX'ing

LETTERS TO THE EDITOR

Request for Photos

Photographs of all kinds—air and ground shots, aircrew and maintenance subjects—are urgently needed by the Directorate of Flight Safety to illustrate future issues of FLIGHT COMMENT. We would particularly like to have photos of personnel engaged in all phases of aviation operations. Crash shots are not required—our supply of those is quite adequate.

We're inclined to believe that some pretty fine photography must be turned out at RCAF units and we'd like to see some of it. Glossy, 8 x 10 prints are best, but we'll be happy to accept whatever you have.

If you wish, we'll return your shots—and take good care of them while they're in our possession. Just mail them flat in an envelope, backed with cardboard, to the address appearing elsewhere on this page. Thanks.— **ED**

Sabre Engine Seizure

When the Sabre engine seizes, the generator and the normal flight control hydraulic system fail. Battery power for the emergency flight control system will last only six or seven minutes. However, the actual battery output duration is an unknown quantity, as it will depend upon the total electrical load being used, state of battery charge, battery temperature, and the amount of control movement initiated by the pilot. In view of these many unknown quantities involved, the following message was sent to all Sabre user commands:

CAO 96 20 JUN 55

"EMERGENCY PROCEDURES SABRE AIRCRAFT (.) SHOULD SUFFICIENT ALTITUDE REMAIN TO SUCCESSFULLY EJECT IT IS NOW CONSIDERED MANDATORY TO ABANDON THE AIRCRAFT FOLLOWING ENGINE SEIZURE (.) ALL SABRE PILOTS OPERATING INSTRUCTIONS WILL BE AMENDED ACCORDINGLY (.)"— **ED**

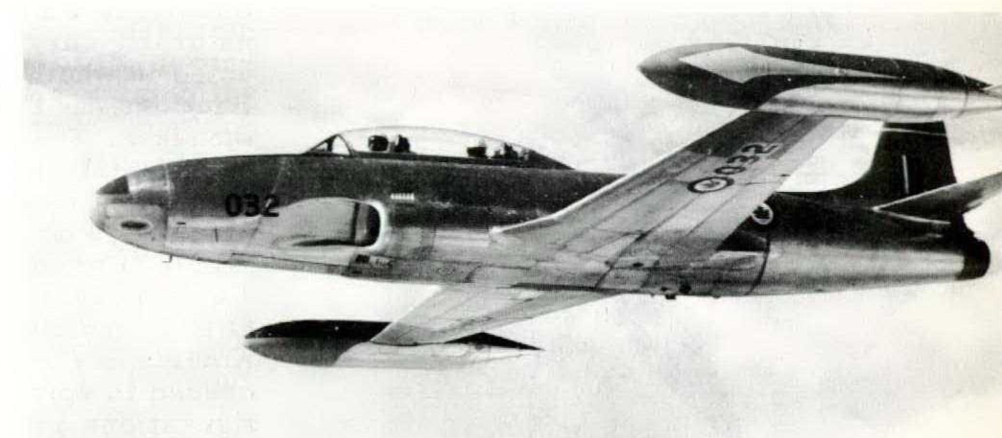
Articles, comment and criticism welcome.
Address all correspondence to:

THE EDITOR, FLIGHT COMMENT
DIRECTORATE OF FLIGHT SAFETY
AFHQ, OTTAWA

SPINNING

THE AUTHOR

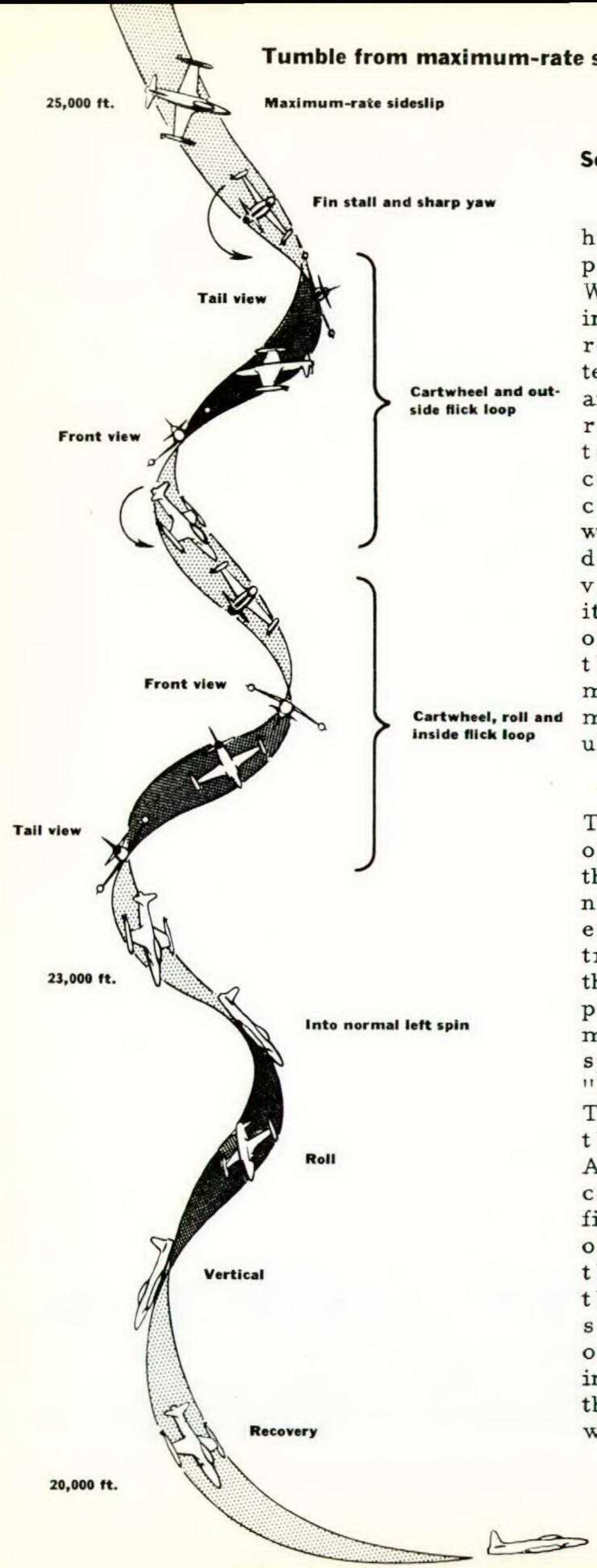
F/L J.C. Henry graduated from the University of Toronto as an aeronautical engineer in 1949. He was also a member of UATP 1, the first post-war course of University Flight Cadets. After completion of his training with this group he went to 426 Squadron for a period of three years during which he participated in the airlift to Japan. A tour of duty at Central Experimental and Proving Establishment followed next, after which, in 1953, F/L Henry went to Britain for the Empire Test Pilots Course. Since that time he has been stationed at CEPE Rockcliffe as a test pilot



the T-33

by **F/L J.C. HENRY**

Tumble from maximum-rate sideslip to right

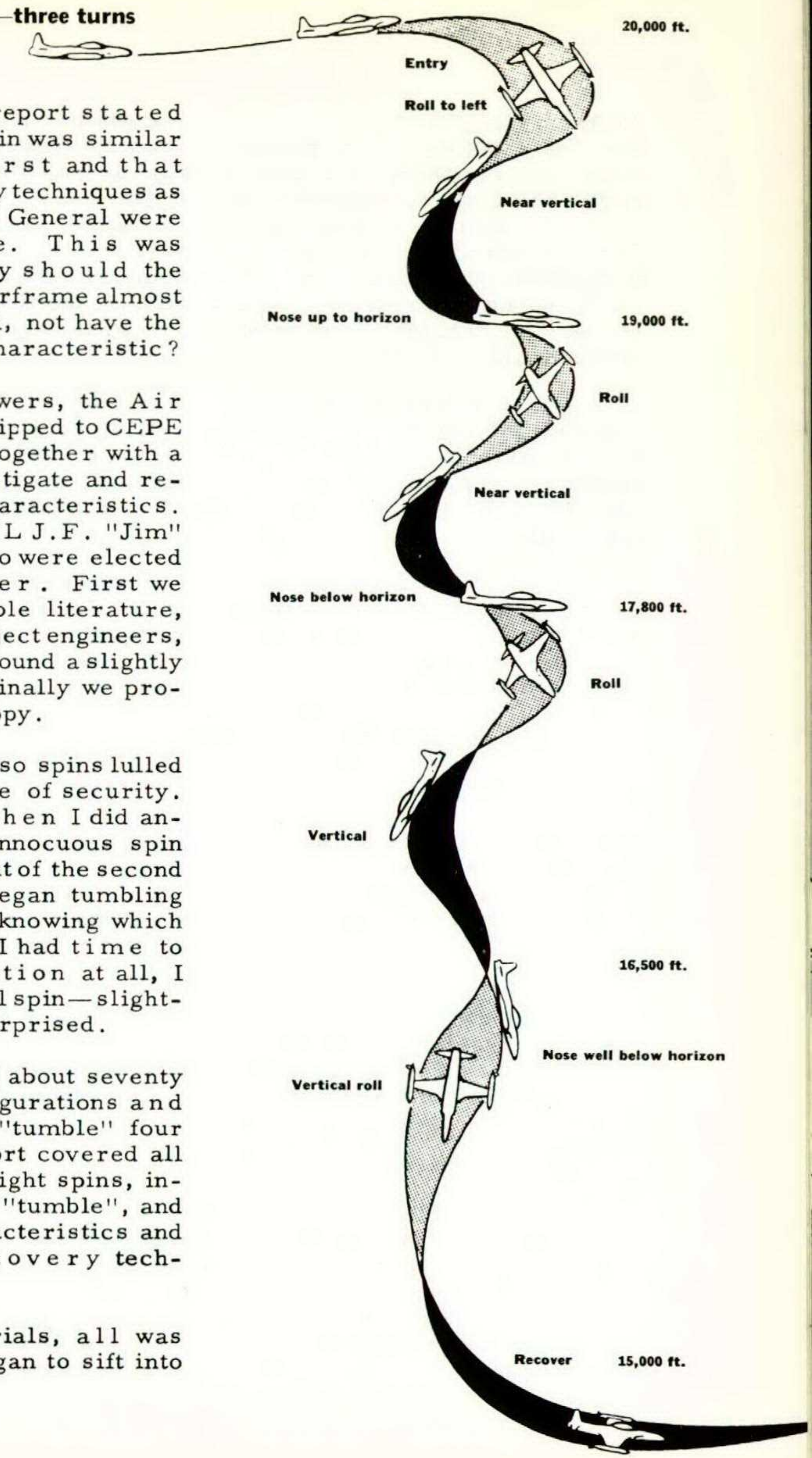


Some Spin History

During the past two years there has been considerable needless apprehension about spinning the T-33. When this aircraft was introduced into the USAF as the T-33A, spinning restrictions were imposed because test pilots occasionally encountered an unusual flight condition which they referred to in such uncomplimentary terms as "tumbling" and "out-of-control manoeuvre". Lockheed Aircraft Corporation, in conjunction with the USAF, investigated to determine what caused this manoeuvre and what could be done to prevent it. Among the problems arising out of the project, test pilots found that the aircraft's inherent stability made it difficult to reproduce the manoeuvre intentionally, particularly in spins.

The T-33 Mk 3 (essentially a T-33A with a Nene Engine in place of the Allison) was introduced into the RCAF early in 1953. Quite naturally our Air Force was interested in whether the spinning restrictions on the "A" would apply to the Mk 3. Subsequently Central Experimental and Proving Establishment (CEPE) was requested to do spin trials on the Mk 3. S/L R.G. "Bob" Christie, at that time Chief Test Pilot at CEPE, examined all the information available from American sources and then proceeded to spin the T-33 in all configurations and at various centre-of-gravity positions. Not once in these spin trials did he encounter the "unusual flight condition", and since there had been no reported occurrences of it at RCAF units using the T-33, it was concluded that the Canadian version of the aircraft was not susceptible to "tumble".

Normal, erect spin to left—three turns



S/L Christie's report stated that the T-33 Mk 3 spin was similar to the Harvard's worst and that standard spin recovery techniques as given in Pilot's Notes General were effective and adequate. This was all very well; but why should the T-33 Mk 3, with an airframe almost identical to the T-33A, not have the latter's one unusual characteristic?

To get the answers, the Air Force had a T-33A shipped to CEPE in February, 1954, together with a request that we investigate and report on its spinning characteristics. This time it was S/L J.F. "Jim" Fewell and myself who were elected to look into the matter. First we read all the available literature, consulted with the project engineers, and groped our way around a slightly unfamiliar cockpit. Finally we proceeded to get spin happy.

The first ten or so spins lulled us into a false sense of security. Nothing happened. Then I did another—a perfectly innocuous spin to the left. Coming out of the second turn I suddenly began tumbling through the sky, not knowing which way was up. Before I had time to take any recovery action at all, I was back into a normal spin—slightly shaken and very surprised.

All told, we did about seventy spins in various configurations and encountered this "tumble" four times. Our final report covered all types of normal upright spins, inverted spins, and the "tumble", and described their characteristics and the recommended recovery techniques.

Following the trials, all was quiet until reports began to sift into

Training Command Headquarters from units in the field. These reports covered a variety of complaints from poor stall characteristics to difficult spin recovery and unusual flight manoeuvres. The upshot was a request to Central Flying School, Trenton, asking that an investigation be made into the spinning of the T-33 Mk 3 and associated problems. The new trials were conducted in February and March of 1955 and a total of 140 spins and disoriented conditions of flight were racked up. Forty-seven attempts were made to obtain the tumble condition but only 16 were successful—and these occurred through gross mishandling of the controls.

An excellent report was produced from these trials, and the conclusions and recommendations arrived at confirmed the previous results obtained by CEPE. In addition, an excellent film was obtained showing a T-33 doing one of the tumbles. It will be used in a training film now being produced by CFS and RCAF Photographic Establishment, Rockcliffe.

While the foregoing tests were in progress, Lockheed had been doing some further investigation on the T-33A and ultimately recommended a small modification: the addition of a stall strip on the leading edge of each wing, together with a modified wing root fillet. With these modifications the USAF lifted spinning restrictions on the aircraft. Canadair, as the Canadian manufacturer of the T-33, was informed of this, and a modified Mk 3 T-33 was sent to CEPE for trials in March 1955. The new "mods" certainly improved the aircraft's stalling characteristics and appeared to aid the spins, too, since the characteristic tumble entry was not encountered on any of the flights. At the end of April, I had a chance to visit Lockheed's plant at Palmdale, California, and discuss the whole problem of the T-33 with "Sammy" Mason, the Lockheed test pilot who has "lived with" the T-33 since it was first flown. Our get-together was most informative and revealed that basically we agreed on the conclusions drawn from our respective trials.

So much for the history of the T-33. A brief discussion of the various characteristics of the aircraft would now be in order. The manoeuvres covered are those which might be confusing to the pilot: spinning—upright and inverted; snap or flick rolling; and the tumble.

The Normal Spin

The normal spin in the T-33 is a typical oscillatory spin in all configurations. The entry is normal with full rudder and stick full back at the stall. During the spin the nose rises and falls; the rotation alternately speeds up and slows down; and, as the spin progresses, the attitude of the aircraft becomes progressively more nose-down while the oscillations decrease. The pilot is almost always under positive G, and the spin (although the aircraft may be momentarily inverted during

the manoeuvre) cannot be classed as "rough". Normal height loss is 1000 to 1500 feet per turn. With the undercarriage or flaps down, with fuel in the tip tanks, with no tip tanks installed, or with power on during the spin, the rate of rotation may be changed but the basic spin pattern remains the same.

Standard recovery action provides the most effective method of recovery. In detail the action is as follows:

- ▲ Clean up the aircraft if gear, flaps or speed brakes are down.
- ▲ Throttle back to idle.
- ▲ Stop the rotation with full opposite rudder.
- ▲ Move the control column smoothly, steadily forward until the spinning stops. (It is not advisable to move the control column much beyond the central position since this could produce a bunt or possibly an inverted spin.)
- ▲ Immediately the spinning stops, centralize the rudders and ease the aircraft out of the resulting dive.

The Inverted Spin

This type of spin is not taught normally and it is seldom performed intentionally. However we mentioned it here because you might encounter it some time. The method of intentional entry is from inverted, level, power-off flight. As the speed falls off, the control column is pushed slowly ahead until, at the inverted stall, it is fully forward. Then full rudder is applied.

The inverted spin may take one of two forms. The first is a smooth, flat, fairly fast, inverted spin in which the pilot is subjected to a fairly steady minus one-half G. The second is an oscillatory-type spin, similar in pattern to the upright spins with the exception that, as the nose of the aircraft rises, the aircraft is inverted instead of upright. The pilot in this type of spin is subjected to alternate positive and negative G varying between +2 and −1-½. Combined with rotation and oscillation this treatment can easily confuse a pilot.

Recovery from the inverted spin is quite simple and is accomplished in the following manner:

- ▲ Clean up the aircraft if gear, flaps or dive brakes are down.
- ▲ Throttle back to idle.
- ▲ If the direction of rotation can be definitely established, apply full opposite rudder.

▲ Move the control column smoothly and steadily back until the rotation stops;

▲ Centralize the controls and pull out;

▲ If the direction of rotation cannot be definitely established, centralize all the controls and wait for the spin to stop—which it will do in about one or two turns. Then proceed with a normal pull-out from whatever attitude the aircraft has stopped in.

Snap or Flick Rolling

Intentional flick rolling is prohibited because of the stresses imposed on the aircraft, although there is no record of damage caused to the T-33 as a result of the manoeuvre. Essentially the flick roll is a high speed spin; the controls are in the pro-spin positions with the stick back and full rudder on, but the airspeed is well above the stalling speed. Consequently the aircraft motion is primarily a rolling one along a downward, curved path. The rolling motion is quite fast, with no nose oscillation, and can be readily recognized.

Recovery from this manoeuvre is simply to centralize all controls; and since the airspeed is well above stall, the aircraft is flying again immediately.

The Tumble

This is the manoeuvre which has caused all the concern and apprehension over the T-33. It can be entered only from a maximum-rate sideslip condition seldom encountered in normal flying. The actual tumble is caused by a fin stall and a stabilizer stall, the combination of which render the stabilizing sections of the tail non-effective. The resulting motion is a confusing mixture of cartwheels, flick loops, and rolls, subjecting the pilot to alternate positive and negative G varying in intensity from plus three to minus two. Consequently the inverted spin is easily mistaken for a tumble, and vice versa.

Recovery from the tumble is not strictly in the hands of the pilot. The proper procedure is to:

▲ Centralize all controls as soon as the tumble is recognized or suspected;

▲ <u>Wait</u> until the aircraft assumes a known condition of flight;

▲ Take appropriate recovery action to get back to level flight.

This may not seem like a very positive recovery technique, but it does work. The aircraft will normally tumble through about 2000 feet before settling into a normal spin or some other recognizable flight condition. From there the pilot can take positive recovery action to return to level flight.

On one or two occasions it has been reported that a tumble lasted through six to eight thousand feet; but whether these were tumbles or inverted spins cannot be ascertained. The fact remains that on each of these occasions the tumble or spin stopped before the aircraft reached an altitude of 12,000 feet. Denser air at the lower levels tends to unstall the fin and stabilizer, and so aids in recovery.

Summary

Recovery from any of these unusual flight conditions—spinning, flick rolling or tumbling—can be boiled down into the following simple procedure:

▲ Clean up the aircraft if the gear, flaps, or dive brakes are down;

▲ Throttle back to idle;

▲ If the direction of rotation can be definitely established apply full opposite rudder to stop the rotation;

▲ Move the control column smoothly and steadily to the central position until rotation stops;

▲ Centralize the rudder and recover to level flight;

▲ If the direction of rotation cannot be definitely established, centralize all the controls and wait for the aircraft to assume a familiar or recognizable condition of flight. Then take appropriate recovery action to regain level flight.

To clarify the last point listed above, if the familiar or recognizable condition of flight is a spin, the appropriate recovery is a normal spin recovery. If it is a spiral dive or aileron turn, stop the rotation and ease out of the dive. If it is inverted flight, allow the nose to drop, and gain sufficient airspeed to roll out. The altitude required to loop out of the inverted position is very much greater than that required to roll out.

Dropping the tip tanks, with or without fuel during a spin or tumble, is not recommended unless the fuel load in the tips is known to be uneven enough to cause control difficulty. The reason for this is that the dropped tanks, during a spin, may roll along the top of the wing and then back towards the tail surfaces, possibly causing serious damage.

For pilots, a word of caution should be added here: Always ensure that the seat straps are fastened securely before flight to prevent you being tossed around the cockpit, and to prevent the seat or emergency pack from being dislodged and jamming the control column. This has happened!

If Recovery Action Is Ineffective

As yet no difficulty has been experienced by test pilots in recovering from spins, tumbles, and other out-of-control manoeuvres. However, the following should be borne in mind:

- ▲ If the terrain clearance goes below 10,000 feet or if the pilot feels that sufficient time has elapsed for recovery action to be effective without results, it is recommended that the canopy be jettisoned. This serves a dual purpose in that it is the first step towards a possible bailout and it may assist the actual recovery. Consequently, if the pilot stays with the aircraft a few seconds after the canopy has been jettisoned, a recovery may be possible.
- ▲ However, if a definite recovery from the out-of-control condition has not been established prior to reaching a terrain clearance of 7000 feet, BAIL OUT! Bear in mind that observation of the altimeter is difficult, and that ground reference, due to the gyrations of the aircraft, is even more difficult!

Conclusion

A tribute to the design and manufacture of the T-33—or "T-bird" as it is called by pilots familiar with it—is certainly in order here. Not once during all the spinning, gross mishandling, tumbling and other unusual manoeuvres that were carried out, was there a case of structural damage. Nor were flameouts encountered, although it is possible that one might occur under prolonged negative G.

The T-33 is a docile aircraft when handled properly but it is a fairly high speed trainer and as such needs to be treated with respect.

Every T-33 pilot should become familiar with the normal spin and recovery of the aircraft. He should memorize the techniques for recovery from inverted spins, flick rolls and tumbles despite the fact that he may never use them. What it boils down to is this:

● KNOW YOUR AIRCRAFT ●

● KNOW YOUR PROCEDURES ●

THEN ENJOY YOUR FLYING

REFERENCES

(1) CEPE Report 1062 — T-33 Mk 3 — Aircraft Handling and Performance Trials (20 Jan 54)

(2) CEPE letter Report 164 — T-33 Mk 3 — Elevator Up Stop and Spin Restrictions (31 May 54)

(3) CEPE Report 1094 — T-33 — Stall Strips and Extended Leading Edge: Evaluation (Apr 55)

(4) Lockheed Report 8962 — T-33 A-Spin Evaluation Tests (3 Mar 53)

(5) Lockheed Report 9802 - T-33 A-Stall and Spin Tests With Modified Wing Root Fillet and Spoiler Installation (29 Mar 54)

(6) CFS Trenton; Report on T-33 Spin Evaluation Conducted 8 - 15 Mar 55 (24 Mar 55)

(7) CFS Trenton; Report on T-33 Spin Characteristics (5 May 55)

SLICK WORK SAVES SABRE

The Sabre pictured here developed a cocked nose wheel just prior to landing at Gros Tenquin, France—but precision flying by the pilot, F/O R. Caskie, and quick thinking by the operation's officer of the day, F/L Lloyd Skaalan, was responsible for saving more than $250,000 worth of aircraft.

When the emergency was declared, F/L Skaalan ordered a strip of fire extinguisher foam put on the runway for the crippled wheel to slide on. Then F/O Caskie brought his Sabre in, straddled the foam strip with his main wheels, and gently lowered the nose wheel to the slippery surface. The aircraft was undamaged.

An American commercial airline first employed this idea several years ago, using water. The USAF has resorted to it on several occasions since, and was the first to introduce the use of foam.

Wheels-Up Landings

There have been 25 cases of wheels-up landings in the past 27 months of RCAF flying operations, seven of them in the past six months. A number of the latest were reported in the "Accident Resume" section of FLIGHT COMMENT for Nov - Dec 1955.

With wheels-up landings averaging one per month, it is high time we asked ourselves, "What is the cure for this epidemic?" The following article proposes one method of attacking the problem. Have YOU a suggestion?

One of the most morale-devastating events which can happen to a pilot is to arrive with that horrible scraping noise—wheels-up. The maximum just disciplinary measures are negligible compared to the humiliation experienced when one neglects that essential pre-landing cockpit action and check. Ever since wheels were made retractable, pilots—some of them experienced—have forgotten the undercart. How can we overcome this human frailty of forgetfulness?

Two procedures are followed, amongst other things, to ensure that pilots remember this vital action. Our accident records over recent years indicate that units that make a strict and formal use of cockpit check lists have not suffered a wheels-up landing through pilot negligence. While the use of check lists might be considered the answer, there are types of flying in which the responsible authorities deem it impractical to use them. The other procedure is, of course, that followed by our very helpful friends in flying control. A landing clearance is invariably and conscientiously given in the following precise and correct phraseology:

"Air force 232.........tower, cleared to
land, check gear down and locked."

Now why in the face of this very appropriate reminder do we have pilots who acknowledge the transmission, disregard the reminder, and land wheels-up?

Well, in the first place, they don't do it on purpose; nor is it done for lack of knowledge. There must be some other reason for failing to act on the tower reminder. Let us attempt to analyze the situation.

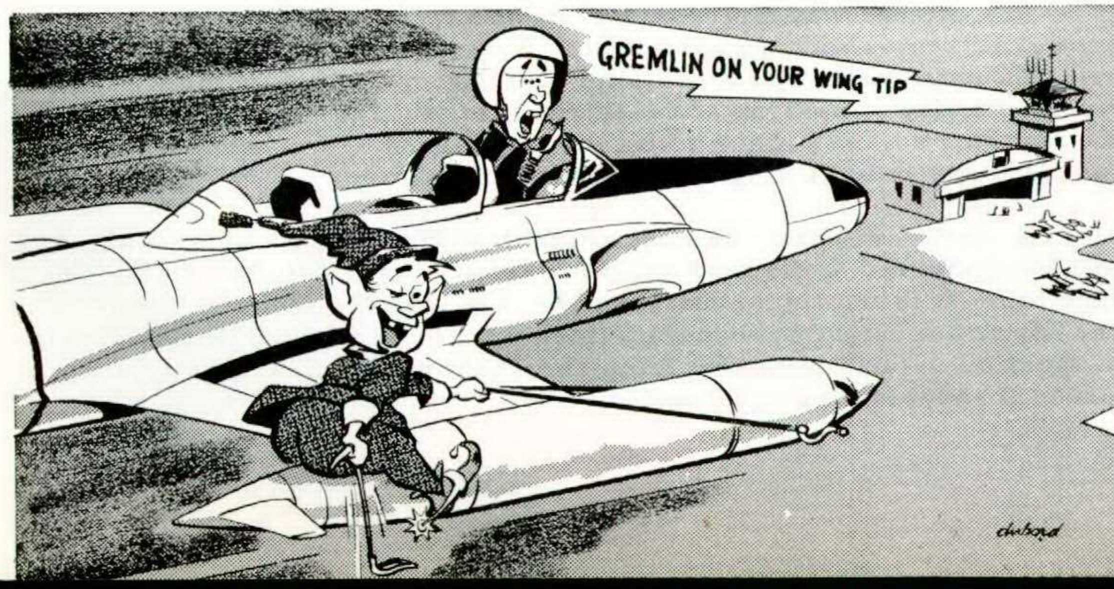
Before the last call to the tower we get the aircraft into the landing configuration with all our checks completed. We then ask for landing clearance and anticipate one of two answers which we subconsciously abbreviate into "yes" or "no". We do not anticipate a gear check reminder. (After all we supposedly attended to that previously.) Every time we receive a landing clearance we also get the gear reminder. But because of the standard phraseology, and because it is always part and parcel of the tower's transmission which we automatically simplify to "yes we land", the significance of the gear reminder can be unconsciously overlooked.

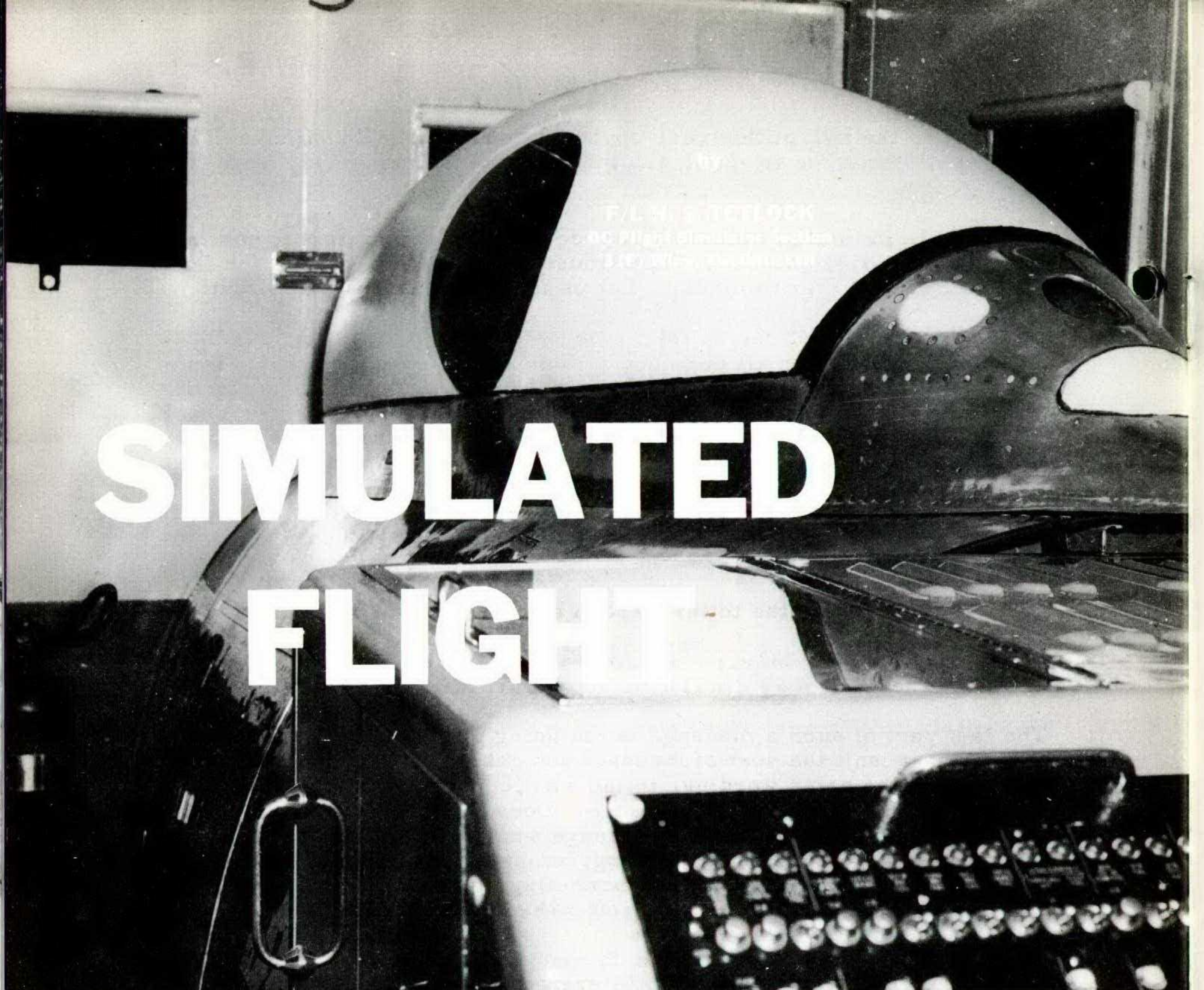
Now supposing the tower were to answer our landing request with:

"Air force 232..........tower, cleared to land.
There is a gremlin on your starboard wing tip."

The last part of such a message is not going to be ignored, one reason being that it isn't the sort of message you get repetitively—in the same manner, in the same wording, in the same position in the approach—every time you call for a clearance. Does this not give us a clue to the manner in which a warning message should be given? Standardization of phraseology is a fine thing, but have we not defeated the purpose of the tower's warning by camouflaging the message "gear down and locked" in standard, routine, often-heard phraseology?

Would it not be preferable to encourage tower controllers to exercise their initiative in using different phraseology when transmitting a gear warning check?





SIMULATED FLIGHT

"And there I was at twenty thousand feet in the blackest cloud you've ever seen—with a dead engine! Sweat? It was oozing from every pore. To make matters worse, the stick trim control suddenly failed. Boy, I'm telling you—I really worked to get a re-light on that engine and bring her safely back to base. What a relief when I suddenly realized I was only "flying" the simulator!"

The foregoing remarks are typical of those you'll overhear when pilots get together to discuss their various "trips" in the F-86 Flight Simulator. It is not uncommon for them to lose themselves completely in the illusion of flight and become most concerned when things go wrong. The sight of a pilot climbing from the cockpit with beads of sweat on his face provides the evidence.

The F-86 flight simulator will duplicate the various Marks of Sabre aircraft manufactured by Canadair. The simulator pictured in this article is located at 3(F) Wing, Zweibrucken, Germany.

Portion of the flight simulator workshop

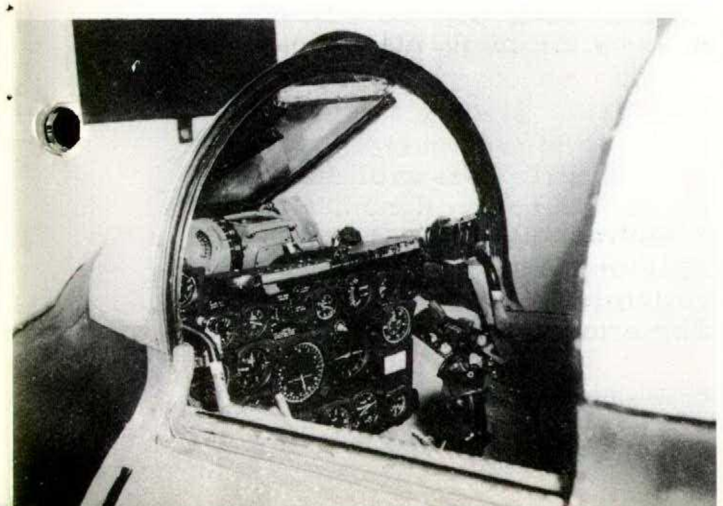
Arrival

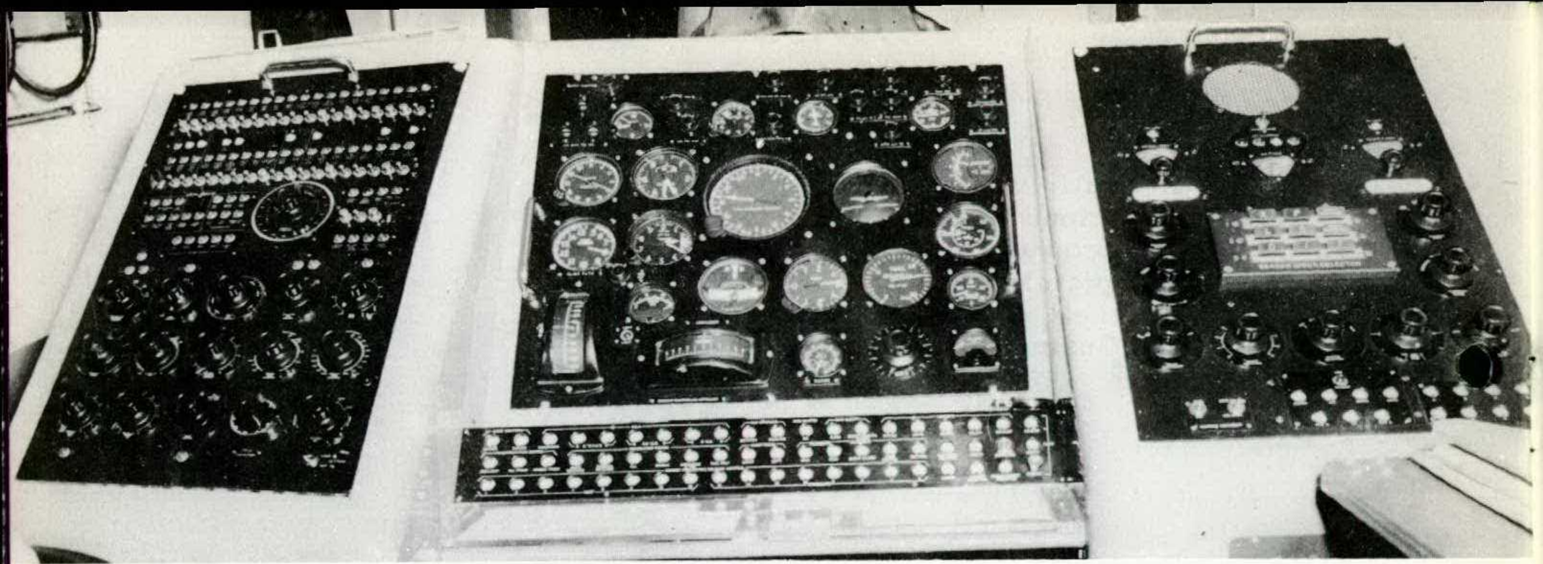
First, a word about the introduction of flight simulators to the RCAF. After the initial planning and evaluation, a contract was let to the Redifon Company Limited of England (an electronic research and production firm) for ten Sabre-type simulators. The first of these, an F-86 Mk 2, was delivered to 1(F) Wing, North Luffenham, England, in December 1953. The next five models were Mk 5s, two going to RCAF Station Chatham, N.B., and three to Europe. The remaining four will be Mk 6s and are to be delivered to continental wings in the fall of this year. Those in use in Europe are of the mobile type, the entire unit being housed in a large trailer van.

Description

A brief picture of the F-86 model will help you to visualize this trainer. The cockpits and a portion of the fuselage are taken from unrepairable Sabres. The cockpits are complete in every detail and can be operated exactly like those in the actual aircraft. The squeak of wheels turning can be heard while taxiing; and when the nose wheel steering is engaged, a turn is registered on the compass. Engine and slipstream sounds are simulated and vary in pitch and intensity with the movement of the throttle and changing air speed. The squeal of tires as the wheels touch the runway on landing is also clearly audible. These noises are electronically taped from actual F-86 aircraft sounds and fed through a number of loud-speakers concealed in the cockpit. The canopy is painted white, and when viewed from the inside has the appearance of thick cloud. The density of the "cloud" can be varied by the instructor dimming the overhead lights, while the right atmosphere for night flying exercises is simulated by extinguishing them. Instrument readings and stick forces are identical with those obtainable in an aircraft in real flight. In short,

Flight simulator cockpit.





Instructor's console. Left, faults panel; middle, flight instruments; right, radio aids panel.

the only difference between a flight in the simulator and in the aircraft is the lack of the acceleration forces and physiological and psychological sensations experienced in actual flying.

Situated directly behind the fuselage is the instructor's console which contains a set of instruments duplicating those in the cockpit. On the right side is a bank of controls for the radio aids, consisting of radio beacons, VHF and APX 6. Only two radio beacons can be set up simultaneously but this choice can be changed at will by setting the correct latitude and longitude of the beacon desired, together with the correct frequency and identifiers. On the left side of the console is a bank of switches and controls lovingly referred to by the pilots as "the torture panel". It is here that any one of over thirty different faults or emergencies can be selected. To name a few, there are undercarriage irregularities, inverter failures, generator failures and flameouts. The control for rough air is also located on this panel and has sufficient intensity to simulate the most violent of CB turbulence.

There are two track recorders on the wall beside the instructor. The first is used for letdown and GCAs with a scale of 1:250,000. The glide paths of the most frequently-used airfields in the local area are marked on this map. The second recorder has a scale of 1:1,000,000 covering an area of 450 square miles. Flight progress is registered by a pen which passes over a map. It is interesting to note at this point that when the pen crosses a beacon tuned in by the pilot, station passage is registered by radio compass.

Uses

Flight simulators belonging to the continental wings are employed for the continuous training of squadron pilots in cockpit procedures, emergency procedures, radio and navigation drills, and instrument flying practice. Training is accomplished by a series of planned exercises

which incorporate all of the emergencies that can be given, with repetition of those which occur relatively often during actual flying. The exercises include local flying, navigation crosscountries, ground-controlled interceptions, and limited panel instrument practice. They begin with an ITO and are completed by a GCA to touchdown. Normal application of brakes after landing will reduce airspeed to zero. A preflight briefing is held before each exercise so that emergency procedures, cockpit drills, weather conditions in the area, and alternate aerodromes available are all covered. A discussion between instructor and pilots follows at the conclusion of the exercise.

In most of the exercises, the instructor simulates a fighter controller. The aircraft is "scrambled" for a patrol line, rendezvous or interceptor duties, the pilot acting as the leader of a two-or four-plane element. Authentic call signs and R/T patter are used throughout, and in this way pilots are familiarized with the various ground control and fixer agencies in the area. Aircraft operational equipment—such as APX 6 and armament switches—is also used during this type of exercise. Pilots are expected to complete an exercise in the flight simulator as if it were an actual flight, querying doubtful fixes and vectors as well as leaving GCI control with sufficient fuel for the return to base.

Navigation exercises are divided into two types: Mental DR and crosscountries. For Mental DR practice the pilot is required to fly a number of courses for specific times. On each leg he is asked to estimate his course to base. The actual course is then noted and an average error is determined. The radio compass is failed during this type of exercise. On the crosscountry flights the pilot is required to compute courses and times and submit a complete flight plan. Simulation for this exercise is detailed right down to the hypothetical weather situation; cloud base and tops are given along with the Met wind. As the pilot commences his climb through cloud, the overhead lights are dimmed. The break-through "on top" is simulated by turning the lights on full. Normal instrument flight rules apply with regard to clearances and position reports. The pilot has two radio beacons available at all times. As he passes one beacon and tunes in the next, the first beacon is replaced by one further along the track. Diversion to an alternate aerodrome usually completes the "flight".

At first glance, most of these exercises may appear to be relatively straightforward. This is seldom the case though, since at least three or four emergencies or faults are injected during the "flight". While some faults are relatively simple to correct, others demand con-

The author instructing on a flight. Track recorder and one of six computor bays in the background.

centration and usually require the pilot to make important decisions such as whether to carry on with an exercise or return to base, land at the nearest aerodrome or abandon the aircraft. If a man makes the wrong decision, the flight becomes more and more difficult as mistakes pile up. In these situations, pilots are encouraged to use their own initiative.

Reaction

Response to this type of training aid is considered to be satisfactory. Considerable effort goes into the planning of each exercise to make it as interesting and realistic as possible. Emergencies are injected where they could be expected under live conditions. Communication is maintained on a pilot-to-controller rather than instructor-to-student level.

Pilots who have flown the flight simulator agree that there is a vast difference between merely reciting a particular emergency procedure and actually carrying it out. However, even in the simulator, the introduction of emergencies on initial "flights" causes a certain amount of hesitancy and panic. On subsequent "flights", as pilots become familiar with the various emergencies, they react with more confidence and without delay.

*

Evaluating the flight simulator accurately in terms of accident prevention is difficult if not impossible. Nevertheless, the author believes that devices such as this synthetic training equipment, coupled with an active Flight Safety program, will help to reduce the RCAF's accident rate.

THE AUTHOR

F/L H.S. Tetlock joined the RCAF in 1947. On completion of his pilot's training he flew Vampire and Meteor jets with 421(F) Squadron at Chatham, NB, and Odiham, England, and T-33 Sabre aircraft when the squadron was based at St. Hubert, PQ. After nine months with 434 Squadron at Uplands, Ont., he was transferred overseas to 3 Fighter Wing, Zweibrucken, Germany, in April 1953.

Since August 1955 F/L Tetlock has commanded the Wing Training Flight, and in this capacity is responsible for preparing pilots for flying emergencies. In 1954, he was chosen to attend a special course in England on the operation of a new type of "flight simulator" trainer for pilots. From this background he has drawn the material for the foregoing article.

near miss

FORCED DOWN BY A PENCIL

Authorized as captain of a Mitchell, I was scheduled to take off at 1000 hours in the number two position of a two-plane formation. Prior to takeoff, the aircraft was inspected in the regular manner and checked "serviceable".

On the ensuing formation takeoff, the air was smooth and no slipstream was encountered. My aircraft appeared to be flying normally. Number one made a gentle turn to port, and I had no difficulty following since little aileron control was necessary in the still air.

Fifteen minutes after takeoff, number one started another gentle turn, this time to starboard. It was then I discovered that the ailerons were restricted to very limited travel. I slipped out of the formation and found that, although banks to port were possible, those to starboard required a great deal more than normal pressure in order to get even the slightest movement out of the aircraft. I next notified the leader about the problem and he suggested that the crew check for anything that might be affecting the control cables. I made sure that the auto-pilot was off and control locks disengaged. Both the co-pilot and myself checked for restrictions around the control column and wheels. As nothing could be found and the ailerons were still jammed, I called the tower, and by making a wide circuit and long approach, managed to set the aircraft down without too much difficulty.

After landing we tried moving the controls by using considerable pressure. They became free until after shutdown, when they jammed again. A subsequent investigation by groundcrew turned up a pencil which had caught in the pulley and cable assembly below the map compartment, restricting aileron movement.

*

This Near Miss occurred on 406(LB) Sqn (Aux), operating from RCAF Station Summerside. Tactical Air Command's Flight Safety Officer was on the unit at the time. A check was made on the exact location of the jammed pencil and it was found to have been caught

Subject to considerable beating from the pilot's feet

between an aileron control cable and one of the pulleys (part number 62-52343).

An inspection plate on the floor of the aircraft covers this pulley, and on this aircraft it was bent out of shape, leaving a gap large enough to allow a pencil to fall through. The plate is subject to a considerable beating from the pilot's feet as he enters and leaves his seat. On inspecting other aircraft of the squadron, it was found that plates on the older Mk 2 Mitchells were all distorted in varying degrees, whereas on the newer Mk 3s their condition was good.

(This Near Miss could have had serious consequences because often on a formation takeoff a Mitchell will drop a wing due to slipstream, and harsh aileron control is required in correcting. Had a crash occurred, the cause would have been almost impossible to find.

The following preventive measures are urgently required if we are to avoid problems of this hazardous nature in the future:

- Ensure careful maintenance of all inspection plates, particularly those on the floor and in other positions where loose articles may easily fall through.
- Whenever a member of aircrew loses a pencil or like object in an aircraft, he should report it in the L.14 on landing. If at all possible, it should be located prior to the aircraft flying again. — **ED**)

HAVE YOU CHECKED FLOORS AND REMOVABLE PANELS IN YOUR AIRCRAFT LATELY?

Accident Resumé

SABRE

Flying Discipline

During a four-plane formation exercise the pilot of number 3 twice broke formation and descended for a low pass. On rejoining the formation the second time he pulled up violently and collided with the leader. Both aircraft crashed, killing the pilots. The engine of number 4 was damaged in flying through the debris and the pilot sustained a spinal injury when he forced landed in a field.

The lapse in good flying discipline on the part of the number 3 pilot is not an isolated occurrence, nor is it one which is confined to one type of aircraft. Many other cases could be cited of deliberate, unauthorized low flying and low aerobatics— all examples of failure to obey regulations, and all resulting from a lack of personal flying discipline. The end products are death and broken aeroplanes.

The man who needlessly endangers his own life is a fool. To deliberately endanger the lives of others is criminal.

T-33

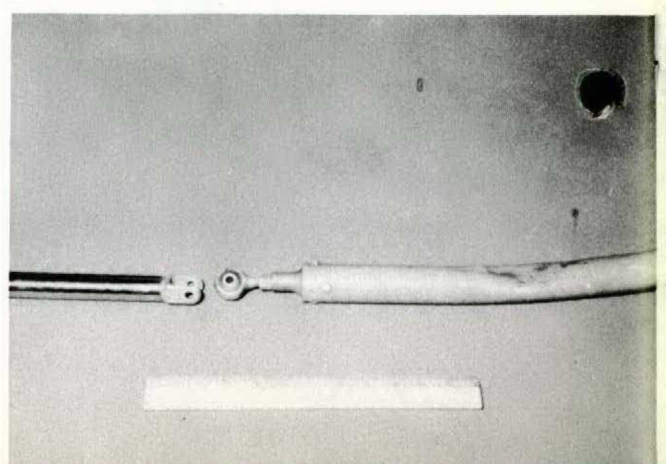
For Want of an Inspection

While in a climbing attitude at 9000 feet, the aircraft was seen to dip its nose down in a steep dive and then pull up and commence a series of gyrations somewhat resembling a stall turn. The pilot advised that he had no control of his elevators except by using the electrical trim. He attempted to jettison his canopy without success. Although advised to use the normal electrical switches to open it, he failed to understand the order and attempted an unsuccessful forced landing.

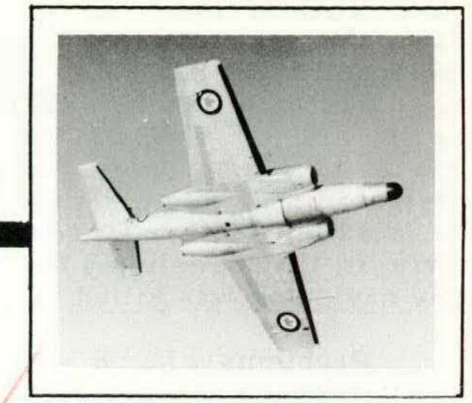
Investigation revealed that loss of control was due to an elevator disconnect. A connecting bolt had been removed to complete a special inspection. It is considered most probable that the fibre self-locking nut was not put on when the bolt was re-installed. Also, the final inspection by a senior NCO as required by EO 05-1-2J was not made—otherwise this fatal accident could have been prevented.

The investigation revealed that a number of engineering orders were incompatible insofar as the use of self-locking insert nuts was concerned and these orders are being amended. Why the canopy would not jettison could not be established. A check of other unit aircraft, however, disclosed four whose canopy jettison mechanism would not function properly due to mis-rigging. Some unit students and instructors were not aware of the alternative methods of getting rid of the canopy in the event of failure of the normal jettison system—nor were they required to practise these procedures in their FTTU training.

This accident, and the subsequent investigation, turned up a number of unsatisfactory conditions. Have you taken a critical look at your own maintenance and training procedures lately?



CANUCK



Know Your Aircraft

On his familiarization flight in a Mk 4 Canuck, the pilot allowed the airspeed to drop too low during the final approach, with the result that the aircraft touched down heavily 70 yards short of the runway. The undercarriage collapsed and the aircraft caught fire and burned.

The pilot was somewhat out of flying practice. On the previous day he had landed another Canuck excessively fast and had run off the end of the runway. This experience may have contributed to his mishandling of the Mk 4. Despite the fast landing which took him off the runway he was not given a check ride before being detailed to fly an aircraft model with which he was unfamiliar. Furthermore, he had not received the proficiency checks laid down in the annual training requirement.

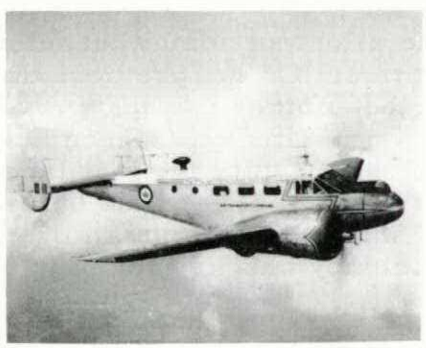
Abandoning Drills

The vital necessity for knowing and rehearsing a clear and unmistakable drill for abandoning aircraft can not be stressed too strongly. Should an emergency arise at jet speeds, there is not time left for extraneous discussion. Each member of the crew must have his procedure down pat. Proof of this is to be found in a Canuck crash in which the navigator failed to eject.

At 11,000 feet the pilot started a turn on auto-pilot. When the aircraft reached approximately 30° of bank, it flicked onto its back. The pilot disengaged the auto-pilot and attempted recovery from the inverted position, but the aircraft stalled and went into a spin. For approximately three turns of the spin the pilot tried to regain control, but without success.

When it became obvious that the aircraft would have to be abandoned, the pilot warned the navigator by calling "Bail Out!" over the intercom. The navigator queried by saying "What?" in such a manner as to indicate that he didn't believe an emergency existed. The pilot repeated, "Bail Out! Canopy going!" and ejected the canopy, which left the aircraft cleanly. He heard no further communication from the navigator. At this point the altimeter read approximately 6000 feet. He tried for another 1-1/2 to 2 turns of the spin to regain control of the aircraft; then, realizing that he was getting very low, ejected himself. The navigator was killed in the crash.

Problems which used to confront the navigator in ejection have been reduced with the installation of the windscreen. This, together with automatic seats, makes front and rear seat ejections equally practicable, as shown by recent tests and a film of a live ejection. It is evident, however, that correct procedures and close team work are vital to a successful ejection. A complete drill is detailed in POIs and must be studied and practised to ensure that the order to abandon will not be misunderstood and so that the correct actions will be instinctive if an emergency arises.



EXPEDITOR

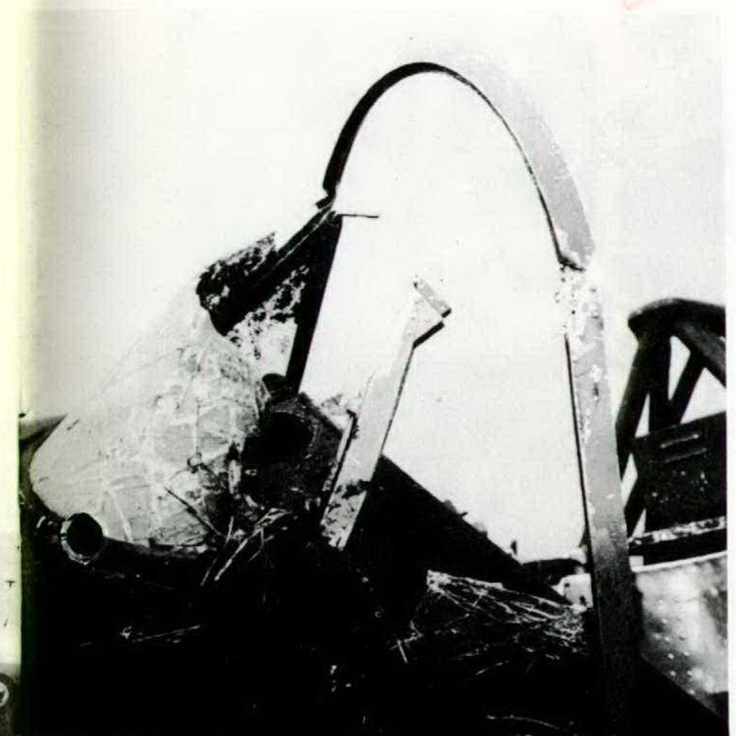
Taxi Way or Obstacle Course?

The pilot had landed and was taxiing to the parking area designated by the tower operator when he noticed obstructions on the ramp. Electing to give wide clearance to an aircraft loading passengers, he next noticed in his path a new concrete drain standing about two feet above the tarmac level and marked by a red flag. Aerodrome construction was mentioned by the tower operator after a radio call from the pilot during which reference was made to the "obstacle course". Shortly thereafter the port wheel of the Expeditor struck one of these concrete drains with the result pictured here. The pilot certainly erred in not maintaining a sharper lookout, but blame also attaches to the tower operator. His warning of obstructions should have been much more precise.

HARVARD

Low Low Level

Two pilots were authorized to practise close and battle formation flying at low level, and both were authorized to carry passengers. After a formation takeoff they practised at altitude before descending into the low flying area. Battle formation was continued down to a clearance of approximately 50 feet. Number two struck a power line, shattering his windscreen and injuring himself. He immediately called the leader to warn him that he could not see and would require help in regaining altitude.



The leader swung around in a sharp turn to a position from which he could observe the number two, and commenced radioing instructions to him. However, the injured pilot did not acknowledge, nor did he respond to instructions. His aircraft climbed to about 125 feet, then started a descending turn to starboard, and finally crashed into a field. Both occupants survived.

The accident was caused by the failure of both pilots to maintain their height at least 50 feet above all ground obstacles as required in CAP 100, article 104.71. Contributing factors were pilot inexperience and the fact that the leader did not know of number two's inexperience. In addition, supervisory staff, despite knowing the experience level of the two pilots, authorized the exercise.

In the Alfalfa

On his third solo flight the student was performing an overshoot when he found that he had insufficient power to fly with wheels and flaps down. He raised the wheels, set the flaps to 25 degrees in an attempt to gain speed, and checked his throttle at full open and mixture rich. Directly ahead of him was a hill. Realizing he could not clear the top of it, he selected "flaps up" and crash landed on the slope.

Investigation revealed that the pitch control was in "full coarse" instead of "full fine".

The student had less than three hours' solo time under his belt so that inexperience was certainly a factor here. Nevertheless, his drill of vital actions was incomplete. Had his checks included the pitch control, this accident could have been prevented.

SAFETY *is Contagious*

Let's Start an Epidemic!

JOWL-SAGGING GEE-PULLER

An intrepid bird. Recognized by wrinkled appearance of wings and body. This creature has most erratic flight characteristics. Usually to be seen in abnormally tight turns or performing sharp manoeuvres - often stripping plumage in the process. Has also been known to break bones through sheer exhuberance. Call: CANCHAHACKIT

BIRD WATCHERS' CORNER

DFS