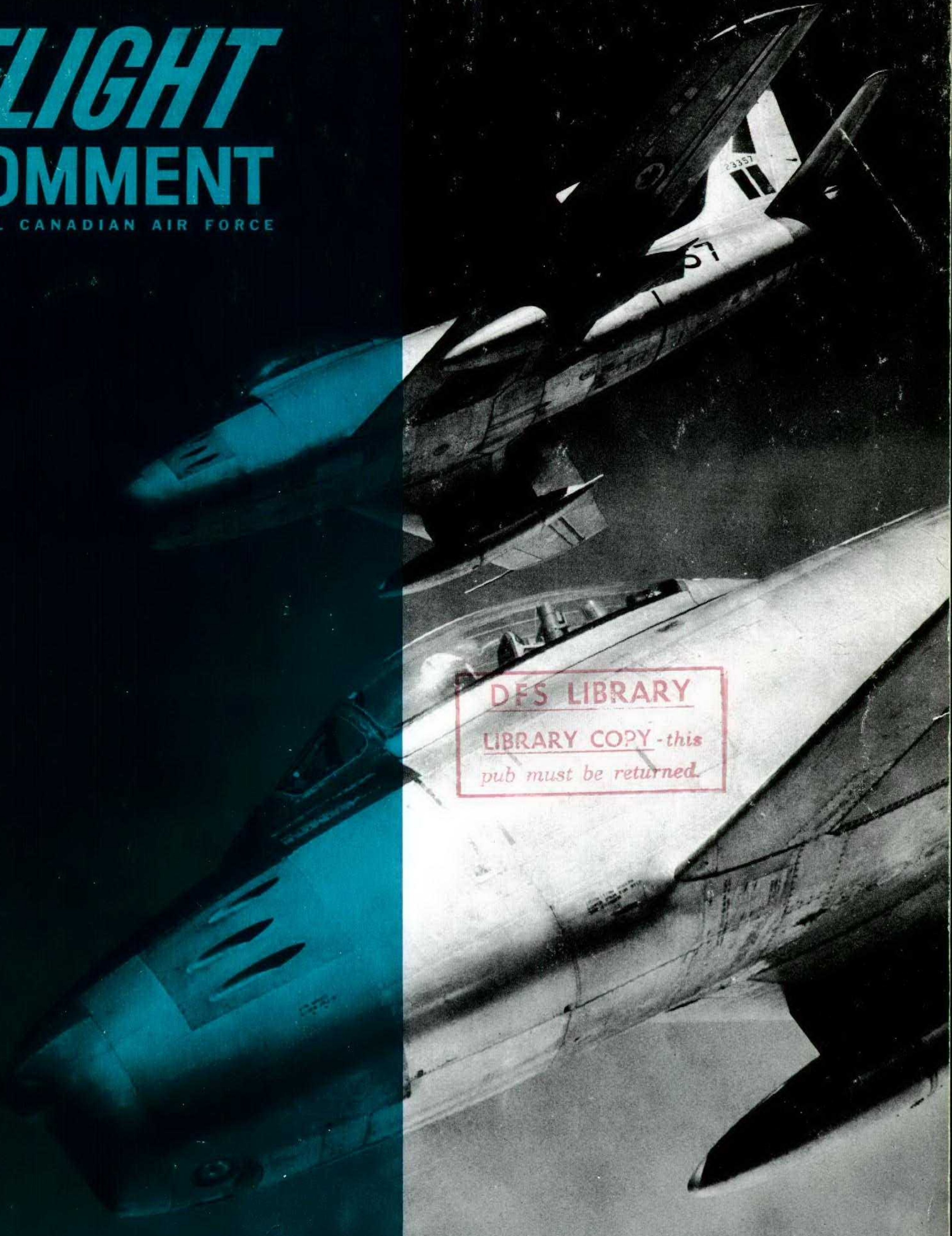
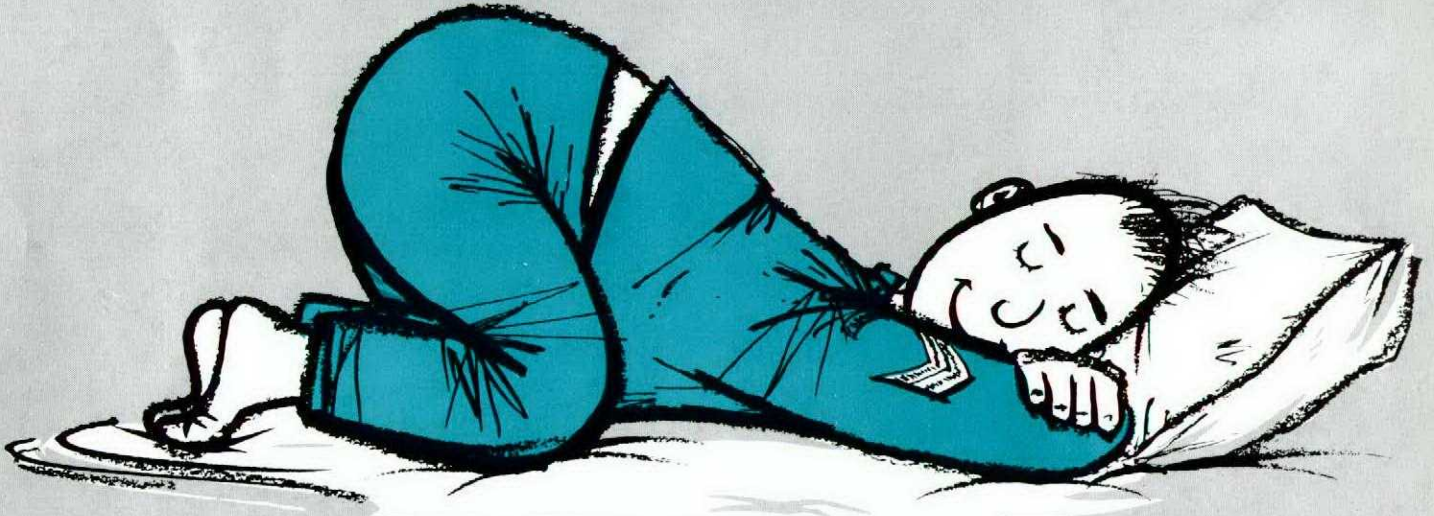
FLIGHT COMMENT

ROYAL CANADIAN AIR FORCE



JULY • AUGUST • 1960

NO SLEEP LOST HERE!

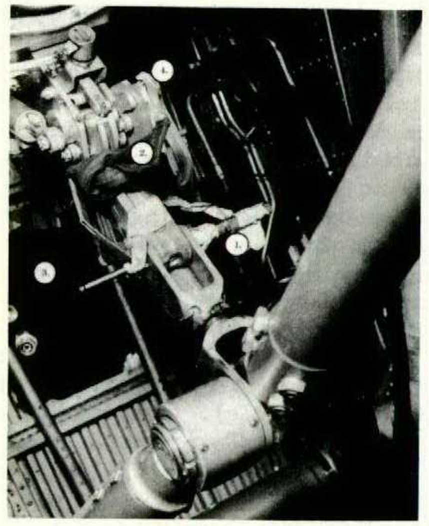


He has a clear conscience, because that maintenance job was completed thoroughly and conscientiously.

405 SQUADRON

Front row (left to right): F/O E. H. Mohns, F/O A. D. Mahaffy, F/O A. W. Newhook, F/O C. L. Matheson.

Back row (left to right): F/O D. I. Johnston, Sgt A. Watters, Sgt P. L. Durant, Sgt T. L. Powell, F/O J. S. Sargent.



1. Tapered punch secured by masking tape and locking wire.
2. Ground safety pin secured by flag.
3. Hole cut in the floor.
4. Follower cam of the UP-DOWN lock broken during down selection.

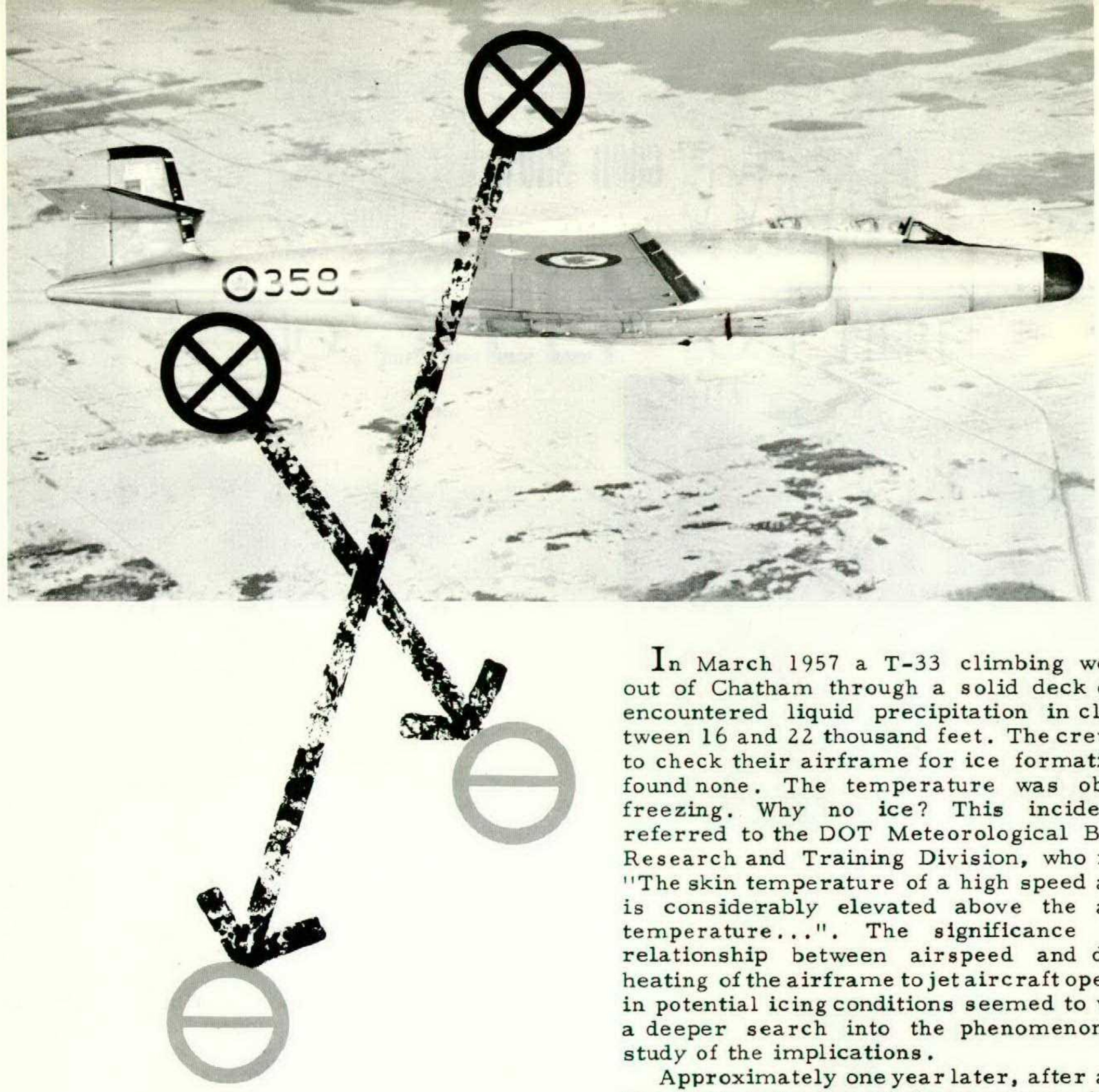
Immediately after takeoff to air test an Argus, the crew noticed a severe hydraulic leak in the nosewheel well. The aircraft returned to base for a landing, but the nosewheel failed to lower. After finding that a hydraulic fitting on the up-lock actuator had failed and was causing the leak, the captain, F/O J.S. Sargent, requested and received technical advice from the ground.

After numerous unsuccessful attempts to lower the wheel, the second engineer, Sgt. A. Watters, tried to replace the broken hydraulic fitting with a good one from another hydraulic line, but was unable to remove an undamaged fitting for the purpose. Finally, a hole was chopped through the floor, and the nosewheel up-lock was disconnected. The wheel was lowered and manually locked by use of a rope on the lock strut. When the nosewheel was down, it was impossible to reach the lock strut to re-insert the lock bolt that had been removed in the process of getting the wheel down. The hole in the floor was enlarged, and Sgt. Watters was lowered on a rope. He inserted the ground locking pin and secured it with a flag; in place of the lock bolt he inserted a tapered punch and secured it with tape and locking wire.

After approximately five hours of struggle, the crew was able to land the aircraft safely.

This fine display of initiative and determination and the high degree of co-operation between ground and air prevented a major accident. This, in turn, permitted the early discovery of a design peculiarity in the Argus nosewheel system which is now being corrected.

Our compliments to the crew and technical staff. A very Good Show indeed.



AIRFRAME ICING

Its behaviour with increasing airspeed

by Mr. R. B. B. Dickison
Senior Meteorological Officer
R. C. A. F. Station Chatham

In March 1957 a T-33 climbing westward out of Chatham through a solid deck of cloud encountered liquid precipitation in cloud between 16 and 22 thousand feet. The crew began to check their airframe for ice formation, but found none. The temperature was obviously freezing. Why no ice? This incident was referred to the DOT Meteorological Branch's Research and Training Division, who replied, "The skin temperature of a high speed aircraft is considerably elevated above the ambient temperature...". The significance of the relationship between airspeed and dynamic heating of the airframe to jet aircraft operations in potential icing conditions seemed to warrant a deeper search into the phenomenon, and a study of the implications.

Approximately one year later, after a tentative guide to the expected temperature increase had been extracted from the available literature on the subject, an excellent opportunity arose to test the effect of dynamic heating on airframe icing. An F86 pilot on a weather-check at Chatham, 4 March 1958, agreed to experiment with icing conditions. Cloud conditions were 400 to 600 overcast, tops 4300, surface temperature 29° F, visibility 1 to 3 miles in light freezing drizzle, occasionally 3/4 mile in light snow grains (frozen drizzle). Conditions were ideal for airframe icing. Temperatures in the cloud were computed to be -3° C at 600 ft, -9.5° C at 4000 ft.

On a 30 second climb through cloud at 180 knots no icing was encountered. The aircraft re-entered cloud at 170 knots, began to accumulate ice after 2 to 3 minutes at 4000 ft, then climbed out of the cloud. Re-entering cloud the second time at 250 knots, the aircraft picked up ice within 30 seconds. Remaining at 4000 ft, the pilot increased the airspeed until, at 340 knots, the ice began to melt and break off (A - A', Fig 1). Before landing, the pilot flew around beneath cloud in the vicinity of the aerodrome, where freezing drizzle was being reported, at airspeeds 180 to 250 knots, but did not pick up any ice (B - B', Fig 1).

The results of this experiment were carefully analysed with respect to theoretical computations, and all phases of the experiment agreed closely with the anticipated results.

Another chapter in this episode was added on 25 October 1959. A T-33 approaching Chatham from the west at 20,000 ft, TAS 360 knots, entered a solid cloud deck, encountered liquid precipitation, and began to rapidly accumulate a layer of ice. In 2 to 3 minutes a layer of ice half an inch thick had formed, and descent was immediately begun at 395 knots to 15,000 ft. The ice ceased accumulating before 15,000 ft was reached, and within 10 minutes had all melted. Temperatures were -17° C at 20,000 ft, -10° C at 15,000 ft (C - C' Fig 1). Following the T-33 was a CF100 on descent from 39,000 ft. The CF100 encountered light icing from 26,000 ft which decreased to an insignificant amount by 12,000 ft. Airspeed on descent decreased from 450 knots to 340 knots (D - D', Fig 1).

The significant data from these trials are plotted on Figure 1. Temperature - airspeed combinations which result in freezing temperatures are in the shaded area. Note that melting in each reported incident occurred while air temperatures were still well below freezing. The close agreement of these results with theoretical computations seem to justify the application of special operating techniques for jet aircraft in icing conditions—techniques which involve judicious use of the throttle. The following points should be borne in mind:

(a) Layers of ice over one half an inch thick may take a considerable length of time to discharge, since the temperature cannot increase above 0° C until the melting process is complete.

(b) If it is not operationally feasible to maintain an airspeed high enough to prevent ice from forming, decrease airspeed. While icing continues, increasing airspeed only serves to sharply increase the icing rate. This was evident in the F86 encounter.

Operational use of this relationship should be as an anti-icing procedure, not primarily as a de-icing procedure. The most obvious application of this physical relationship is during descent, or while holding an altitude where icing conditions exist. For example, on a descent through cloud at 450 knots TAS, icing would be encountered only above levels where the temperature was -20° C, but if the descent was made at 300 knots TAS ice would accumulate down to the level where the temperature was -6° C. Bearing in mind that serious icing is rare at temperatures below -18° C, because of the predominance of ice crystal cloud, there should be no significant icing in the first case. Even more obvious is the influence of the changes in TAS for an aircraft required to hold an altitude. With the ambient temperature at holding altitude say -12° C, serious icing may be encountered if the airspeed is 350 knots, but none if the airspeed is 380 knots.

Much icing of significance to jet aircraft occurs on approach patterns. As variations in approach patterns are operationally feasible, this suggests a means of avoiding icing during the approach. Obviously an approach to minimums cannot be made at high airspeed; however in many cases the icing zone does not extend to within 1000 ft above ground. In fact ceilings themselves may be 1000 ft or better, permitting a visual circuit before landing, in which case high airspeed could be maintained to the cloud base. In cases where GCA controlled landings are necessary, special icing let-downs can be designed to permit the airspeed to remain high as long as possible. Figure 2 shows a normal approach and suggested revisions for use under icing conditions. In the normal approach, 280 knots IAS during descent, an airframe temperature of 0° C is not reached until 6000 ft (typical temperature distribution as shown on letdown diagram). Furthermore, the last 9 miles of the approach is done at 160 knots, at 1500 ft to the glide-path, which would permit icing to persist for 3-1/2 minutes. Using the revised letdown, 0° C airframe temperature would be reached at 10,000 ft, where the ambient temperature is assumed to be -14° C. Experience indicates that some ice would have begun to form prior to then, even in layer cloud, due to the rapid rate of accumulation at high airspeeds, but the ice should be very thin, and melt off below 10,000 ft. To about 8 miles out, 330 knots can be maintained. At this point two choices are possible:

(a) If the cloud base is above 500 ft, descent can be made to that altitude, and the approach made under GCA surveillance. If freezing precipitation is occurring, the airspeed can be

Figure 1.

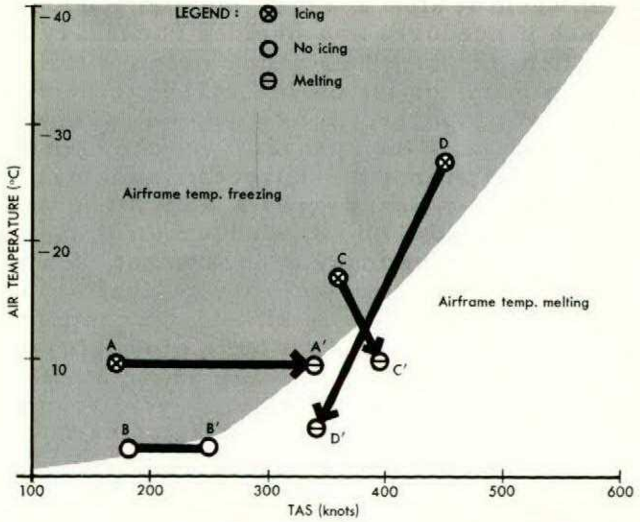
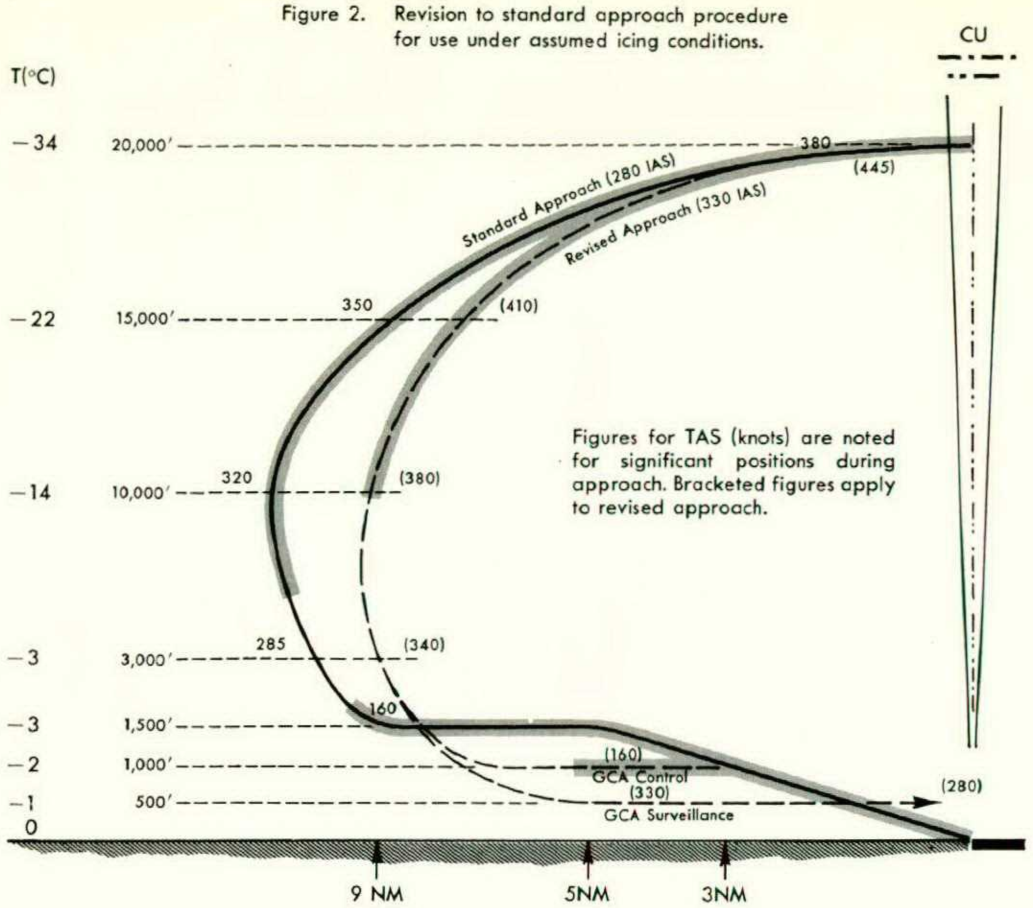


Figure 2. Revision to standard approach procedure for use under assumed icing conditions.



Figures for TAS (knots) are noted for significant positions during approach. Bracketed figures apply to revised approach.

Note: Assuming the temperature distribution given on the left side of the diagram, potential icing would exist along the shaded portion of the let-down.

kept at 280 knots, and the landing completed from a low level visual circuit.

(b) If the cloud base is below 500 ft or visibility less than 1 mile, the aircraft can approach at 1000 ft under GCA control, reduce airspeed to 160 knots at 5 miles, lower undercarriage, intersect the glide-path at 3 miles and do a full-stop GCA. Icing would be possible once the airspeed reached 160 knots, but the accumulation would be slow and the time element brief.

Such procedures are deemed necessary for operation of the T-33 not because that a small amount of ice on the airframe itself is particularly dangerous, as a few extra knots at touchdown will compensate for the normal effects of airframe ice, but because a thin layer of ice on the windscreen is a definite hazard. Restricted vision due to windscreen icing has been the cause of many an overshoot, and the downfall of more than one runway light.

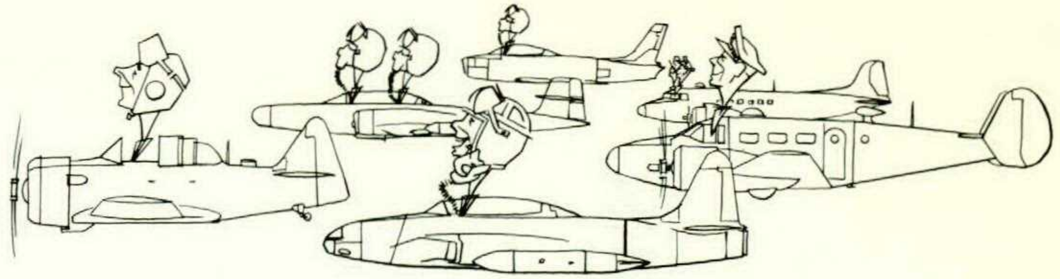
The basic principle is simple; the complications many. The cooling effects of evaporation and sublimation, the heating effects of air compression and friction, unit rate of water catch, unit conductance of the airframe itself, and other factors must be carefully assessed in deriving the exact answer at each airspeed, under various atmospheric conditions. The co-operation of aircrew, in carefully noting the behaviour of airframe icing when it occurs will be required as further experimentation continues on the icing problem. Care should be taken to note location, airspeeds, altitudes, and the time elements involved, and report them as soon as possible to the nearest Met office. Co-operation such as that already evidenced at Chatham will provide further links to the solution of this fascinating problem.

Acknowledgements

Co-operation of Flight Lieutenants W.S. Deacon and F.G. Fowler, and the assistance of Flight Lieutenant F.E. Sylvester, OC Instrument Flight, Station Chatham, in designing the icing letdown, is greatly appreciated.

Editorial Note

As the author suggests, much more information is needed before this "theory" can be developed into an operational procedure. It does, however, illustrate how flying techniques grow out of co-operation and exchange of information. Whether or not this becomes a new technique will depend on the proofs produced by continued study.



HEADS-UP FLYING

PROFESSIONAL FLYING

When landing at Shearwater, an Expeditor swung violently to starboard on touchdown. The pilot, S/L J.F. Drake, applied power immediately and overshot. He suspected a locked brake or a flat tire so he declared an emergency. He flew a normal circuit and prepared for a violent swing to starboard to occur on the second touchdown. The swing occurred so S/L Drake used opposite rudder and the starboard engine to keep the aircraft straight. When the tail lowered to the runway brake was used to keep the aircraft on the runway and to bring it to a stop. The aircraft was not damaged during this landing.

On inspection it was found that the starboard tube had failed. The tire appeared to be undamaged.

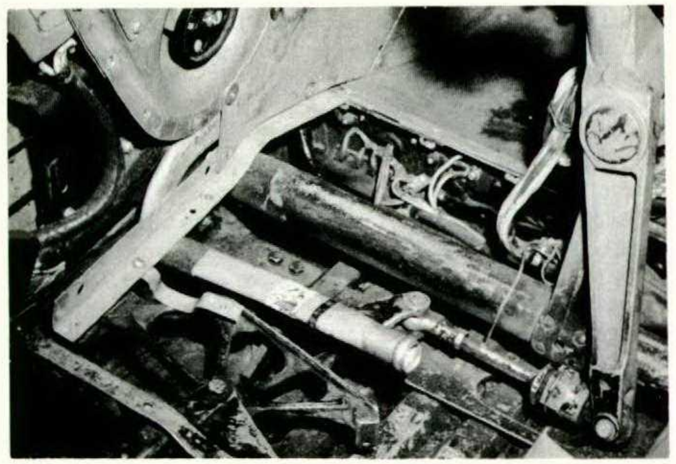
The Expeditor is a tricky aeroplane to land under normal conditions; but to land an Expeditor on a flat tire is really tricky. S/L Drake is commended for the excellent landing that he carried out. His display of airmanship was of the highest order. This is professional flying first class.

CONTROL RESTRICTION

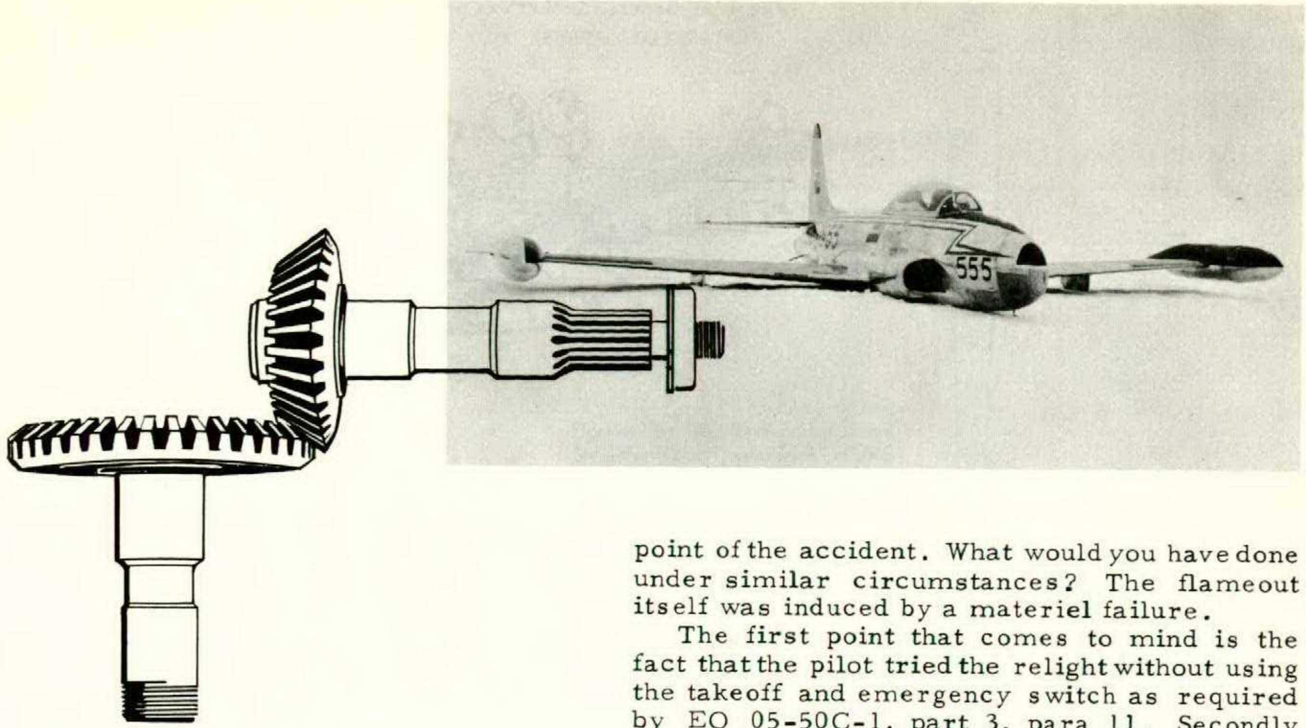
After about 40 minutes of aerobatics between 3000 and 8000 feet, a Sabre aircraft was in a four point rolling manoeuvre. As the aircraft entered the third point of the manoeuvre, the pilot, F/L L.J. Hubbard, tried to check the roll with right aileron, but discovered the stick could not be moved to the right of neutral. He used severe rudder and the elevator to regain straight and level flight. The control was manually changed to alternate without effect, and neither normal nor alternate trim relieved the restriction. He then checked the slow speed flight characteristics of his aircraft and decided he could land it safely.

Investigation revealed an improperly secured oxygen line clip, part no. 176-73301-950, ref items 55 and 56, fig 287, EO 05-5E-4. The picture shows the clip in a position in which it could foul the bell crank assembly, part no. 140-52305. This accident was assessed "Maintenance" and the parent unit of the aircraft asked to prototype a better method of securing the oxygen supply line.

The professional manner in which F/L Hubbard handled a serious control restriction, checked his aircraft, and completed a successful landing, earns him a Heads-Up Flying rating with Flight Comment.



The clip that caused the trouble.



A FORCED LANDING IS INVESTIGATED

by S/L G. L. Sheahan

On passing the radio range during a SRA in a T-33, the engine failed at 800 feet above ground level. The pilot selected speed brakes up, pulled the throttle fully back, and selected the high pressure cock to the off position. The altitude at this time was 600 feet AGL. An air-start was attempted but failed, so the pilot selected wheels up and prepared for a forced landing straight ahead. On touchdown the aircraft struck a small mound and bounced. The second contact with the ground was heavy. The snow conditions at the time made landing extremely difficult. A whiteout condition existed, with the result that the pilot was unable to recognize the mound or control the aircraft attitude properly on initial contact. It was the general opinion that the pilot executed a good landing under very difficult conditions.

The pilot in the front seat received spinal injuries, while the pilot in the back seat was uninjured. The pilot in the front seat did not have his harness locked. The pilot in the back seat not only had his harness locked but was able to brace himself before the aircraft hit the ground.

You have read the facts of the case up to the point of the accident. What would you have done under similar circumstances? The flameout itself was induced by a materiel failure.

The first point that comes to mind is the fact that the pilot tried the relight without using the takeoff and emergency switch as required by EO 05-50C-1, part 3, para 11. Secondly the aircraft was force landed in the clean configuration. The wing flaps were not used in accordance with EO 05-50C-1, part 3, para 35(c). Thirdly, contrary to EO 05-50C-1, part 3, para 35(b), the pilot in the front seat did not have his harness locked.

It is most likely that the failure to use flaps or to lock the harness contributed to the pilot's injuries.

It is not the intention to berate the pilot for this failure to adhere to the EO, for it is obvious that he didn't have too much time to do all the things that he had to do to recover from the emergency. It is the intention to discuss the various points for the benefit of all who could be caught in the same circumstances. In the investigation that followed the accident, it was determined that the upper fuel pump bevel gear had failed. (More about this later.) In this case if the TOE switch had been used, in all probability the relight attempt would have been successful.

The configuration of the aircraft deserves some discussion. An article was printed in Flight Comment in the September-October 1959 issue, "Wheels Up or Down", covering this subject. A paragraph from the article is quoted in full as it concerns this type of forced landing:

"There are cases on record where the pilot either tried to put the wheels down or retract them just before landing, with the result that the last minute distraction caused a poor landing. This brings in the psychological aspect of indecision. If you are trying to decide whether to land wheels-up or wheels-down, you are apt to forget your flying and lose control close to the ground. As the evidence we have does not indicate that one configuration is safer, a good policy to follow would be to make up your mind early, then under no circumstances change it at the last minute. And again: Choose your configuration then concentrate on controlling attitude and speed."

In this case the pilot tried a relight at 600 feet, and after the relight had failed he selected wheels-up. Whether the time consumed by selecting wheels-up had any bearing on the case would be pure conjecture, so no further comment.

Now we come to the flap and speed brakes. The EO states that full flaps are to be used in a forced landing as the flaps will help prevent the wing tip from digging into the ground. While not included in the EO it has been well established that collapse of metal in the forward and underside of an aircraft dissipates considerable kinetic energy. Even a few inches of metal collapsing makes a large reduction in the G forces experienced by the aircrew.

While the collapsing flap reduces the G forces, the lower touchdown speed resulting from the use of flaps also assists in executing a controlled touchdown.

The direct cause of this accident was attributed to materiel failure. The failure, the gear-wheel shaft bevel drive to the upper fuel pump and tachometer drive, was the first failure of this type in the history of T-33 aircraft. Because of this a thorough investigation was instigated. The results of the investigation are interesting and again point out that any individual who has anything to do with an aircraft is involved in this business of flying safety.

The fuel pumps were examined and a full rig test of both pumps showed them to be within calibration limits. It was found that the drive shafts rotated freely and required a similar torque to that of a new unit. In other words the pumps were fully serviceable.

A strip examination of the wheel case (Fig.1) revealed that the upper fuel pump bevel gear-wheel shaft assembly had failed, with complete separation of gear-wheel from the shaft occurring at the shaft/gear-wheel radius (Fig.2). Examination of the failed and associated parts showed the fracture of the failed driven gear to be due to fatigue cracking (Fig.3) which had originated at the junction of shaft to gear radius at the locking tool locating hole chamber, and progressed over a long period of time to within .015" to .030" of the front face of the gear prior to complete separation. Discolouration in the form of oil stain and traces of oxide, with evidence of heavy fretting was observed on the severed surfaces, which indicated that the fatigue cracking of the gear had been taking place over many hours of operation.

Inspection of the drive gear revealed that metal to metal contact had occurred at the tooth root and land section. Inspection of the failed gear shaft assembly showed the part to be dimensionally correct with the exception that the chordal thickness of the teeth was .008" below nominal. With the chordal thickness of the driving gear .008" below nominal, the crown faces of the teeth would mesh with a .0025" interference fit into the roots of the driven gear. This condition would induce an alternating compressive load at the point of mesh, with a resultant tensile loading on the opposite side of the shaft at the gear shaft radius. It was calculated that during the life of the failed gear it would be subject to stress reversals in the order of one billion times.

It was concluded that the engine flameout

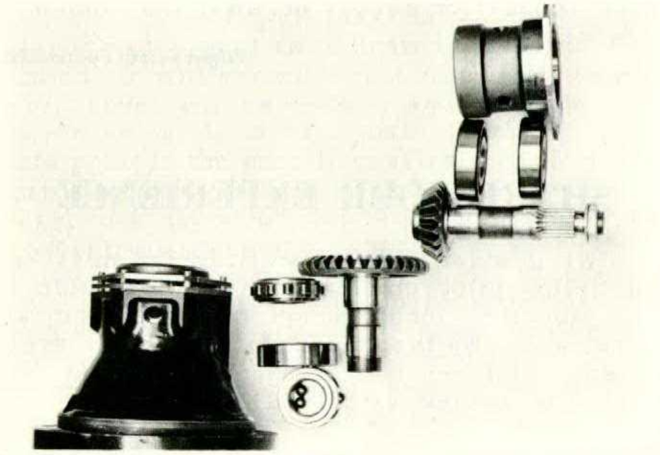


Figure 1. Exploded view of assembly.

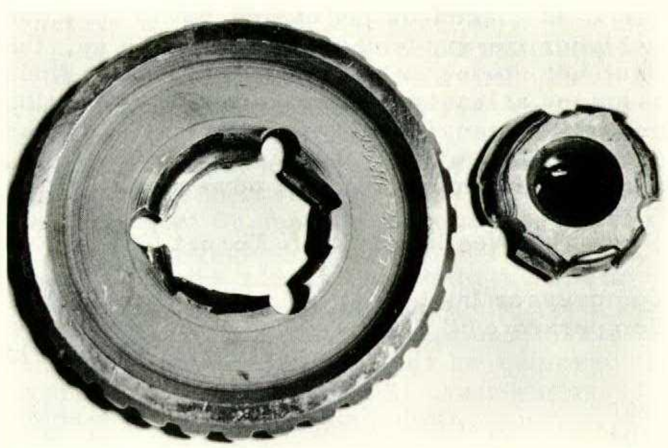


Figure 2. Failed bevel gear.

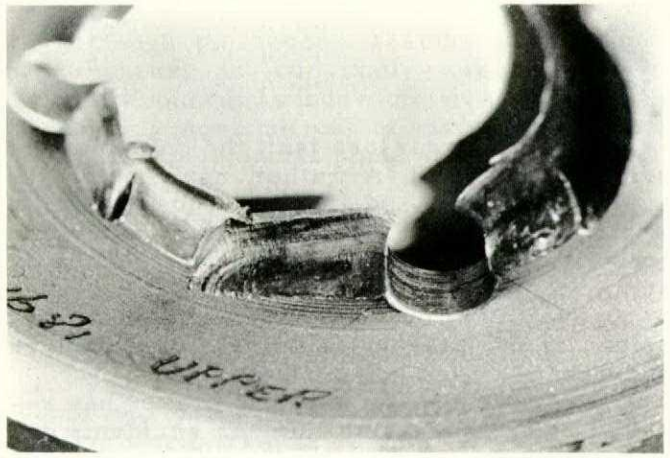


Figure 3. Fatigue origins.

was caused by the failure in fatigue of the upper fuel pump bevel gear. This fatigue was possibly induced by the reduced chordal thickness of the driving bevel teeth allowing bottoming in the teeth of the driven gear, producing abnormal loading at high frequency for a long period of time.

In this case an improperly manufactured item that defied detection through the inspection processes was the cause of an accident three years later. This again points out the importance of meticulous and knowledgeable workmanship on the part of each and every individual that is directly or indirectly concerned with the aircraft industry. This applies not only to the military but also to any and all people who manufacture, overhaul, repair or service aircraft.

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HIGH, HOT AND HEAVY

In summers past, considerable emphasis has been placed on jet engine power loss due to higher runway temperatures. Even so, the first hot spring or summer day usually finds us having at least one premature gear retraction or similar takeoff bust somewhere. So, for the proverbial 2 percent who miss out on the word, here are the thumb rules of power loss.

Hot Weather Takeoff Thrust (Jet)

Compressor Inlet Temperature (0° F)	You get	% of Thrust Available at 100% RPM
120°	" "	81.6%
110°	" "	83.9%
100°	" "	86.9%
90°	" "	89.7%
80°	" "	92.9%
70°	" "	96.3%
59°	" "	100.0%

Of course power loss isn't the only summer aviation problem! A rather new one is the exploding of tires and wheels. These **hazards**, which have caused fatalities to crewmen and strike damage to aircraft, are increased by summer temperatures. ComNavAirPac dispatch (062001Z) of April, 1959 quoted in part below, is of interest in preventing this type occurrence.

"Extensive use jet aircraft brakes has resulted in an increasing number accidents due to tire/wheel explosions. All units flying high performance aircraft will observe following:

a. Aircraft that have experienced heavy braking on aborted takeoffs or "hot" landings will be parked in an isolated area clear of runway with minimum taxi and shut down.

b. Do not inspect landing gear in either case for at least 30 minutes to eliminate possible personnel injury..."

USN: Approach

Seen On A D14

(By definition u/s means unserviceable, which leads us to believe that this report was written by an honest man.—ED)

"The u/s officer was going on an IF mission on 5 Nov 57 at 0800 hrs. The external check was completed and both student and the u/s officer were sitting in the a/c. The u/s officer wanted to put the canopy down immediately so called for external power and put the battery master switch on. The a/c began to start up by itself. The throttle was closed and H.P. cock was closed. The nose immediately collapsed. The battery master switch was turned off immediately. Soon as the nose started to collapse, the u/s officer looked at the undercarriage handle and it was up. A total of about 3 - 5% was on the RPM gauge when battery master was turned off. The u/s officer left the a/c with a guard on it and returned to the Flight."

ON THE AIR — EVENTUALLY

When transmitting on VHF, no delay is required before speaking. You are ready to talk when the mike is depressed. But...on HF it takes several seconds after the mike is depressed to build up generator voltage. If you begin talking right away, your first few words are lost. To the person on the receiving end, your request or report began in the middle of a sentence.

Flight Safety Foundation

SHARE YOUR EXPERIENCE

"We in aviation must profit by the mistakes our fellow pilots commit, for we as individuals will not live long enough to make them all ourselves. By the same token, when we avoid making mistakes and accidents, we must discuss the means employed in achieving our success."

Flight Safety Foundation

Don't Sell Yourself Short

Why should a trained, qualified pilot have so much difficulty in manoeuvring his aircraft so that touchdown is made on the first third of the runway in the proper attitude and at the correct airspeed?

How many short landings would occur if there were no wind and all approaches were made in still air? The answer, I think you'll agree, is very few. Nor would there be a problem if the wind were constant in direction and velocity.

One of the factors involved is wind. What makes wind a problem is that air in motion near the surface of the earth consists of countless currents and eddies continually varying in velocity and frequently changing direction. These two variables in the wind pattern are the source of the pilot's concern during final approach and landing flare.

Since the effect of wind gusts on a landing airplane is easier to understand—and certainly more widely publicized, let's discuss that portion of the problem first. Aircraft velocity in the surrounding air mass is, of course, displayed to the pilot as indicated airspeed. This indication will remain constant as long as aircraft speed and the velocity and direction of the surrounding air mass remain constant. From this point in the gust discussion we will disregard the effect of air-mass pressure, temperature, and direction for simplicity sake, and concentrate on velocity change, or gust effect. If the air mass speed changes (as occurs in a wind gust), the indicated speed of the aircraft will change. The amount of change, the critical factor when the aircraft is close to the ground at approach speed, will depend on several variable factors, the most important of which are the duration, amplitude, and sharpness of the gust.

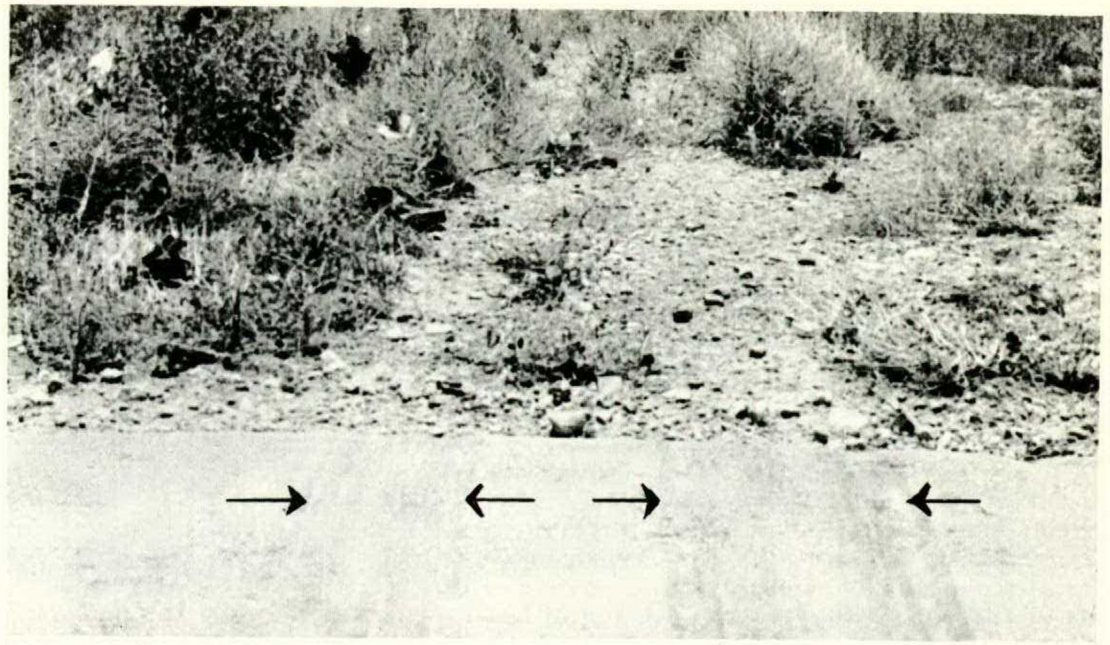
Wind Variables

Unfortunately the pilot cannot predict the exact wind speed he will encounter during the final phases of the approach and landing flare. Therefore, he must increase the normal approach speed to insure that uncontrollable rates of sink or aircraft stall will not occur if a sustained gust suddenly plays out when the aircraft is close to the ground. For most aircraft, this extra speed margin will be two-thirds of the reported gust velocity—and this gust correction must be maintained until the aircraft is over the landing surface and the pilot is ready to let the aircraft touch down. In almost every short landing accident where gusty surface winds were a factor, the pilot either failed to apply a gust correction or he removed the gust correction before the aircraft was over the runway and ready to touch down.

Wind Shear

Although the second weather phenomenon, wind shear, is commonly associated with weather fronts and winds aloft, we are concerned here with a more uncommon variety that occurs in a nearly horizontal plane and comparatively close to the terrain.

To establish a working definition, let's say that this type wind shear is a boundary, or surface layer, separating two parcels of air that have radically different velocities or directional components, or both. Let us consider two ways this low altitude wind shear can occur. First, an extremely shallow frontal surface as would normally be associated with a rapidly moving warm front is an ideal situation for the development of a sharp, limited wind shear zone



Don't use the "shoot for the end" technique—you might hit it.

very close to the earth's surface. A second situation exists when a strong pressure gradient is present over an area and an extremely rapid temperature decrease in the air in contact with the surface occurs as a result of nocturnal cooling. Why is this a pilot problem and what has it to do with short landings?

The answer to the first part of the question has made a lot of people pause, because the biggest part of the problem is that the pilot is blissfully unaware that wind shear exists on the final approach until after he has passed through the shear zone. And perhaps not then, for he may put the full blame for that sudden change in airspeed or glide slope displacement on that "lousy GCA operator", "misaligned ILS glide slope", or maybe "improper power control" on the part of the copilot. Or, perhaps, the shock of suddenly touching down in a muddy overrun and sliding up on the runway sans gear has left our hero with a real good case of amnesia.

We have already insinuated, in answer to the second part of our question, that wind shear close to the ground can contribute to an "operator error" short landing. Let's examine the "how" a little more closely. For this example we will assume that we are concerned with a north-south runway and that a shallow frontal zone, oriented east to west, separates cold air below and warm air above about 100 to 200 feet above the surface of the runway. An accurate weather map of the existing conditions would, of course, display the frontal surface contact with the terrain at some distance to the south of the airfield. Now let's make the further assumption that the surface winds at the airfield are accurately reported as light and variable and are actually less than two knots with a general westerly component.

Now for the villain of the piece. Let's also assume that the wind at the 1000-foot level is from the south at 50 knots and that immediately adjacent to the shear zone, in the warm air and 200 feet from the ground, the wind is from the south at 40 knots. To complete the weather picture, let's throw in a ceiling of 500 feet broken with some scattered low scud and a visibility of seven miles in light rain.

Enter our boy and his airplane, cleared for a no sweat GCA and just rolling out squarely on the centerline for runway 18. Everything is going just fine as he intercepts the glide path and takes up the recommended rate of descent. Small power corrections, smooth on the controls; he'll demonstrate to that young copilot how the Old Man can make those clocks behave. Just a little turbulence but no sweat from the wind (didn't the GCA controller just give him his final landing clearance and confirm "wind calm"?).

At about one mile from touchdown, slightly less from the end of the runway, and just after the GCA controller advised "on glide path, on centerline," the approach suddenly goes real sour. Turbulence increases suddenly, airspeed falls off rapidly in spite of progressively greater application of power, and the rate of sink of the aircraft becomes uncontrollable. The result? The airplane hits the ground in a condition approaching—if not actually—a full power stall considerably short of intended landing point.

Now let's examine the basic physics of "why" this airplane apparently "fell out from under" the pilot. At a point two miles out on the approach, with an indicated airspeed of 140 knots and an effective headwind of—say 40 knots, the aircraft ground speed was approximately 100 knots. Move the aircraft down the approach slope a little more than a mile and through the transition shear zone into the cold air, and the effective headwind has suddenly changed to zero knots. We know that due to inertia of the aircraft, mass gound speed will remain at about 100 knots until sufficient power is applied or altitude lost to overcome drag and increase aircraft velocity. The net effect is that the aircraft has lost 40 knots of indicated airspeed in the very short span of time it has taken to cross the wind shear zone.

It is well to remember at this point that where the opposite condition prevails (strong tailwind aloft dropping off to a light wind below the shear line), an overshoot is likely.

There are many variable factors that can bear on the wind shear situation. Some of the more important are amount and height of the shear, type of aircraft, engine acceleration characteristics, and pilot reaction time. However, there is a valid conclusion that we can reach based on this example and discussion: Significant wind shear occurring during the final phase of a landing approach may prohibit the unwary pilot from touching down at the selected point on the runway, and under severe conditions may actually result in inadvertent touchdown a considerable distance short of the landing surface.

Remedies

There are several ways that the pilot can avoid being trapped in this situation. First, thoroughly discuss the landing area weather with the weather forecaster when progged atmospheric conditions appear to be favorable for the development of low-altitude wind shear. Second, stay especially alert during approach any time winds at low levels are known to be strong or when significant differences in velocity or direction are known to exist between low-level winds and surface winds. Third, use particular caution when executing landing approaches during periods of weather frontal activity. And last, since areas of low-level wind shear are generally localized, do not hesitate to execute a missed approach and proceed to an alternate airfield.

Usually the underlying cause, when a pilot induces an accelerated stall on approach, is that the landing flare is started too late out of a relatively steep, minimum power glide. In addition, analysis of some short-landing incidents that occurred during darkness indicates that the pilot may have been startled by the sudden reflective glare of the landing lights on landing path terrain and pulled back on the control yoke in a reflex action, inducing a stall and a sudden landing.

There is a two-part solution to avoid becoming a member of the short landing club through these causes: first, put the airplane on the correct glide slope—far out on the approach and avoid last-minute large corrections during the landing flare; second, when it becomes apparent that for any reason a large displacement correction will be required to put the aircraft back on the desired glide path, don't fall victim to false pride—go around.

The last contributor we will discuss stems from a pilot tactic that is extremely unpopular among accident investigators and the keepers of the accident rate.

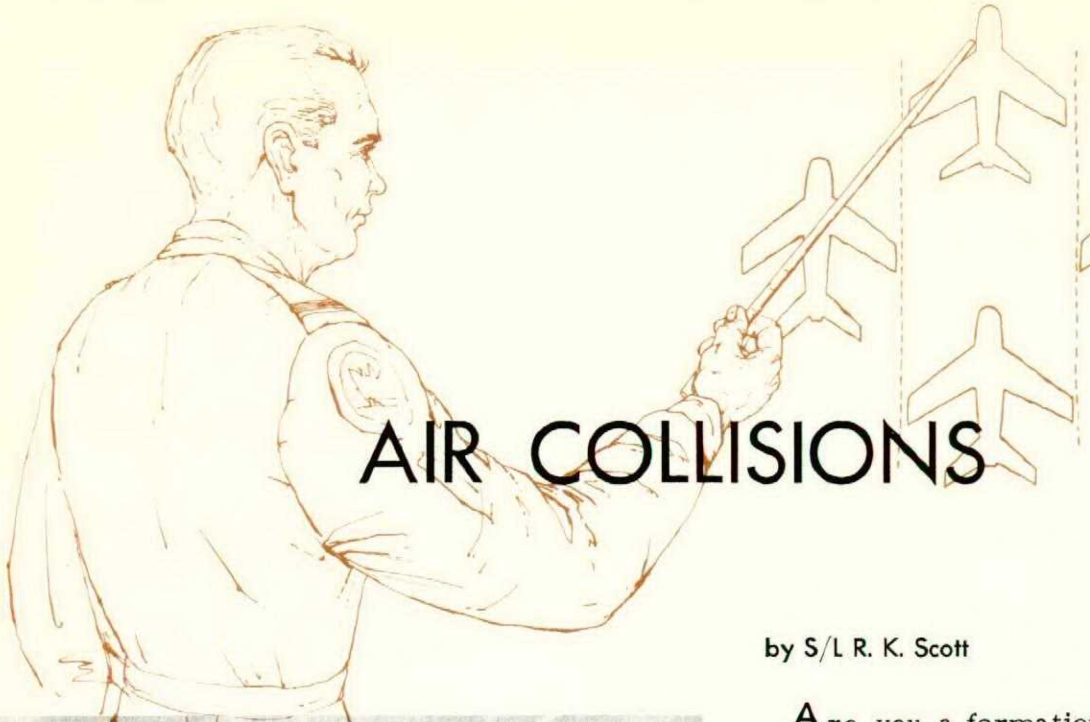
There are still a few pilots left who aim their approach just short of the end of the runway and count on excess speed or ground effect to carry them over the runway threshold and permit touchdown within the first few feet of the actual runway.

This procedure is so foolhardy and loaded with possibilities of minor errors in judgment or technique that it should never be attempted, particularly with a high-performance jet airplane, unless some extremely serious emergency dictates immediate landing on a short strip. Even then, it may be better to land 500 to 1000 feet down the runway and chance rolling off the far end at 20 or 30 knots than to hit down in the overrun and clip the four-inch lip of the pavement edge.

Fortunately, prevention of this type short landing incident is easy: Don't use the "shoot for the end" technique, you might hit it!

Combat Crew

Heavy black marks at the approach end of your runway are proof of premature touchdown.



AIR COLLISIONS

by S/L R. K. Scott

Are you a formation pilot? If you fly in a fighter or interceptor squadron then you certainly have to be in order to fulfil the operational role; or if you are in the jet training mill as an instructor or student you must take part in this interesting phase of military flying. For any pilot who does fly formation here is a startling fact provided by our statistics; eighty per cent of all RCAF air collisions occur during formation flying, and the greatest single cause factor is "Aircrew - error in judgement".

This means that aircrew can do something to reduce the number of air collisions. Let's consider some of the things that could contribute to a safer operation.

How do the more hazardous situations arise during a formation flight? The section leader, by reason of his experience, knows when and where these hazards are most likely to occur and can place emphasis on these specific points during the briefing. Here is a suggested list of situations and briefing points that will provide food for thought.

Look-Out

The most important factor is look-out. Insufficient look-out and losing sight of the other aircraft in the formation is dangerous. Be especially alert. Keep your eyes open and inform the leader of any potential hazards. It is vital for the leader to maintain a good look-out.

Losing Sight Of

In connection with look-out, you may lose sight of the other aircraft in your formation. This may be because you are out of your proper position, or looking into an unfavourable sun condition. Whatever the reason pull away from the formation in a direction that you can see is clear, and rejoin when in visual contact.

Join-Up

A very slow join-up is not acceptable for operational reasons. A very fast closure for join-up often results in a "belly-up" to the formation, if you are joining up on a closing angle. This results in losing sight of the formation and mushing towards it. When closing from astern and close to the formation you often end up in a dangerous position below and ahead of the formation. Never lose sight of the formation while joining up. Stay well clear when you know that you have a high rate of closure and use power and speed brakes to reduce to a low overtake speed before moving in smoothly.

Breaking-Off

Abrupt breaking out of close formation can be dangerous. Another aircraft could be formating in echelon on your outer wing. The technique used in moving out of close formation or breaking-off will depend upon the circumstances. Normally, however, start a smooth pull away and have a look in your direction of turn before going hard.

Flying Too Close

Flying too close by overlapping wings unnecessarily does not provide a margin of safety in the event of an error in judgement or an emergency situation. Wing tip and nose-to-tail clearance should be stressed in the briefing and insisted upon by the leader.

Over-Controlling

Over-controlling may be experienced in close formation by pilots under training, flights at high airspeed, or in turbulence. Move smoothly out of close formation to a safe and comfortable spacing in order to relax and to trim your aircraft. Leaders should order opening up the formation or a reduction in airspeed to lessen apparent over-controlling by wingmen.

Changing Position

Moving too quickly or too close often results in erratic changes, over-controlling, and turn reversals towards the formation. Ensure that you understand the correct technique for changing position, and concentrate on a smooth manoeuvre. Avoid large power changes and control movements. Stay out of jet wash.

Leadership

When a leader does not conduct the flight in accordance with the briefing, or when he departs from the standard operating procedures, problems are more likely to be encountered within the formation. The lack of smooth flying, the use of speed brakes, the use of improper R/T procedures, the use of improper hand signals, the use of improper calls for formation changes which result in aircraft moving in opposite directions, and many other displays of poor airmanship can precipitate a hazardous situation.

The greatest contribution to a safe and effective formation flight can be made by the section leader. To lead a formation well, he must avoid these mistakes; he must visualize himself in the position of the wingmen. He must insist on good air discipline and set the example.

Cross-Over Turns

Many near misses have occurred within a section when one element leader has led his wingman through the other element. This is usually the result of the wingman falling too far behind and concentrating on his lead, or the leader passing too close to the other element. When the wingman is behind, he should keep a sharp look-out for the other element. The element leader should consider the position of his wingman and ensure that he will pass well clear of the other element.

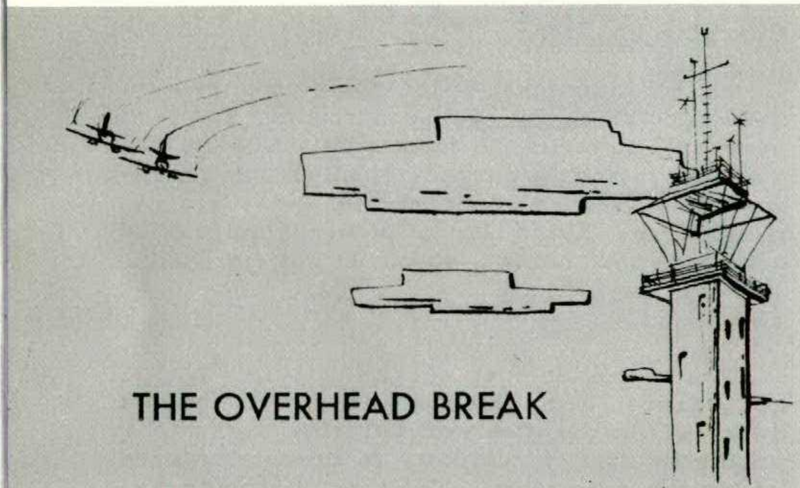
There are many other situations which could be included, many that you may have experienced. Discuss them so that they can be avoided in future flights.

Things to Stress

In a program to reduce formation accidents, a clear understanding of all aspects of formation flying is essential. Included here are some things worth stressing.

- Orders: It is the pilot's responsibility to understand the orders concerning formation flying, including flying manuals, CAPs, Command Instructions and Squadron Operating Procedures. The supervisor should ensure that all publications are current and available. He should insist that his pilots keep up to date.
- Briefing: Adequate briefing is vital to a safe operation. Each briefing should be given with the least experienced pilot in mind. The briefing should include all aspects of the flight, including aborts and especially emergency procedures. The person giving the briefing should ask questions throughout the briefing to ensure that the pilots are attentive and fully understand their part in the formation.
- Air Discipline: From the beginning of his formation flying training, the pilot must realize that he is being trained for an operational role, that strict air discipline is the basic requirement for safely achieving the aim. On the squadron, teamwork and effectiveness result from continued stress being placed on air discipline.

Formation flying is an art, a matter of skill, discipline, judgement and teamwork. It can also be a source of real pleasure.



THE OVERHEAD BREAK

The advisability of the continued use of the 360-degree overhead approach method of controlling military turbojet fighter-type aircraft was investigated approximately three years ago. Our evaluation of regional office and field comments at that time overwhelmingly indicated that this type of flight pattern for military turbojet aircraft was favored over the conventional rectangular traffic pattern. During July, 1958, we conducted another survey on the same subject. Comments again conclusively indicated that the 360-degree overhead approach should be retained.

We would like to point out some of the major advantages of the 360-degree overhead approach:

1. Formations of jet aircraft can be more expeditiously handled into and through the traffic pattern onto the runway.

2. Only one radio contact for landing instructions and one for landing clearance per formation is necessary.

3. The tower controller has complete discretion with respect to approving or disapproving the approach.

4. The controller can retain more positive control over the size of the traffic pattern. This can be accomplished by requiring the jet aircraft to re-enter the initial approach or extend the point at which the aircraft makes a turn into the conventional traffic pattern.

5. As the altitude utilized in this procedure is usually higher until turn onto final approach, a degree of segregation is attained between 360-degree overhead approaches and conventional rectangular patterns.

6. Allows the controller to group his traffic by speed types to a greater extend than is possible with a conventional pattern.

7. Permits the controller to observe the aircraft during the entire approach after the initial approach over the airport. This is not always possible with a military jet aircraft in a conventional pattern.

8. Provides a safer approach to landing considering a possible flameout by the military jet aircraft.

Because of the above advantages, we believe the 360-degree overhead approach pattern is the safest and most expeditious method of controlling military turbojet aircraft at joint-use airports where a significant amount of this type traffic exists. Therefore, we do not plan to change our existing procedures at the present time.

USN: Approach

FLYING PROFICIENCY VS THE CHAIRBORNE PILOT

Flight Safety Sentry

The demands of our modern-day Air Force have chained many of our most experienced pilots to their desks. As a result, with few exceptions, the flying proficiency of these pilots has suffered a gradual disintegration.

At first, the new desk-bound pilot fights for every hour of flying time he can get; however, as time passes, he becomes more and more involved with the demands of his administrative duties, and his interest and will to fight for flying time suffers proportionately. Eventually his motivation is whittled away concerning off-duty and weekend flights, and often, the resistance of his boss to duty-hour flights. Eventually he finds his knowledge of emergency procedures becoming rusty, his traffic patterns are no longer precise, his habit patterns dim and fade, and his precision instrument work loses its polish and requires great concentration and effort. Often he hears the less experienced and less constrained pilots speak sneeringly of "desk pilots". At this point, a feeling of inferiority sets in and he resigns himself to "fighting for twenty-five".

If he is fortunate, he recognizes his state of proficiency and establishes his personal weather minimums and is very conservative in his flying. His outlook at this point is to live to a happy retirement or die with a heart attack as a result of his sedentary life and administrative frustrations.

If he is unfortunate, he may be low in flying proficiency but high in confidence or pride. He is now a real menace to himself, and to the military personnel and equipment entrusted to him. Bad weather and mechanical difficulties can compound into severe trials for the most proficient pilots - and fatal nightmares for the unproficient. Under adverse conditions, the little things: frequencies, headings, emergency procedures, etc., can make all the difference. Under very adverse conditions, the experienced but more cautious pilot would be safely on the ground, awaiting a break in the weather or proper repair of mechanical difficulties. Needless to say, the unproficient but confident and proud egotist has the odds stacked against his reaching retirement.

Sometimes our "desk-bound pilots" are returned to flying jobs. It is amazing how rapidly proficiency is re-attained. The wise pilot is already acutely conscious of his shortcomings and after a month or so of intensive flying, he can also afford a feeling of confidence and pride in his flying ability. It is nice to be alive.

How does this fit into flying safety? All of us, including the pilots who sneer at the "desk-bound", are destined to be constrained from the joy of full-time flying at one time or another. If you are unable to maintain high flying proficiency, it is vital that you recognize this fact and do everything possible to keep the odds in your favor. Don't let false pride or overconfidence overcome your good judgment.

NEAR MISS

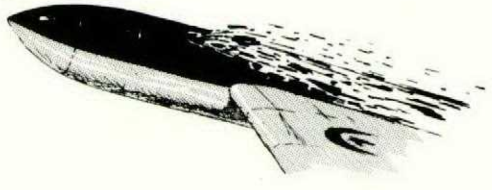
LEARNING THE HARD WAY

I was preparing to fly a short trip in a T-33 with an experienced ex T-Bird driver when I discovered I had forgotten to sign the L14. Leaving my "clued-up" passenger to carry out the external I made a short sprint to the hangar to complete what I had forgotten.

All went well until we were airborne, then we discovered that our port tip tank filler cap was dangling by the chain and that fuel was streaming from the tank. The starboard tip cap was doing an enthusiastic cha-cha with every intention of leaping out into space.

Obviously, we weren't going very far in this condition so we made a delicate return to terra firma (125 gallons in tips). Groundcrew, doing a compass swing near the end of the runway, tightened up the loose caps and we proceeded on our merry way.

The person responsible for this serious oversight was yours truly and therefore no stones are being hurled. I now know that I should have done the external myself and not left it up to an ex-driver. "Once bitten, twice shy" is a fine expression as long as the "bite" is not fatal.



IFR FOR NIGHT FLIGHTS

On completion of a mission that was flown at night at 40,000 feet in a CF100, I reported to approach control. I gave my position and estimate of when I would be over the range. I was cleared for a standard jet range approach, VFR between 30,000 and 26,000. Traffic was given as a westbound Britannia on Red 1 at 28,000 that was estimating over the range at the same time that I was.

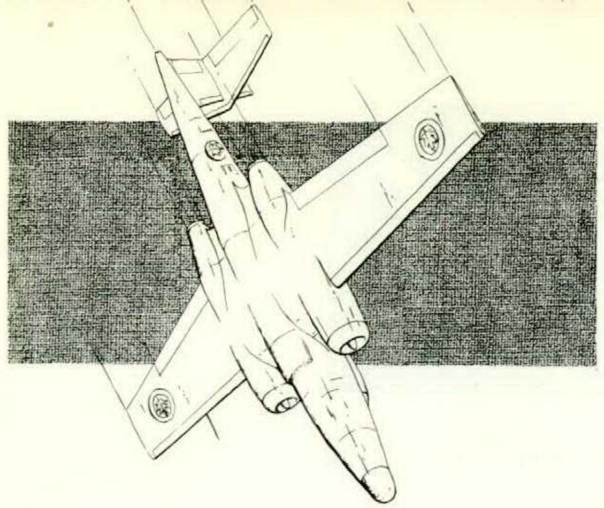
As I approached the east course at an angle of 45 degrees my altitude was about 32,000. I said to my observer, "You never know how good visibility is. We'll level off and cross (Red 1) at 30,000." When we levelled out there was the Britannia on a perfect collision course, just below the nose of the starboard tip tank. The Britannia remained in the same relative spot until it passed beneath us. Only our vertical clearance saved a collision.

"Legally", I could have continued the VFR descent as my visibility was unlimited, except for the tip tank. "Legally", I was permitted to cross an airway at 45 degrees. "Legally", I could have collided with the Britannia.

I called the Britannia and they had not seen us. This is understandable because aircraft design does not permit all around vision. The pilots also must look at their instruments occasionally. This raises the question: Now that the difficulty of assessing the relative position of another aircraft at night has been so amply demonstrated, is it not time that all night flying is conducted IFR?

SPEAK TO ME

A CF100 pilot told his navigator that he suspected oxygen trouble. The navigator told the pilot to pull the emergency oxygen bottle. As the pilot pulled the emergency bottle he did a slight wing-over and started down—but fast. At approximately 35,000 feet the aircraft entered cloud in a descending turn.



From where the navigator sat things didn't look too good. He was sure the aircraft was inverted. The ASI needle seemed to be stuck at limiting Mach. His pilot was mumbling away quite happily. The navigator decided that it was his day to eject, so he picked his altitude and was ready to go when the aircraft was passing through 18,000. At 17,000 feet he noticed a decrease in airspeed. He also saw the altimeter had ceased to upwind. He didn't eject.

In the front cockpit everything was fine. The pilot pulled the emergency oxygen bottle and started down. His oxygen problem cleared up immediately and he had everything under control all the way. The only difficulty he experienced after pulling the emergency bottle was when he tried to talk. He had his mask cinched up tight and the pressure from the emergency bottle was more than he could speak against. He could only mumble.

This is a problem we have to live with. Both crew members did what good aircrew should—took the appropriate emergency action. And, by submitting a Near Miss report on their experience, this crew has provided a valuable reminder to all concerned of how difficult it is to speak while using pressure breathing. Be on the look for this problem. If you can recognize it you may save yourself a few bad moments.

SHORT CHANGED

Sometime between 1840Z and 2000Z on 20 Feb 60, I was short changed. I made an enroute stop and was directed by the tower to transient flight. I shutdown and gave the servicing crew the travelling copy of the L-14. I also requested 677 gallons of fuel and was told that the T-33 would be ready to go within an hour.

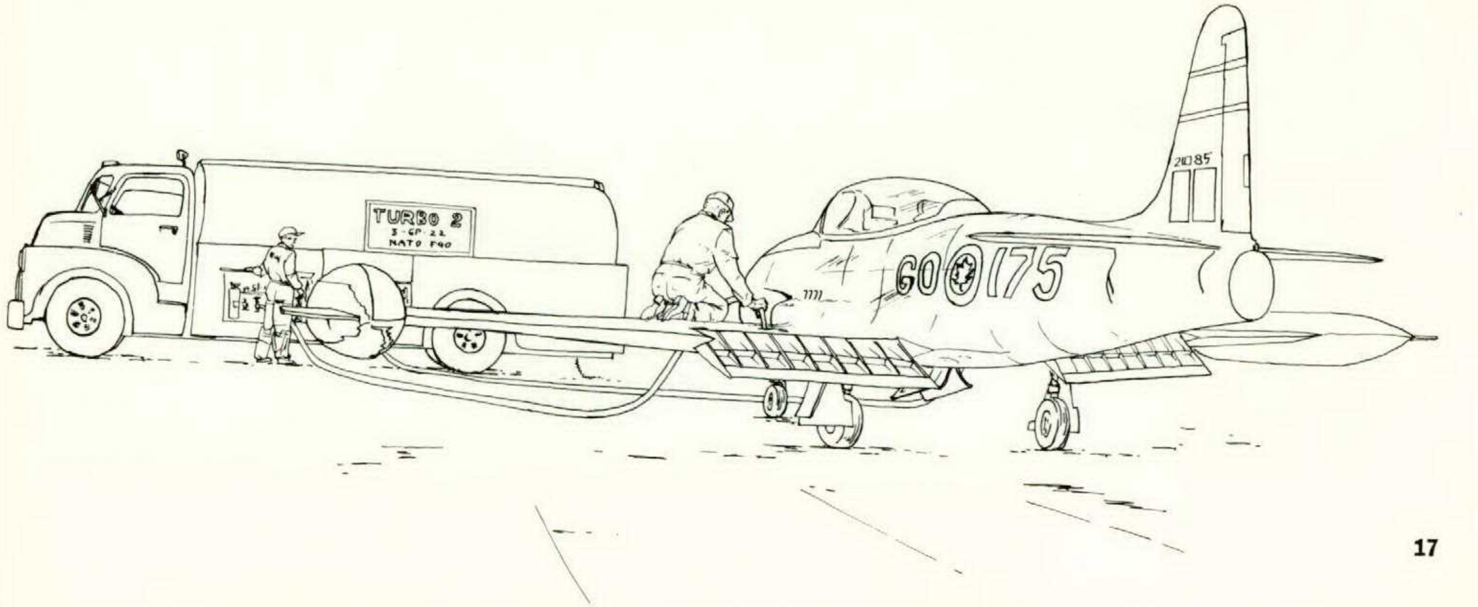
I was ready to leave at 2000Z. The L-14 showed the aircraft to be in satisfactory condition. On the preflight walk-around I did not remove the fuel caps to check the contents of the tanks. At 2045Z I was off for a non-stop flight to Portage.

Over Sault Ste Marie the fuel counter showed 360 gallons remaining and the tip tank lights were on. Not knowing how much fuel I had I landed at Lakehead. When I shutdown the counter showed 246 gallons. I had the tanks filled and it took 509 gallons to do the job. This means that transient maintenance had short changed me by 78 gallons.

Luckily the shortage was in the tip tanks so that it showed up while I still had time to change my flight plan. Had this shortage been in the internal tanks there may have been several serious complications around my destination.

I do not think aircrew should personally remove filler caps and check fuel contents, however it seems as though this is the only way you can be sure of getting what you sign for.

(Transient facilities have been commented on several times in recent issues of Flight Comment. These facilities are the units' responsibility. So good transient servicing is one way a unit can contribute to flight safety. However, this does not excuse the pilot from his responsibility to ensure that he has adequate fuel for the flight. Checking the servicing of his aircraft is the cheapest and best insurance a pilot can get.—ED)



ARRIVALS and DEPARTURES

BOOTS AND BRAKES

The airman said, "I was detailed to take an energizer to a T-33 in front of hangar number 3. I drove around the port side of the aircraft and angled in from the back. I was pulling out from the angle formed by the fuselage and wing when my foot slipped off the brake. Before I could stop, I struck the tail cone of the starboard tiptank."

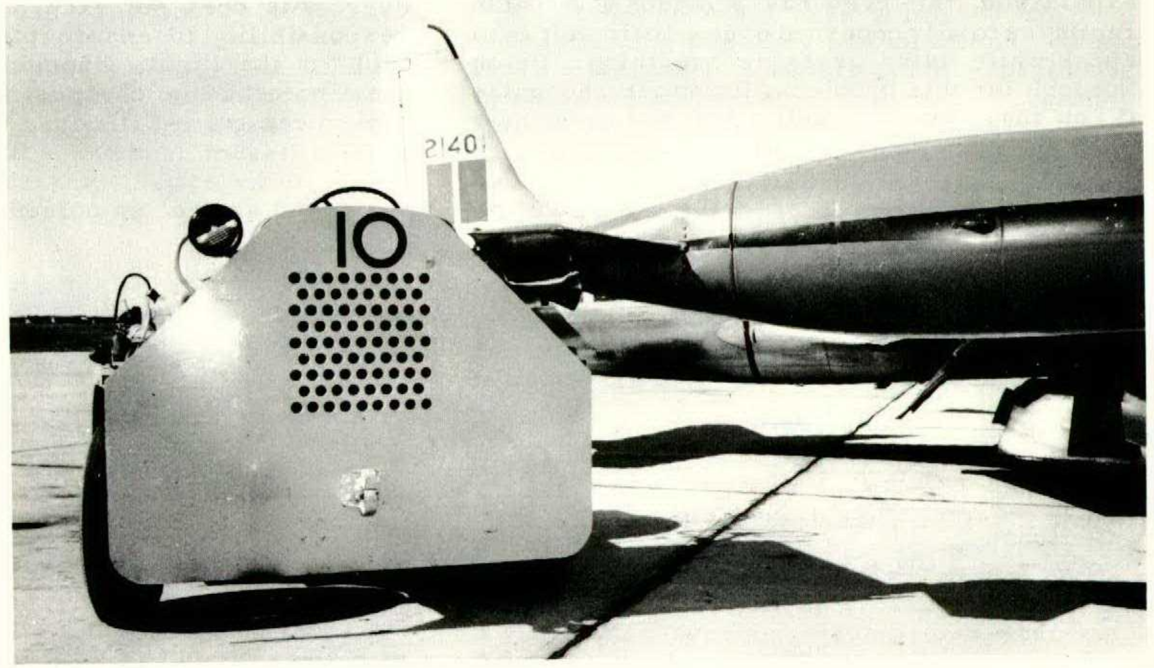
Question: What is the condition of your shoes?

Answer: Very badly worn.

Question: What was the condition of the D6?

Answer: The brakes were good, however the brake pedal was worn smooth.

This airman was found guilty of not exercising due caution. And again we have two items—the condition of the airman's boots (his responsibility) and the condition of the D6 (ME's responsibility)—that had nothing to do with the T-33 which, plus a little negligence, contrived an accident.



The brake pedal was worn smooth.

DISTRACTIONS AND INATTENTION

The number of wheels-up landings has decreased in the last few years, but they still happen.

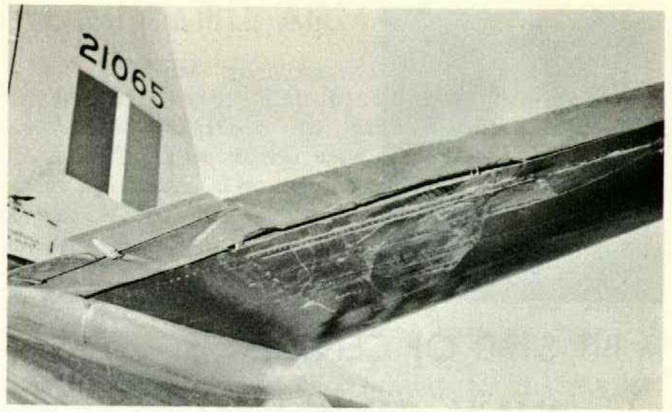
The last case concerns a wheels-up landing in a T-33. On return from a clear hood navigational exercise the pilot carried out several touch-and-go landings. The last circuit was to be a closed pattern. On the downwind call the pilot dropped the speed brakes for a normal approach. The tower advised that a three-plane formation was on final GCA, so the pilot extended the downwind leg and called for a flapless landing. He carried on and landed the aircraft wheels-up.

The cause of this accident was never in doubt. However, a survey was made of all wheels-up landings for the last three years to try to find the cause behind the cause. In every case the pilot broke his normal habit pattern. He either flew a different type circuit, received an unusual instruction from the tower, was concentrating on the approach because of poor visibility, or was fouled up with traffic. In other words some form of distraction occurred in the cockpit when the pre-landing check was being carried out.

In almost every case, a second distraction took place on the ground, either in the tower, or in the control tender. In this last case, the duty pilot in the control tender was experiencing difficulty with the radios, and while trying to clear up the trouble, he did not witness the aircraft landing wheels-up.

This pin-points the secondary cause factor as distraction and inattention, distraction of the pilot, and inattention of the ground support personnel. It follows that special care is required when anything abnormal takes place in the circuit.

In the maintenance end of flying it is possible to have a system of supervisors and double checks that eliminate most errors. But how can you counter-sign a pilot's decision, or the controller's instruction for that matter, when an aircraft is on final? Obviously you can't. Therefore the pilot, the controller, the man in the tender, each has to be his own supervisor. Each one must be aware that any unscheduled change in activity can precipitate an accident. The unscheduled change then is the danger signal. Watch for it.



No. 1's empennage.

No. 2's tip tank.

THAT LITTLE EXTRA

Fire at Sea! This cry was the dread of all sea captains in the days of the sailing ships. Today the call of a "mid-air collision" causes the same dread in the hearts of all aircrew.

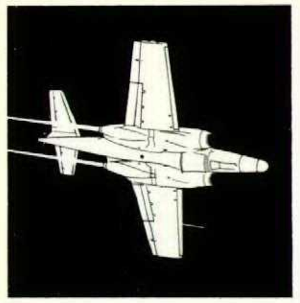
It has been said many times that if we have to fly formation, we can expect to have mid-air collisions. This is a fallacy. In all cases where a mid-air collision occurred during formation flying someone goofed. The goof wasn't deliberate but the end result was a collision.

The latest case concerns two T-33 aircraft. The aircraft were being flown in the local area and were in short trail. The leader called his No.2 to rejoin in echelon starboard. While No.2 was joining up, No.1 initiated a turn to port and reduced the throttle while turning through the sun. No.2 lost sight of No.1 so he broke to starboard. The port tip tank of No.2 collided with No.1's starboard elevator and horizontal stabilizer.

In this case the lead didn't give his No.2 much consideration; but his action did not cause the collision. It was determined that No.2 tried to rejoin the lead too quickly, and this combined with the turn, the sun, and the reduction of throttle caused the accident.

There is no argument that during formation flying the element of risk of collision is increased. Because this is so, the pilots who are flying formation must be on their toes.

It is useless to say that because we fly formation we are going to have collisions. Let's face it, the element of risk is greater and it takes that little extra to prevent an accident. You have "that little extra"; it's all a matter of using it.

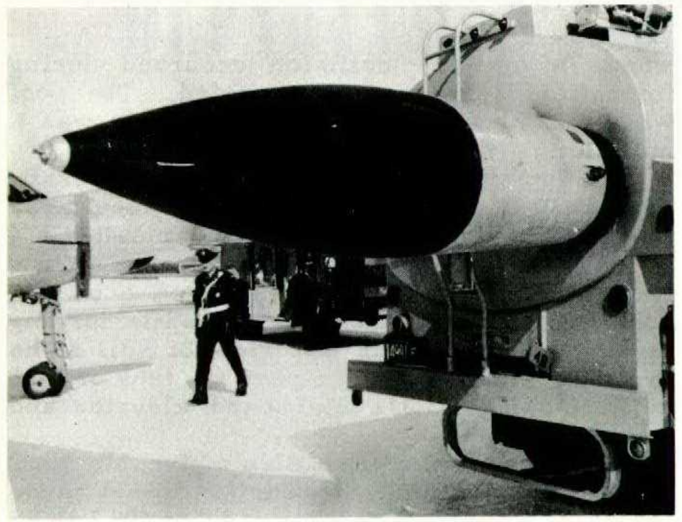


A BIT STBD OF CENTRE

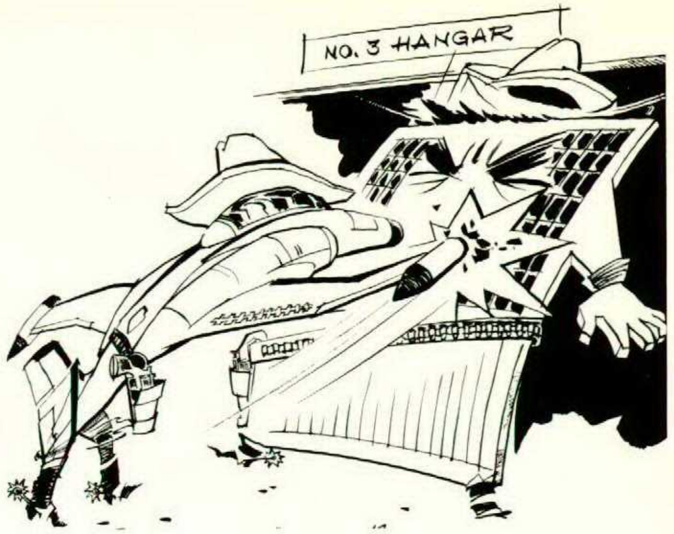
"What is it?" was the first reaction of our staff when this photograph arrived in DFS. A second look was needed to see that we had another CF100 taxiing accident.

The pilot had been taxiing his aircraft parallel to the back of the fuel bowser. As no marshaller was in sight the aircraft was stopped almost directly behind the bowser. A marshaller finally appeared about 75 yards away and motioned to the pilot to come to him; so the pilot turned to pass between the bowser and another CF100 which was parked 114 feet from the bowser.

In this case the bowser came out second best in terms of repair dollars. It goes without saying that this accident may not have happened if the marshaller and the aircraft had been separated by something less than 75 yards.



A secret weapon or a direct hit stbd of centre?



AIRCRAFT HITS HANGAR DOOR

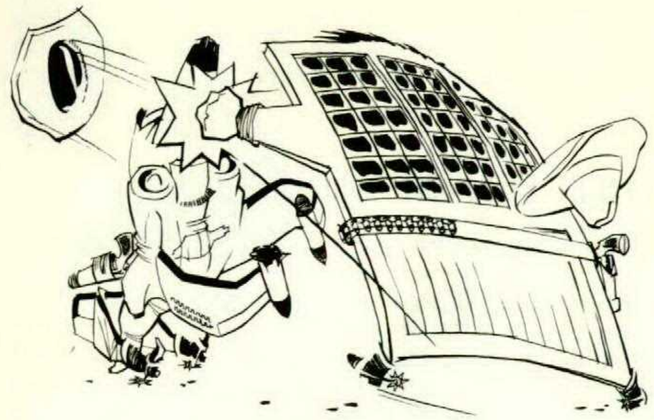
As seasons change, the CTechSO has to concern himself with keeping his aircraft operational in spite of ice, mud, rain, wind or whatever the season may bring. These and other weather induced hazards are obvious. A less obvious weather hazard is the way the slope of a hangar floor can change. Such a change was the cause of "E" category damage to a CF100 last spring.

At the station concerned, aircraft were parked in the hangar without brakes or chocks so that in case of fire the aircraft could be moved out quickly. Everything was fine for a number of years. Then one night last spring a CF100 was parked in the hangar with its nose about five feet from the hangar door. In the morning it was discovered with its nose against the hangar door. The slope of the floor of the hangar had changed. The station is now using wooden chocks in the hangar.

HANGAR DOOR HITS AIRCRAFT

After looking over this accident report we would not be at all surprised to hear of an aircraft that slipped on a cake of soap in the washroom. For, according to insurance statistics, home is a dangerous place.

The aircraft concerned is a Dakota that was parked just inside a hangar door. The night servicing crew were opening the door. When the bottom leaf of the door had opened about 3 feet, the operating cables of one counter-weight broke and sent the counter-weight crashing down on the port wing of the Dakota. Three Herman Nelson heaters were also damaged, two of them beyond repair. Total cost, aircraft and heaters, over nine thousand dollars.



The investigation of this accident was not complete when we received the accident report; it is printed, however, because it again points up the fact that we are all in this flying business together, and that each one must keep the equipment for which he is responsible in top-notch condition.

(In future, I am going to stand well clear of counter-weights.—ED)

THE INFALLIBLE AIRMAN

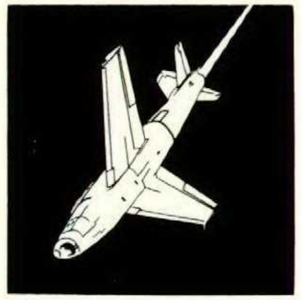
An AETech gp 3 installed a propeller on a Dakota aircraft. The blades were set in the feathered position in accordance with EO 05-35A-2. The dome was installed in the fine pitch position. The technician, however, failed to check the blade angles as outlined in EO 05-35A-2, sec IV, para 4-361, sub-para E, before he proceeded to unfeather the propeller by using the aircraft feathering system. Damage was caused to the rotating cam gear and to each of the propeller hub gears.

This case was investigated by the SAEO. The investigation revealed that this airman had changed propellers before and was considered very reliable in his trade. The senior NCO in charge of the crew had complete trust in the technician, therefore he did not supervise the work as he should have. The NCO, it seems, does not appreciate that his duties as supervisor are a recognition of the fact that no one is infallible.

Here we have a case of a capable technician making a costly mistake, and a senior NCO, because of the airman's ability, being lax in supervision. Who is responsible for the accident?

In our books both of them are at fault. The airman was just plain negligent. The same applies to the NCO. It is interesting to note that if either one of these skilled technicians had carried out their work properly, the accident would not have happened.

The large rectangular object in the right foreground is the concrete filled counter-weight.



THINK!

After completing an external check on a Sabre aircraft the pilot proceeded to remove the seat and canopy safety pins. Difficulty was experienced in removing the canopy safety pin as it appeared to be jammed in its recess. An AF Tech standing by for the start-up volunteered his assistance, and by using a screwdriver managed to pry the pin out sufficiently so that it could be withdrawn by the pilot. The technician then stood back. As the pilot removed the pin the canopy fired. The pilot suffered minor bruises to his forehead and left hand. Damage to the aircraft was estimated at $2000.00 plus 50 man hours.

Investigation into the circumstances of this accident revealed the following: (a) On the previous day the canopy and seat were removed and reinstalled to facilitate a radio modification. (b) An independent check was carried out by senior NCOs of both the airframe and safety equipment trades following the reinstallation. (c) A BFI was completed just prior to the accident. (d) The cause of the canopy being fired was due to the canopy sear pin not being in place when the canopy safety pin was withdrawn by the pilot.

The recommendations of the unit commander were as follows: (a) Sabre POIs include an appropriate warning; (b) Witness wiring of the alternate canopy release handle be considered; and (c) Safety publicity be given to this accident.

The following action has been taken to prevent this type of accident:

> Aircraft Operating Instructions General EO 05-1-1. A cautionary paragraph has been placed in this EO outlining the purpose and use of safety pins. Read it. The Sabre AOIs EO 05-5E-1. Para 2 R (b), Part 2, Handling, page 43, has been deleted and the following inserted: "2 R — Ensure that the canopy and seat charge sear pins are properly engaged. Remove ground safety pins from canopy remover and seat triggers.
>
> Note: If any difficulty is observed in removing any of the safety pins declare the aircraft unserviceable."

The basic lesson to be learned from this accident is one of caution when dealing with seat and canopy charges. The safety pins supplied with this equipment are designed to prevent inadvertent firing. Their design is such that they can be replaced or removed easily. If this is not the case then be very suspicious. THINK of the consequences.

WHEEL FLANGE FAILURES

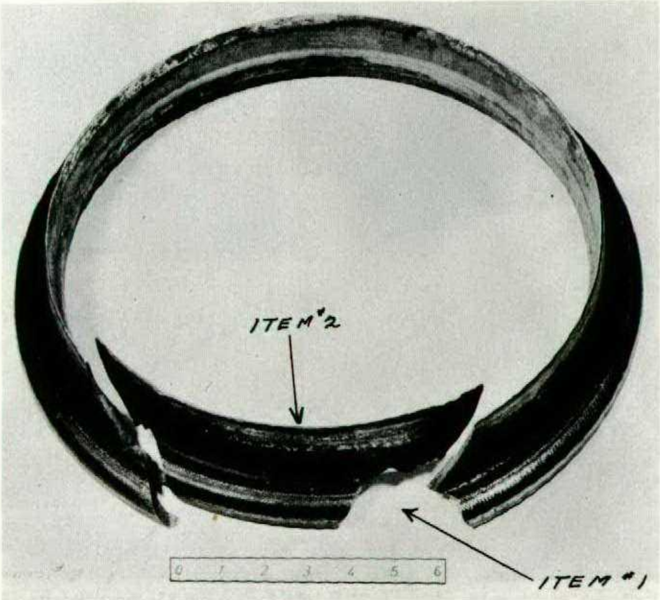
While doing a primary inspection on a Sabre, an airman noticed that a small piece of the demountable flange was missing (Item #1 in photo). When the tire was demounted, the big piece of broken flange (Item #2 in photo) fell out. It was obvious that this piece had been cracked for some time, and had been held in place by the tire.

In another case, a Sabre was being towed when a large piece of wheel flange fell off. It too had been cracked for some time.

The question is, if a piece of the wheel flange breaks right out during a landing, does the tire blow? There is no reason at all why the tire shouldn't blow. With part of the flange missing, there is nothing to stop the side of the tire from flexing out and causing tube damage. When the tire blows, the wheel and tire would probably be so badly damaged that only a very thorough on the spot investigation would reveal the true cause of the blow-out. There are, in fact, numerous cases on record where this type of flange failure could have initiated a tire failure, but the cause has finally been assessed "Obscure" because of lack of evidence.

The prevention of these flange failures is straightforward.

- Inspect the flanges carefully for cracks while doing BFIs and inspections.
- Use proper tire mounting tools and follow correct tire mounting procedures.
- Clean and inspect thoroughly as per EO 05-35-2 before building up wheels.



OTTER PILOTS TAKE NOTE

Shortly after takeoff in an Otter aircraft, the pilot noticed a slight film of oil forming on the windscreen. The oil temperature and pressure were normal. Although the film of oil was building up very slowly, the pilot decided to return to base and land. Using reduced power, a successful landing was carried out. Throughout the trip, temperature and pressure remained normal.

After shutdown it was noted that a large quantity of oil covered the lower cowling of the engine and the undersurface of the fuselage. Investigation revealed that the rear oil seal in the propeller had failed. A check of the oil tank showed two gallons of oil remaining.

In this case the pilot made a very wise decision. It is important that Otter pilots take special note. The only warning that a pilot has of a propeller seal failure may be a slight oil film on the windscreen. Most of the oil that is lost is swept downward and is not visible from the cockpit.

LETTERS TO THE EDITOR

Gave Up Too Soon

You recently published an article concerning a T-33 aborted takeoff at Lakehead. This article contained comments made by those responsible for investigating the accident. These "comments" do not appear to be substantiated by records and/or facts, nor have they been brought to our attention officially. For instance you state:

- "The investigation also contained rather pointed criticism of the second pilot's jumping on the brakes." Extract from Second Pilot's statement "The pilot stated he was aborting. At this time it appeared as if we were running out of runway very quickly, and that there was a possibility of hitting the ILS shack at the end of the runway. I then aided...on the brakes."
- "A review of instructor's techniques at the pilot's Unit showed as many types of control column handling as there were instructors." We believe our standards squadron to be qualified, capable, and that they monitor instructor's flying in accordance with accepted RCAF techniques.

In my opinion, ridicule is a poor substitute for constructive criticism, and reflects most unfavourably on a group of officers whom I believe to be second to none.

R. T. P. Davidson, W/C
OC, 2 AFS

(It is not Flight Comment's intent to imply ridicule of anyone unfortunate enough to be involved in an accident. It does, however, recognize that the "sighted sub, sank same" type of reporting does not stimulate thinking. To this end, we feel that a little conjecture along with the facts stimulates thinking and discussion. From time to time, we must also face the wrath of those concerned but even this may result in useful reconsideration of the problem.—ED)

Transient Facilities

The suggestion of a critique form by Cpl R.C. Hutton (Flight Comment, Jan-Feb '60) had been under consideration for some time.

All transients who visit Training Command units will find a standardized "Captains Reporting In and Servicing Requisition Form" in use. Its use, both by the visitor and the visted, will assist units to process transient traffic in an efficient, business-like manner.

Now that this form is in use, the slogan "if you like our service, tell others; if not tell us" is applicable to Training Command. Visitors, by using this form to order servicing and comment frankly on our facilities, will be making a real contribution to our efforts to improve transient facilities. They will be making each and every visit to a Training Command unit something to remember rather than something to forget.

H. D. Harragin, WO1
Training Command Headquarters

Would You Fly It?

On the inside front cover of Flight Comment, March-April 1960 issue, is a bold question, "Would you fly this aircraft?", along with a picture of the aircraft and a paragraph concerning maintenance operations. This paragraph clearly states "you make sure you have not left a single foreign object behind", so I take the liberty of assuming that the airman has finished his inspection.

Although I am not familiar with Dakota aircraft, it seems strange that the airman: would leave a jacking pad attached to the main spar; would leave a squared nick in the trailing edge of a propeller blade; and would not notice a possible oil or de-icer fluid leak.

As I have no specific knowledge of this aircraft, I would appreciate comments on my observation.

D. H. Hingley
RCAF Stn. Bagotville

(After reading the noted paragraph we hope all technicians will ask themselves the question, "would I fly this aircraft?", of each aircraft they work on. The jacking pad is retained on the Dakota at all times. The "nick" in the propeller blade is an optical illusion due to the pattern of light and dark lines in the photograph. And the "oil leak" is varsol.

LAC Hingley's keen observation and desire to know the answers is a professional's approach to maintenance, the best antidote for the "Maintenance Error" assessment.—ED)

Rudder Port or Starboard?

I have just completed reading the September-October issue of "Flight Comment" and would like to draw your attention to the article "Under Penalty of Death" under the main heading Arrivals and Departures.

It would appear from the damage sustained by the aircraft as explained in the article and further clarified by the accompanying photograph that this damage was incurred to the port side wing-fuselage fillet. If this proves to be the case, then surely the pilot would have to apply right rudder in order to maintain his heading and not left rudder as stated in the article.

I would be interested to have your comments on this point at your convenience.

Mr. R. Whyte
Canadair Ltd.

(The small amount of drag that was created by the loose wing-fuselage fillet would not overcome the directional stability of the aircraft. In this case the airflow over the port fillet caused an airflow disturbance effecting the tail surfaces. This reduced the aerodynamic pressure on the port side of the vertical fin and rudder which required port rudder to counteract.

It is interesting to note that when the fillet failed, this disturbance no longer effected the tail surfaces, and the directional stability of the aircraft was sufficient to overcome the extra drag caused by the damage, and that port rudder was no longer required.—ED)

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COMMENT

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BIRD WATCHERS' CORNER

TIGHT-FISTED NEST PACKER

This bird, fortunately rare, is a variant of the common species known as the Supply Basher. This rare bird has a morbid desire to retain everything that comes within its grasp. It has a mania for signs that are designed to frighten any would be intruder away from the nesting grounds. When the Nest Packer is caught with his signs down, he baffles the flock with forms, signatures, form numbers and the like. His odd characteristics often delay the flight of other birds while they wait for new feathers, wings or other spare parts. In the process of mutation he has acquired two mortal enemies, the Maintenance Drake, and the Operations Rooster.

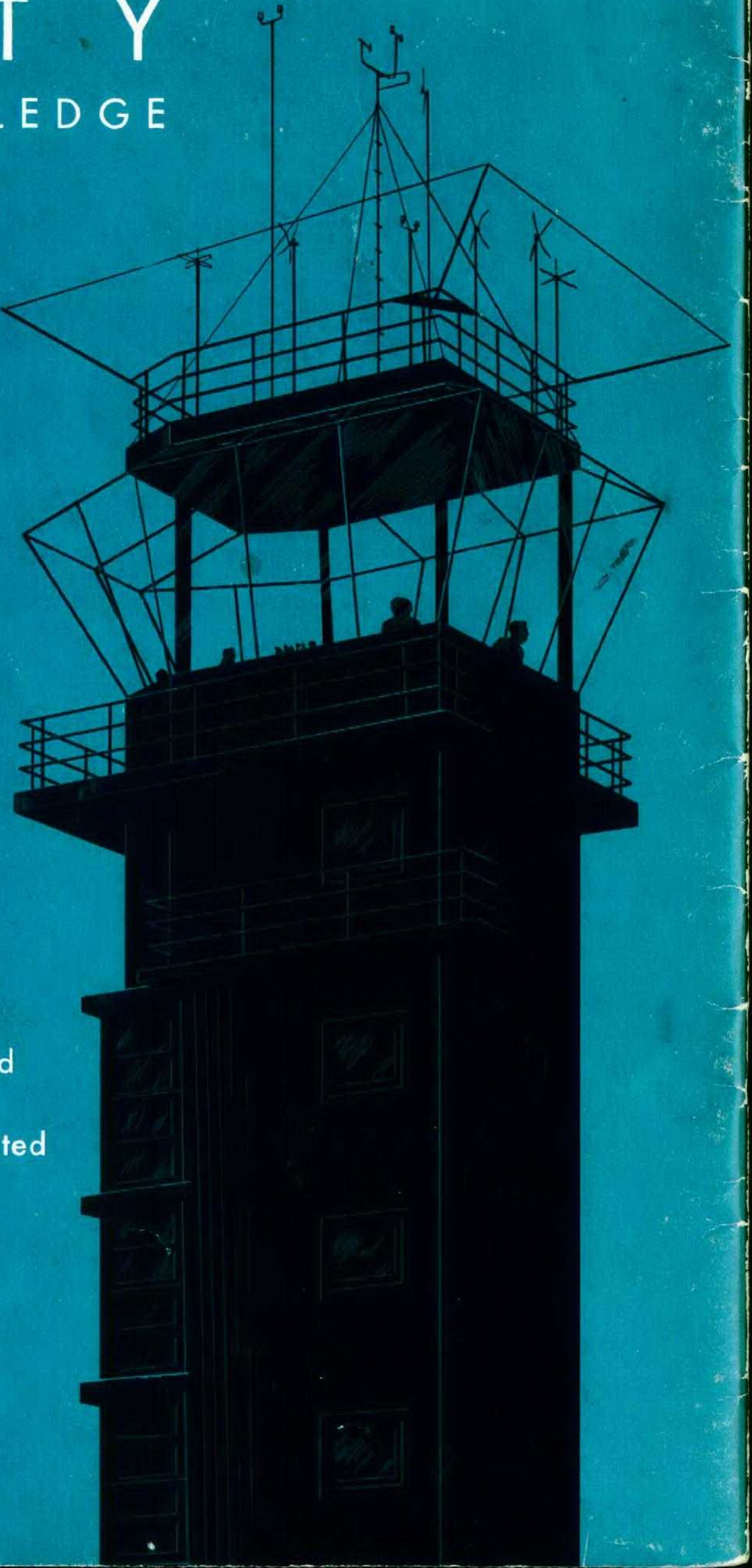
He can be recognized by his call:

CLOSEDFORSTOCKTAKING CLOSEDFORAUDIT
CLOSEDFORCLEANUP CLOSEDFORLUNCH
CLOSED CLOSED CLOSED

The Queen's Printer and Controller of Stationery, Ottawa, 1960

SAFETY

THROUGH KNOWLEDGE



Many accidents have been prevented
through superior knowledge.
Many more could have been prevented
with a little more knowledge.