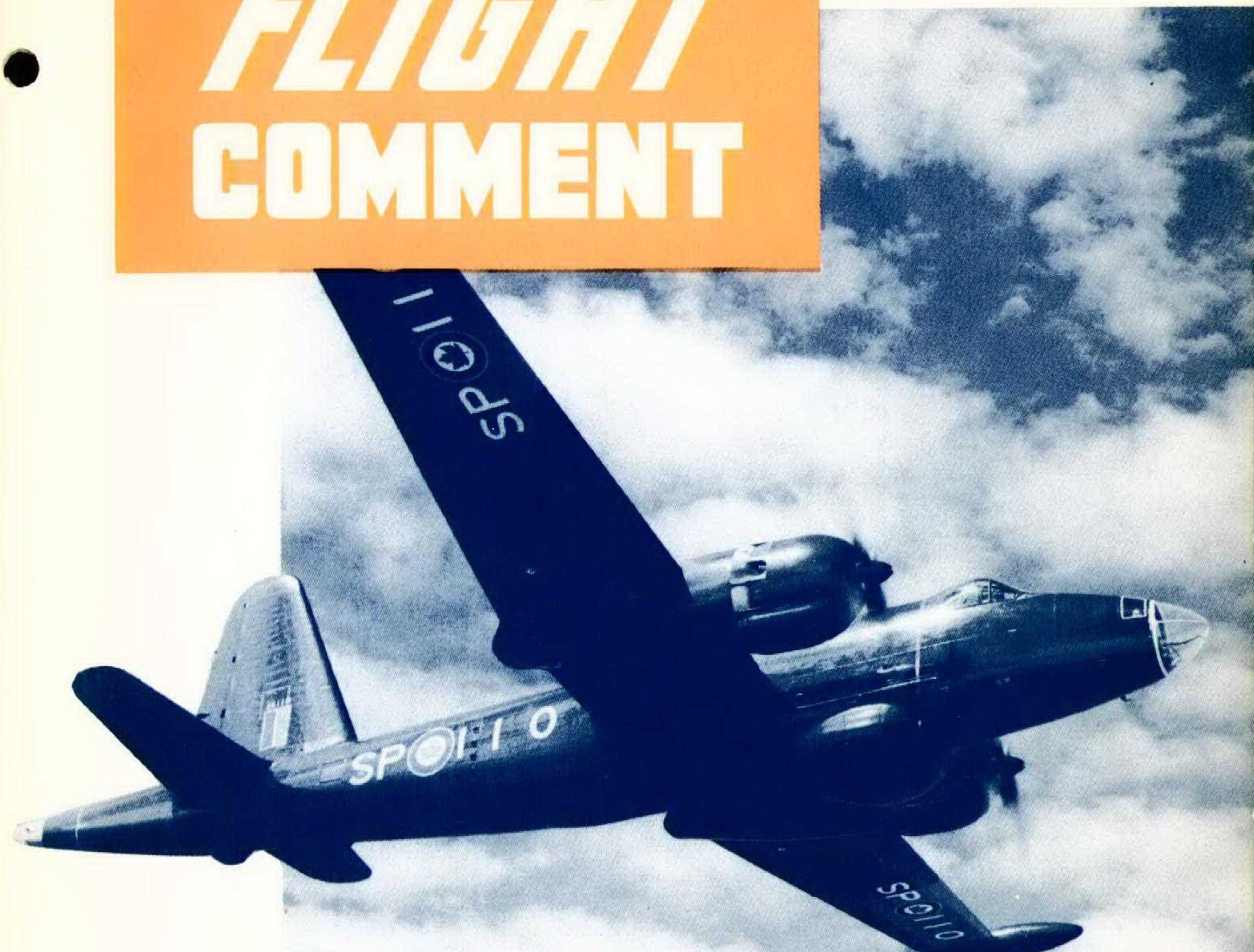
FLIGHT COMMENT



ISSUED BY

DIRECTORATE OF FLIGHT SAFETY

R.C.A.F. HEADQUARTERS • OTTAWA, ONT.

SEPTEMBER · OCTOBER · 1955

RESTRICTED

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SEPTEMBER - OCTOBER 1955

CONTENTS

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EDMOND CLOUTIER, C.M.G., O.A., D.S.P
QUEENS PRINTER AND CONTROLLER OF STATIONERY
OTTAWA

F/O J. A. MORRISON

F/O MORRISON was flying number three position in a four-plane Sabre formation at 40,000 feet when his engine flamed out during a turn. Despite his inexperience on type—he had had only seven hours' flying in the Sabre—he assessed the situation immediately, notified his formation leader of the emergency, and set a heading for the inner beacon.

The aircraft's radio began to fade after several unsuccessful attempts at re-light, so F/O Morrison requested his wing man to lead him down through some solid overcast. Breaking cloud at 1800 feet he positioned the Sabre for a forced landing. When his undercarriage unexpectedly indicated an unsafe condition on final approach, the pilot was forced to jettison his wing tanks. He then landed the aircraft, undamaged, on his home aerodrome.

Throughout the emergency F/O Morrison displayed exceptional coolness and flying skill—a feat for which he has been awarded a Pilot's Commendatory Endorsement.

PHYSIOLOGICAL NEAR MISS

by G/C W. R. Franks

At one time or another practically everyone has had spells of dizziness, if not actual unconsciousness. These may occur as a result of being "boarded" during hockey, standing on a parade square during a hot summer's day or even as a result of indiscretion "the night before". Normally these spells pass off without mishap and are forgotten. When such events occur in the air, however, particularly if one is in charge of an aircraft, they warrant more attention. Recent aviation medical investigation has demonstrated that these events, sometimes resulting in "near misses", are definitely occurring during flight. The incidence of such attacks, especially those of a mild degree, is probably common enough to merit serious consideration. The cause of the spells in normal people is medically well understood. For this reason—and since the consequences can be considerable—preventive measures are available to those who wish to keep informed on the subject.

The Mess Trick

Perhaps the simplest means of inducing physiological confusion and unconsciousness is the well known "Mess Trick" which will cause fainting in most normal people. It can be performed in several ways,

all of which will evoke the same combination of responses in our body. To illustrate: if a normal individual breathes very deeply for about 20 times while squatted down, and then rapidly stands up and closes his windpipe and blows out in order to increase the pressure within his chest, he will probably pass out cold. The act can be dangerous since during the period muscular control is lost and one may fall heavily. If the head is struck, serious injury can result.

As consciousness filters back, there is usually a short period of convulsive movement followed by a clearing of consciousness which requires some seconds before full orientation in space and time is attained. Besides feeling very foolish at finding himself sprawled on the floor in an undignified manner, it takes a man a while to remember where he is and what his mess friends are laughing at! He will be content to go quietly away and sit down; he may be pale, sweaty in the palms, and somewhat physiologically as well as psychologically shaken. School boys have been known to use this manoeuvre to "take down" any member of their group deemed to require such treatment.

When an experience of this sort occurs in flight it can be so embarrassing that the pilot will be loath to discuss the matter afterward. However, since the factors involved are under our control and the consequences may be serious, it is well to have some knowledge about them in order that pilots may avoid an unwitting performance of the Mess Trick in the air.

Medical study of the example just cited has shown that fainting and disorientation result from a combination of three factors:

- ▲ G effects—e.g. those resulting from the postural change
- ▲ Hyperventilation from overbreathing
- ▲ Circulation effects caused by increased pressure within the chest.

Physiologists now know that these factors produce a single overall effect: They reduce the blood flow to the brain. Any one factor will not by itself cause sufficient interference to elicit symptoms; the act of suddenly standing erect in the Mess Trick, for example, will merely produce the equivalent of a 2 to 3 G change. The important fact to remember is that these individual effects, in combination, will cause a significant reduction in the brain's blood supply.

Oxygen and Blood Sugar

We have seen that the essential factor inducing periods of dizziness or unconsciousness arises from the combination of a variety of circumstances whose sum effect is to reduce the minute-to-minute energy supply to the brain. Of course we all know that high G lasting for an appreciable period of time can produce unconsciousness as can profound oxygen lack. In the present instance we are dealing with the summation effect of smaller changes.

In order for consciousness to be maintained, a constant supply of energy to the brain is needed and it is normally supplied by an adequate flow of blood which delivers the required energy-producing materials. These include both oxygen and fuel—e.g. blood sugar. Normal brain functioning thus demands a constant supply of blood containing a normal amount of oxygen and fuel. The importance of these elements is shown by the fact that approximately one-third of the total blood pumped by the heart is delivered to the brain. A reduced supply of energy will result from:

"Gone" and hungry at 11 and 4

▲ a diminished volume-supply of blood

▲ a diminished content of energy-producing materials in this blood.

Dealing with the latter factor first, we have seen that the energy-producing materials in the blood consist of oxygen and fuel. (The problem of oxygen supply is discussed in chapters 1, 3 to 9 and 13 of the Aeromedical Handbook for Aircrew and also in EO 05.) It will suffice to remind ourselves that a continuous supply of oxygen is required by the body, that the brain fails first if the supply is reduced, and that the brain at best possesses only a few seconds' reserve supply of oxygen. The system is critical. Similarly the brain has only a small reserve of blood-sugar fuel and is thus highly dependent on a continuous supply of it.

The amount of sugar in our blood is normally controlled within limits despite the fact that we usually take in a new food supply only three times a day. However, this control in turn has its limits; at about 11 o'clock in the morning and 4 o'clock in the afternoon our blood sugar is apt to be on the low side, particularly if we have not had a proper food intake or if we have been under stresses arising out of the flight conditions imposed during the day. Low blood sugar is announced by that 11 o'clock "gone" feeling which is often accompanied by tremor or increased gurgling within the belly. These internal reactions are closely allied to the normal sensation of hunger and can be alleviated

within five minutes by taking sugar. (Remember that soft drinks contain 10% sugar.) However, this sugar must not be a substitute for the next meal. Unless more food is taken subsequently, the attacks may recur in more aggravated form. Remember that though one's eating is often a matter of habit, good eating habits are a matter of intelligence. Taking off without breakfast is like flying without checking the fuel—and results can be the same.

Effect of G

Now, what are the factors in flight which can diminish energy delivery by diminishing blood flow? How do we accidentally perform the Mess Trick on ourselves in the air?

Among the mechanisms capable of reducing blood flow, perhaps the effect of G is the easiest to understand. We are all aware that blood flow to the brain is reduced by positive G. The subject is dealt with at length in chapter 22 of the Aeromedical Handbook. For our own purposes it will be enough at the moment to recall that:

▲ increased positive G always produces some reduction in the blood flow to the brain;

▲ at sub-blackout levels this may not be noticed (unless combined with other factors);

▲ repeated G may sometimes tend to exhaust even the slight reserves in the brain;

▲ attitude (posture) in the aircraft can play a part;

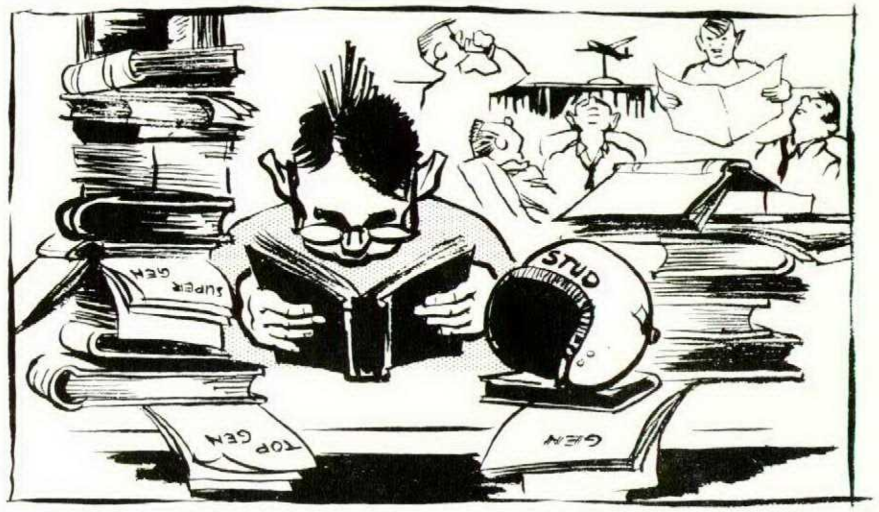
▲ all these effects can be minimized by wearing a G suit.

Hyperventilation

Probably the second most common cause of diminished blood supply to the brain occurring in flight is hyperventilation. It acts in two ways, shutting down the brain blood vessels (making the brain become "pale"), and diverting the blood to other parts of the body as a result of the converse dilation of the blood vessels of those parts. Hyperventilation is an ingredient of all forms of the "Mess Trick". (See chapter 22 of the Aeromedical Handbook.) In addition to the blood flow changes wrought by hyperventilation, it is probable that the blood has difficulty giving up its oxygen to the brain due to the chemical changes which result from the "blowing off" of excessive amounts of carbon dioxide (22).

Hyperventilation occurs when we overbreathe beyond our physical requirements. Overbreathing following heavy work is not hyperventilation; but overbreathing due to anxiety or as a result of a leaking inspiratory valve, or from a wrongly diagnosed air hunger will produce the effect we have discussed. Hyperventilation can be recognized by:

- ▲ Overbreathing
- ▲ Giddiness
- ▲ Tingling in the hands
- ▲ Tingling in the feet
- ▲ Increased restlessness or "jumpiness"
- ▲ Interference with vision
- ▲ Interference with hearing
- ▲ A feeling of air hunger



The best cure is knowing the score

Since breathing is under our voluntary control the correction of hyperventilation, once it is recognized, becomes simple: REDUCE YOUR BREATHING RATE. If the condition has persisted to the point where reduced blood to the brain has resulted in more noticeable changes, a longer period of time may be required to restore conditions to normal. You can tell how effective your corrective measures are by how you feel. If you do not feel you are snapping out of yourself satisfactorily, you are justified in breaking off the operation and notifying base so that the Medical Officer may be on hand to help you immediately you set down.

Prevention the Best Cure

The best treatment for hyperventilation is prevention. This is accomplished by (1) education—knowing your hyperventilation gen; and (2) avoidance of the various conditions which may cause it: difficult expiration from a malfunctioning of the pressure-compensated expiratory valve resulting from a leaking inspiratory valve in the mask; a leaking demand valve in the regulator which does not shut off properly during

expiration (23); or even a loss of your sense of humour in the face of difficulties.

Disorientation and Vertigo

A third cause of diminished brain blood supply which can occur in the air is disorientation and associated vertigo. One of the commonest acute reasons for it is turning the head rapidly in a plane at right angles to that of a close turn in flight (11). The disorientation falsely sensed is that of rotation in the third plane and is associated with varying degrees of vertigo like that experienced in rough weather. These effects can be exaggerated if they occur when the brain blood supply has already been reduced by any of the other causes. You may actually feel that the aircraft is out of control. This vertigo, however, results in a further diminution of blood to brain due to diversion of blood into the abdomen—again that "gone" feeling. Once more, prevention is the answer to the problem. If you have to rotate your head during a turn or in rough weather, do it slowly. If you can move your eyes without turning your head, so much the better.

Excessive Heat

A fourth cause of the diversion of blood away from the head is excessive heat which may sometimes be generated in flight. Fainting on the parade ground on a hot summer's day results from a diminished supply of blood to the heart following dilation of the blood vessels in the extremities. In an aircraft, diminished blood volume from excessive sweating without the balance-restoring properties of an adequate fluid and salt intake may cause similar fainting. It pays to keep as physiologically "cool" as you can.

Flickering Light

A fifth possible cause of diminished blood to the brain stems from the peculiar effects that occasionally result from looking at a flickering light. This effect depends on the intensity and frequency with which the light flicker falls within our eyes (the enemy used "flickering" searchlights during the last war), and may even lead to fainting in sensitive individuals.

The prevention of this effect is simple. If for any reason you experience a flickering light condition—under a helicopter's rotor or flying in and out of clouds on a bright day—keep your eyes averted and concentrate on something less bright. "Blackouts" have been reported during landings into the sun because the pilots were looking through an idling propeller—a rare point, but worth knowing.

Additional Factors

Besides the conditions we have discussed here as capable of reducing the brain's energy supply, there are further medical factors which tend to aggravate the problem. Most important and probably most common of these is influenza. Everyone knows the "gone" feeling that accompanies "flue". Combined with some of the physiological states mentioned earlier in this article, it will assume the role of the last straw that broke the camel's back. Excessive coughing may aggravate the condition, increasing pressure within the chest; and acute changes in fluid supply can also play havoc in the form of a hangover (as shown by the absence of normal wrinkles in your forehead in the morning). Diarrhoea can prove debilitative in a similar way—as will any complaint which causes a man to sweat unduly—and prolonged fatigue itself may culminate in virtual "blackout".

What happens during the Mess Trick we referred to earlier is that the brain becomes abnormally "pale". We cannot see the blood supply to our grey matter but like the normal, rosy hue of our faces, it can be influenced by many factors. By recognizing them as they appear and by preventing their accumulation we can ensure that those factors will never exceed our normal adaptability. Remember that normal individuals vary considerably in their response to them. The wise man comes to know his own capacities as a result of his experience and adapts himself accordingly. Keep in mind also that your G tolerance and visual acuity have nothing to do with intestinal fortitude or intelligence. Aircrew performance is influenced adversely only when a pilot neglects to learn the proper gen or misuses the equipment that is provided.

Confidence Through Knowledge

There is a vital practical consideration that arises out of "near misses" caused by partial or complete loss of consciousness. Obviously a "near miss" could place your aircraft in an impossible position at a time when you are otherwise confused. Skilful handling of such an emergency will depend entirely on a pilot's familiarization with the right drill. Every action must be split-second fast and automatic. There's no time to check the book. Review it now and avoid the squeeze. References (14) to (20) tell you everything you should know.

Right here would be a good place to remind readers about reporting a physiological "near miss" episode in the air. Whether the cause involves yourself or your equipment, the men to see are the Medical Officer and the Flight Safety Officer. Don't risk a life by silence.

One of the great problems facing Aviation Medicine lies with the inability of the Medical Officer to be on hand in the air when he is most needed and would have most to offer. Medical information has to be

passed out and self applied. Providing such aviation first aid is part of the job of the medical branch in a modern air force. The human body functions in a wonderful manner, but it does require knowledge and care if optimum efficiency is to be obtained from it, particularly in view of the virile challenge of modern manned flight.

The danger in providing our aircrew readers with this medical information is that it may constitute the "little learning" which can

THE AUTHOR

G/C W.R. FRANKS (RCAF Reserve) is a professor with the Banting and Best Department of Medical Research at the University of Toronto, Scientific Adviser in Aviation Medicine to the RCAF's Institute of Aviation Medicine in Toronto, and a member of the Defence Research Board's Panel on Aviation Medicine.

He transferred to the medical branch of the RCAF on its inception and from 1941 to 1943 served overseas with Aviation Medical Research at Headquarters, London, the Royal Aircraft Establishment, Farnborough, and with the Fleet Air Arm of the Royal Navy. He returned to AFHQ where he remained until the end of World War II.

For his work in connection with the development of equipment for protection against G he was awarded the OBE and the Legion of Merit, USA; and he was the first Canadian to receive the Theodore C. Lyster Award of the Aeromedical Association.

become a "dangerous thing". To illustrate this point, did you know that, during their training, medical students usually imagine they are developing all the diseases they study? It's not a good habit. Keep your knowledge of the Mess Trick from becoming a cause of hyperventilation or neurotic concern about yourself.

We sincerely believe that the modern pilot learns physiological poise as a result of true physiological knowledge. "Know Thyself" is advice of the highest order for the human factor in modern manned aircraft; but don't let "yourself" become all you know. There's more than oxygen and sugar in your head, although a continuous supply of these is essential if you are to remain "on top".

BLOCKED CONTROL COLUMN

I was in number two position, returning from a formation ferry flight. Over base I broke off to do a circuit while number one made a straight-in approach and landing.

My own approach was normal until I got over the button with power off, speed brakes out and flaps and gear down. Just as I started round-out, I felt a restriction when I pulled back on the stick. Although I used force in an attempt to get it back, the stick resisted my efforts. By then I could do nothing to prevent a hard landing. Fortunately the nose was high enough to keep the nose wheel from striking first, but it slammed onto the runway immediately on impact. The aircraft seemed to bounce off the main wheels. Finally she settled down and I was able to bring her safely to a stop.

The T-33 was equipped with a winter type survival seat having a bailout oxygen bottle strapped to the front of it. When the stick was operated on the ground we discovered that it was striking the bottle and could be moved only so far back because of it. Further investigation showed that the whole survival pack had rotated in the bucket seat, raising the bottle to a point where it fouled the stick.

The stick was striking the bailout bottle

This shift of the pack could have occurred when the dive brakes were opened. That seems to be the only time it could have happened during the flight without me being aware of it. The action of popping the brakes must have opened up a space behind the seat pack into which the flex-back parachute fell, effectively preventing the pack from moving back into place—despite the application of heavy pressure on the stick.

*

Because of this experience it is recommended that all aircrew personnel using this type of equipment should familiarize themselves thoroughly with the seat pack's normal position so that, whenever it moves during flight, they will be aware of the shift at once.

A REPORTED

NEAR MISS

MAY WELL PREVENT A

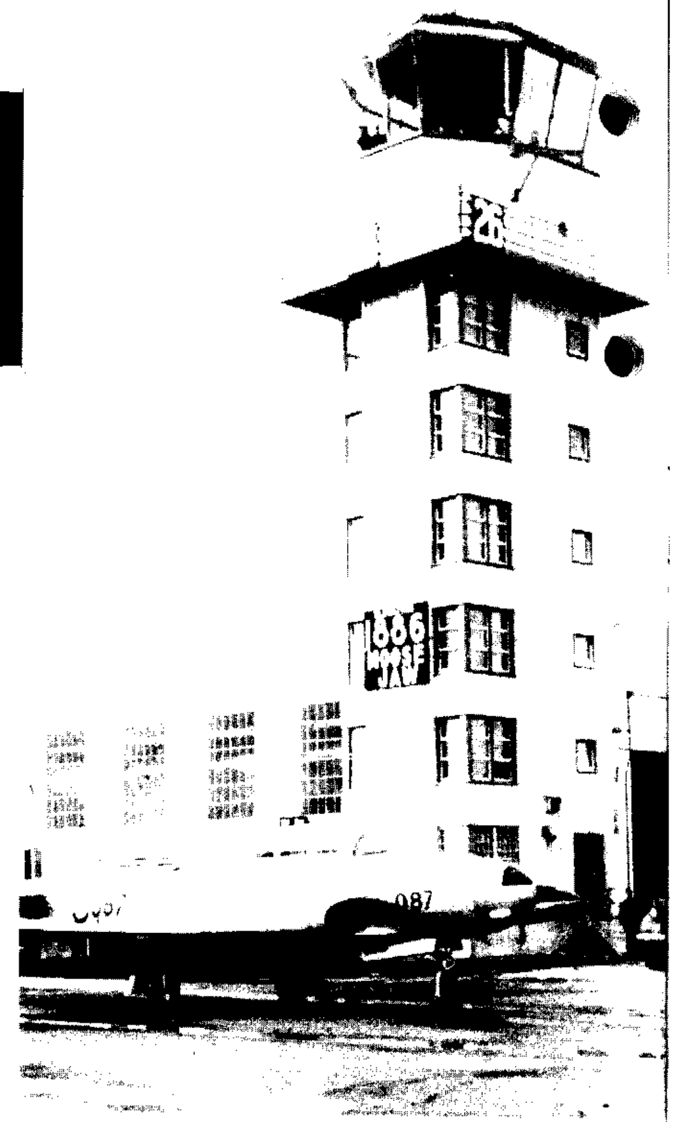
MAJOR

DISASTER

RAF Bomber Command
Flying Safety Review

Flying Control at an FTS

by F/L K. J. Strader



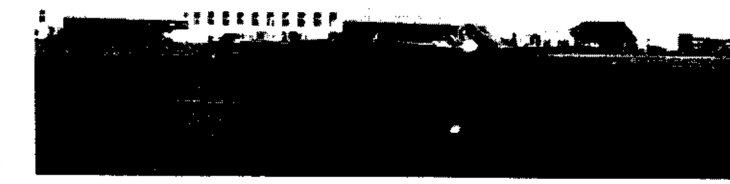
THE MAIN CONCERN of Flying Control at an FTS is the safe, smooth flow of aircraft traffic, either while airborne in the circuit or taxiing within the boundaries of the airfield.

Co-operation the Keynote

Daytime control is exercised almost entirely by the control tender through the use of visual signals, the tower itself maintaining only overriding control in emergencies. R/T traffic other than radio checks and taxi clearance is reduced to a minimum to allow instructors the maximum of uninterrupted time with their students.

The practice at most FTSs is for solo students to "listen out" on Baker Channel while dual aircraft "listen out" on one other frequency where the R/T chatter is low—a custom that is observed either inside or outside circuit.

Density of traffic at an FTS is the determining factor in the use of the visual signals' method of control. A normal daily average of aircraft movement at Station Moose Jaw is approximately eight hundred and fifty arrivals and departures. Of this total, an average of slightly less than one hundred represents the traffic using the relief field daily. Consequently, ensuring the uninterrupted flow of traffic requires not only efficient control, but a high degree of co-operation between pilots and Flying Control. Prompt action is required on receipt of a traffic signal, be it Aldis lamp or Very flare; proper positioning is essential in the circuit; and a prerequisite is the maintenance of a compact circuit pattern and proper approach angle (no long, drag-in approaches, please!) All of which add up to a practical—and SAFE—movement of traffic with a minimum of overshoots.



Traffic volume on normal flying days is not a steady flow, but rather a succession of surges and recessions, commencing with the bustling activity of on-the-line aircraft getting off on their respective exercises—the routine of "circuits and bumps" or the teaching and practice of sequences away from the circuit. An interval of medium traffic then ensues until such time as the aircraft have finished their first mission and come swarming in to the aerodrome for a change of crews and refuelling. This pattern continues until noon when a minor flow of traffic sets in: solo students doing circuits, and some aircraft returning from cross-country navigational trips.

Throughout the afternoon flying period the sequence repeats itself, terminating with a last burst of traffic within the circuit as aircraft converge upon the airfield for the final landing of the day. It is this tail-end of the day's flying which requires an extremely keen lookout on the part of the pilot due to reduced light conditions and the added volume of traffic within the circuit. Poor lookout; improper positioning relative to other aircraft in the circuit; long, low, drag-in approaches; jockeying for position on final; tardy response to visual signals from the control tender—all of these factors contribute to an element of risk which directly affects the welfare of all our pilots. In contrast, good positioning in the circuit, an alert lookout, and voluntary overshoots when it is clear that there is not a safe distance between aircraft, may mean a few extra minutes' flying time, but help to provide that increased margin of safety which is so desirable.

Traffic Management Problems

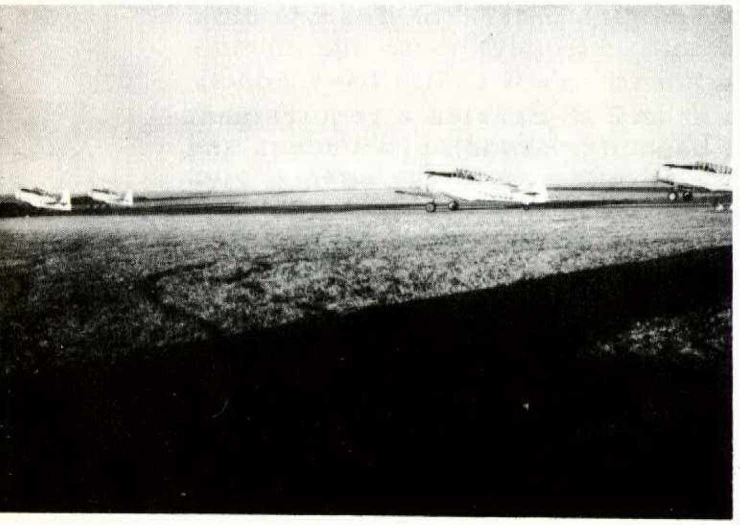
The present training syllabus at an FTS carries a requirement for teaching and practice on standard beacon approach procedures and ADF controlled descents. Both are accommodated during normal circuit traffic. Beacon approach practice is flown in a cross-traffic pattern to allow the best possible visibility to pilots in the circuit pattern and to those practising beacon procedures. Outbound altitude is above circuit height, inbound altitude below circuit height, so that if proper lookout is maintained there is no risk of collision.

Where an FTS is located on or close to an airway, it is imperative that aircraft cross at correct altitudes and that pilots adhere to all regulations governing the crossing of airways or routes. Air sequences should NEVER be practised in close proximity to an airway and pilots are expected always to ensure when crossing an airway that they are maintaining the proper altitude for the condition of flight. Aerobatics in the vicinity are categorically forbidden since they expose not only our own pilots to needless danger but also the occupants of aircraft operating legitimately on the airways.

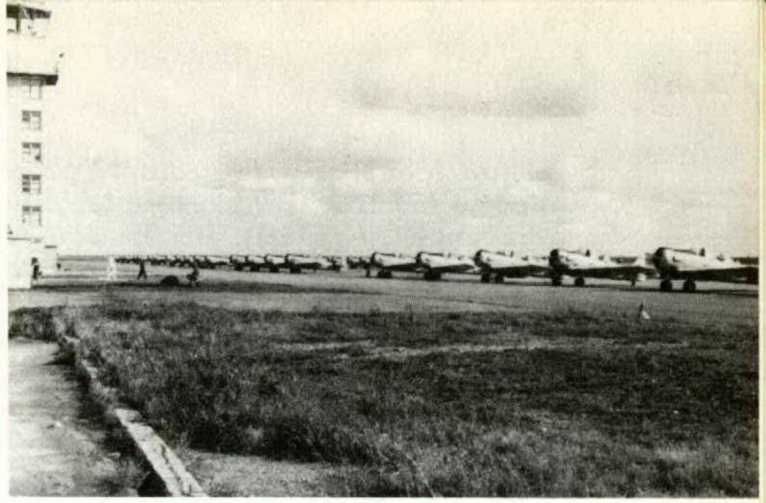
Practice instrument takeoffs present another problem in the safe handling of aircraft traffic mainly because of the added time required for the line-up prior to takeoff. A Pilot's Order requiring that landing lights be switched ON when taxiing out gives the controller in the tender adequate warning that the exercise entails an instrument takeoff with its attendant delays. Since he is busy controlling incoming aircraft on final approach to land, such advance warning allows the controller to make provision for the added time factor.

Mention was made earlier of the advantages of prompt reaction to signals from the control tender. Prompt taxiing onto the "live" runway and prompt takeoff—in both cases subject to the requisite signals from the tender—certainly facilitate the manipulation of traffic. It is also an asset if a pilot does not dawdle after landing, but proceeds with a minimum of delay to the nearest turn-off point and does his post-landing check clear of the live runway. Overshoots can be reduced as a result of such airmanship and the risk factor is again reduced. Such prompt manoeuvring on the ground should at all times be thoroughly consistent with safety and complete control of the aircraft.

Language differences raise difficulties at all schools training NATO students. There is no doubt that the instructor and, to a certain degree, the controller, have a genuine task understanding the broken English of these students. However, patient efforts by both the instructor and trainee have resulted in the student following and understanding standard R/T procedure under normal circumstances and also comprehending and reacting correctly to visual traffic control signals. Notwithstanding, there have been instances where solo NATO, students, either due to the stress of the moment or lack of knowledge of emergency calls, have failed to advise the tower intelligibly of their trouble, thus hampering the tower controller in his efforts to be of practical assistance. Ensuring that these students are conversant with standard R/T emergency calls and able to give a simple statement of any difficulties they may encounter would greatly aid the efforts of the controller to be of help.



Changes of runway are necessary



from time to time, dictated by changes in wind direction and strength. Warning that a runway change is imminent is effected visually by igniting a smoke generator at the control tender and issuing a broadcast over all R/T channels. The R/T warning advises the heading of the new live runway as well as the wind speed and direction. Of course, further takeoffs and landings are prohibited until such time as the tender is in position at the new control point, a move requiring at most a three-minute lag before traffic can be resumed. The safety reasons for this prohibition of traffic are as follows:

- To prevent collision headings of aircraft trying to land on the out-of-wind and into-wind runways simultaneously. (This has happened, due either to misunderstanding or failure on the part of pilots to "listen out" for R/T instructions.)

- To allow aircraft taxiing on the new live runway (or compass swing aircraft) sufficient time to clear it.

- To ascertain that the tender is in position to exercise the necessary control, it being frequently impracticable for the tower to judge whether or not there is sufficient clearance for a plane to land due to distance and the relative position to the approach point.

Weather, present and future, is of primary concern to pilots, the Met section, and Flying Control. It is a measure of the co-operation which exists between all three that rarely are aircraft caught away from base by bad weather. Weather checks are the rule if bad or marginal weather conditions are expected. Pilots on routine exercises who observe a weather system approaching, aid greatly by calling the tower and giving details in advance of the system's arrival, thus enabling the tower to recall aircraft and advise met of either unexpected bad weather or a weather system moving faster than forecast. Knowledge of the extent of the system also permits the diversion of unit aircraft if they are too far from base to return safely before the bad weather arrives over the station.

Night flying which is a regular and continuing commitment at FTSs is carried out with complete R/T traffic control. During hours of darkness, pilots must be particularly alert at all times, whether airborne or taxiing about the aerodrome. A perpetual lookout is a "must". Constant consideration of a pilot's relative position in the circuit and on the ground, particularly when he is approaching the taxi post prior to takeoff (coupled with prompt, properly positioned requests for "clearance to the live", "takeoff clearance", "initial clearance" and "landing clearance"), greatly aid the controller and staff in the tower, and result in a smooth, efficient flow of traffic with a minimum of accident risk. No unnecessary R/T can be tolerated. It is gratifying to add that there are few instances of such chatter. The few inconsiderate offenders are promptly and properly dealt with by their supervisory officers.

How Pilots Can Help

To summarize what I have attempted to put across to you, here are the main points in their proper sequence:

- Test your brakes and make sure all is clear up ahead before taxiing
- Taxi sensibly with regard to traffic and braking conditions—and in a zigzag fashion
- Come to a full stop not less than 75 feet back from the live runway
- When cleared by the control tender, taxi promptly out and take off immediately when cleared
- Maintain a good circuit pattern with proper positioning on final approach
- Make your approach on the unused parallel runway when the live runway is being used for takeoffs (this is an automatic overshoot)
- Clear the "live" right after landing and taxi sensibly on the taxi-paths
- Cross airways at the odd five-hundred-foot levels and at the proper angle
- DON'T aerobat in the vicinity of airways at any time
- DON'T climb through an airway
- DON'T attempt to stretch the hours of daylight and good visibility by returning late to your home aerodrome
- If caught in this predicament, switch your navigation lights ON so that your position is more readily discernible.

Follow these rules—which are simply the practical application of common sense, courtesy, good judgment, and sound airmanship—and Flight Safety could become a flourishing reality in the form of an accident-free flying record to which you yourself will have made a sizeable contribution.

The Author

F/L K.J. STRADER is currently Senior Flying Control Officer at RCAF Station Moose Jaw, Sask. A member of the RCAF since September, 1939, he enlisted as a standard apprentice clerk at Camp Borden, Ontario, rose to Senior NCO rank, and was commissioned as an administrative officer in 1942. He attended the US Army AFSAT at Orlando, Florida, graduating as a Fighter Controller—after which he served in Alaska, the Aleutians and on Canada's west coast.

Transferred to the general list for pilot training, he graduated at 15 SFTS Claresholm, Alta. Employed thereafter mainly on administrative duties, he had a brief respite in the form of a pilot refresher course at Camp Borden until October of 1946 when he reverted to NCO rank, again as a clerk administrative.

Commissioned in January, 1951, in special list, flying control branch, he graduated from the School of Flying Control in April of 1951, was stationed for a short period at the Rescue Co-ordination Centre at Trenton, Ontario, and was next transferred to 3 FTS Claresholm, Alta. As SFCO there he organized the unit's Flying Control Section. F/L Strader remained at Claresholm until his move to Moose Jaw in Mar 55.

COCKPIT LOOKOUT

An airline pilot writes:

"......regarding seeing other airplanes - using the autopilot gives more time for looking outside. I use it from about one thousand feet after take-off all through the climb and in descent until in a position for landing manoeuvre, that is, roughly down-wind on to the landing."

"I'm depressingly impressed with how many co-pilots I have to ask not to do paper work during climb and descent. Many times I've been off the ground for only a few minutes and screwing up through traffic when I've discovered the co-pilot with paper work out, his head inside the cockpit, pencil busy, and eyes focused at 15 inches instead of infinity."

Flight Safety Foundation

PXing

LETTERS TO THE EDITOR

Refuelling Hazards

Dear Sir:

I am quite in agreement with S/L Heck's statement in the Jan-Feb 1955 issue of FLIGHT COMMENT that using an extension lamp during refuelling could prove to be an unhealthy procedure. In checking the original draft of my article I find that mention of use of an extension cord and lamp was made in a separate paragraph under the general heading of cold weather servicing. This lamp is intended for use in carrying out repairs when it is extremely cold and......(when) it is impossible to use flashlights. I have twice personally assisted in carrying out engine repairs which would have been impossible to complete without the use of this lamp.

As for refuelling out of drums, I did intend to imply that the operation was carried out with the APU running and do not know of any other method of supplying power for a portable refuelling pump. I believe the use of this pump has been standard procedure in refuelling out of drums for many years, particularly with regard to larger aircraft.

In outlining this refuelling procedure I was not referring to such northern points as Watson Lake or Churchill where there are normal facilities but to locations such as Cambridge Bay where the only fuel available is stored in drums.

D.H. McNeill F/O
Public Relations Officer
108 Comm Flight, Bagotville, P.Q.

Bouquets and Needles

Dear Sir:

We find your magazine both interesting and educational but have one small suggestion to make. We wonder if distribution dates couldn't be hurried up a bit, as we receive our issues approximately 2 to 3 months after the issue date. Articles such as "Winter Flying" are not of too much interest in May or June. If the issue date cannot be advanced, could articles involving seasonal aspects of flying be planned to appear in whichever issue is arriving on units at the beginning of the season involved.

J.G. Guerin, F/L
422 (F) Squadron, 4 (F) Wing,
Baden-Soellingen, Germany

We agree completely with the sentiments expressed in your letter on the subject of late deliveries. A great deal of planning and effort has gone into attempts to improve our schedules of production and distribution for all flight safety literature, but we are still working toward that ideal. Priorities for both printing and distribution are now accomplished facts and are proving a great help in our drive for increased efficiency.

In the beginning, our backlog of material was about as thick as hair on an egg. Today it is permitting us to plan two and three issues ahead—thus helping to ensure that seasonal and topical articles will reach the field at the appropriate time of year.

There is one point in your letter we'd like to niggle over. Why refer to FLIGHT COMMENT as "your magazine"? Whether the articles are volunteered or coerced (see "According to Methuselah" by W/C H. Bryant in our Jul - Aug issue), this publication is the joint product of the field and AFHQ. Without your letters, your ideas and your articles there would be no FLIGHT COMMENT.

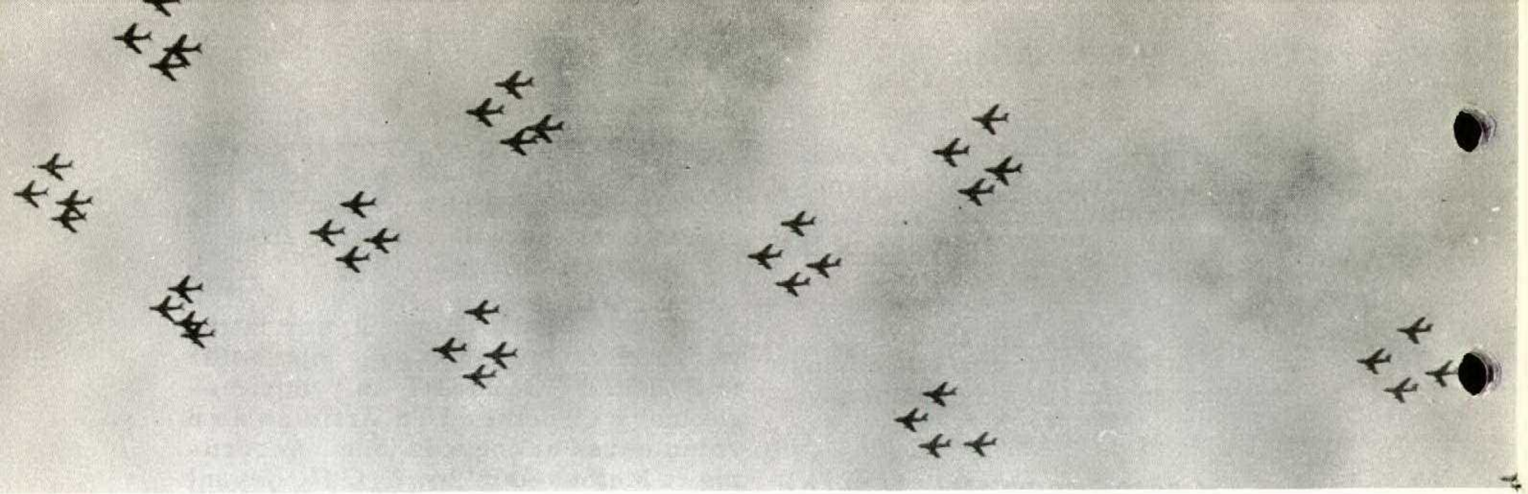
Thanks for the encouraging remarks you made about the interest and educational value of the magazine. Those are two of the principles which guide this Directorate's search for flight safety material. Comments like these from the field will help to keep the work of our staff "on track"—ED.

Beware of Jet Blast

D.J. de Vries of KLM has this to say about jet turbulence:

"The dangerous influence of turbulence created in the approach area by large aircraft is well known to us. All our pilots are fully aware of this and even large airplanes like Constellations and DC-6's are upset by it. We also wish to draw your attention to the fact that the turbulence in the approach area created by jet aircraft is considerably higher than the turbulence produced by a piston-engined airplane. Pilots of large airplanes have to be seriously on the alert when landing behind jet aircraft."

Safety Suggestions
Beech Aircraft Corporation



HI-LEVEL WEATHER PLANNING

by B. V. Benedictson
Senior Met Officer, Gimli

Flight planning is more likely to yield an efficient operation if proven procedures are followed rather than violated. Nowhere does this apply more aptly than to the pre-flight met briefing which is one of the most vital stages in that planning. It is the intent of this article to discuss the pre-flight Met briefing and to cover some of the aspects of high level weather. Aircrew personnel cannot know too much about the subject. Today's long range, high altitude jet operation—often performed in instrument weather and with destination and alternates near limits—can be a tricky business. The Met problems may well be far greater than those for low or medium level flight. They allow no room for indifference on the part of those who must face them.

Organizing the weather information available and adapting it to requirements are often time consuming jobs. Furthermore, if one's destination is unusually distant, arrangements may have to be made to obtain forecasts not received on a routine basis. The time of transmission for such information will depend on its priority rating so that some delay in receiving it should be expected.

Frequently—and particularly if the weather situation is complex—the most effective method of adapting the assembled forecasts to a pilot's specific needs is to display the enroute weather on a composite, vertical cross-section. Such a "picture" saves countless words and leaves less to the imagination of the pilot. To do the best possible job, advance notice of a flight should be given to the forecaster so that he will have time to give the various weather problems the attention they warrant.

There is a natural tendency for the jet pilot to concentrate his attention on weather conditions at base, destination and alternate. Once at altitude he is usually well above any significant cloud and the chances of a forced descent on account of technical failure are indeed remote. Good planning must include preparation for the unexpected, when a knowledge of enroute ceilings, icing conditions and surface weather may be essential. Both pilot and forecaster should guard against the tendency to give enroute, lower level weather a "once over lightly" treatment. Actually there are three stages to every flight, each one of which demands careful consideration.

Climb

Ascent through a dense, stable layer, even up to tropopause height, presents no undue problems to the experienced pilot because a steep climb will carry him quickly through icing layers. However, should the air be unstable with CB cloud present, the pilot is faced with the problem of selecting a good climb heading. He can ascertain from the forecaster the location of the heaviest build-up, and if this information is supplemented by reports from the local GCA unit, the most favorable flight path can be confidently chosen. Once off, further assistance may be available from a nearby GCI.

Altitude

Above 30,000 feet the only cloud types encountered are CB and cirrus. In Canadian latitudes CB clouds seldom extend much beyond 40,000 feet and can usually be topped by modern jet aircraft. In mountainous regions where isolated CB tops have been estimated as high as 60,000 feet, it is usually possible to fly around the cloud tops.

Cirrus cloud (which will almost certainly be encountered during a medium-to-long-range, high level flight) may present a problem, for even tenuous cirrus means instrument flight. Furthermore, prolonged flight in cirrus will result in extreme radio interference and dependence upon DR navigation. Therefore pilots will usually flight plan to remain above or below such clouds. Haze layers in the high atmosphere should be given clearance for the same reasons.

On many high level flights there is little in the way of a cloud problem once altitude has been reached. Cirrus can be topped, isolated

CB circumnavigated. It is worth mentioning that these latter will cause radio compass deviations. However, it is unlikely that any flight will parallel them for long periods; and in any event position can be aurally or visually cross-checked. Patches of high level turbulence may be encountered but these are usually thin—and a slight change in altitude will take the aircraft out of a turbulent zone.

Descent

Cloud and weather will present problems for the descent similar to those for climb. Should the freezing level be close to or on the surface, then icing may be more of a problem—though not for the penetration, since this is made relatively steeply, but during the final approach if it has to be performed in icing conditions. A possibility to be kept in mind is that ceiling and visibility at destination could be different from the last reported values since these two weather elements may change rapidly under certain conditions. Also, pilots should remember that conditions over the field are not necessarily representative of conditions in the letdown area.

Whenever terminal conditions are marginal the pilot has to decide whether to continue to destination or to divert. Thus it is important that, in addition to obtaining a thorough understanding of the weather situation at the met briefing, he makes frequent checks on the destination and alternate weather during the flight in order that he can correctly assess the situation ahead. Since an in-cloud letdown after prolonged flight in clear air places a demand for rapid adjustment on the pilot and will likely monopolize his attention, it is essential that he stay alert to any possibility of weather deterioration and be ready with the right decisions prior to starting his descent.

Wind Factor

Jet aircraft currently employed in Canada generally operate best, from the standpoints of endurance and range, at altitudes near the tropopause. On any long flight at these levels there is a fair likelihood of crossing or paralleling a jet stream. Jet streams are accompanied by marked variations in wind speed, both in the horizontal and the vertical. (Fifty knots in 50 miles and 10 knots per 1000 feet are frequently observed). Therefore, for any high level flight not confined to airways or to a specific altitude it is wise to examine the wind field and to flight plan in order to take advantage of the winds, if favorable, or to minimize their effect, if adverse.

Where the maximum wind along a route is a jet stream, cirrus cloud often marks its position from horizon to horizon, and flight just on top of the cirrus will likely place an aircraft in the strongest wind field.

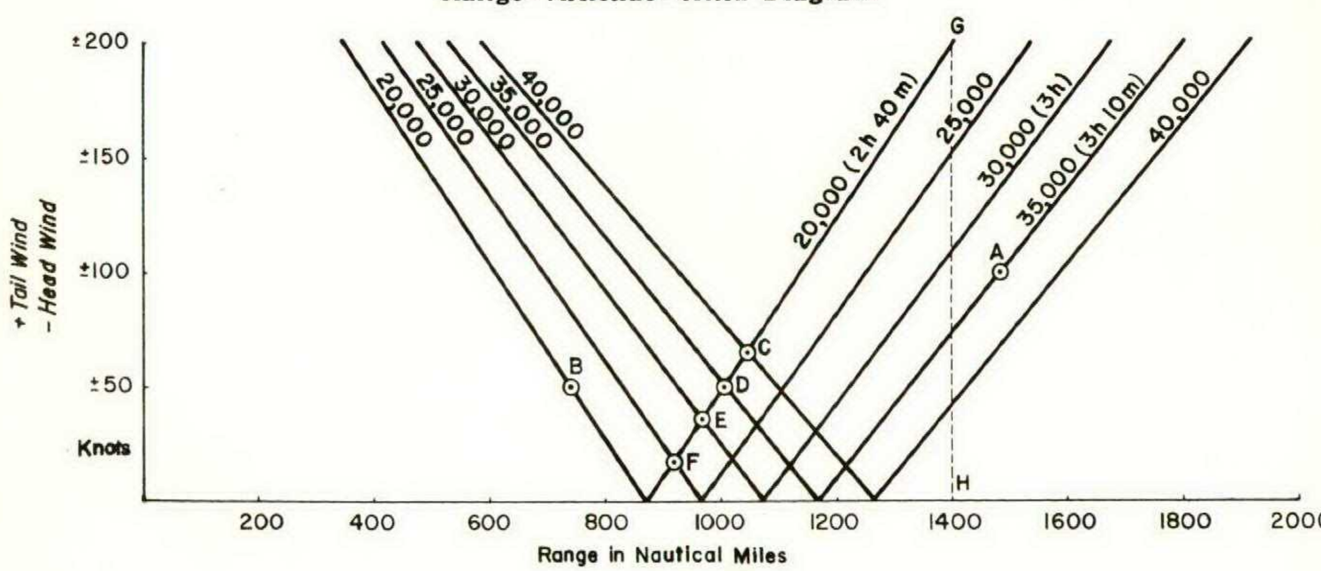
In some cases of flight along the jet stream, aircraft have taken on a wallowing motion. More commonly, however, the turbulence experienced in these regions of strong wind shear has been of the "choppy" variety. Pilots might remember that the amount of data on high level turbulence is still very limited. As more and more reports are accumulated, our current ideas will no doubt undergo modification.

Range - Altitude - Wind

The range-altitude-wind diagram shown here demonstrates the relationship between altitude, wind and range for a jet aircraft (T-33). It is not intended as a flight planning tool but it can be used to show the feasibility of proceeding to an alternate, knowing only the distance travelled since takeoff and the effective wind component during the flight. The lines running diagonally to the left show distances based on headwind values and those running diagonally to the right show distances based on tailwind values. At any point on an altitude line the aircraft is FUEL EXPIRED at the range shown on the horizontal scale and has arrived at this point under the influence of the wind shown on the vertical scale.

At point "A", with a tailwind of 100 knots at 35,000 feet, the aircraft will travel 1480 nautical miles. At point "B", with a 50-knot headwind at 20,000 feet, the aircraft will travel 740 nautical miles. Point "D" indicates that the aircraft will travel 1000 nautical miles at 35,000 feet with a 50-knot headwind; and to travel the same distance at 20,000 feet a 50-knot tailwind is necessary. In other words, there must be a 100-knot better tailwind component to make 20,000 feet as acceptable

Range - Altitude - Wind Diagram



as 35,000 feet for this trip. Other examples of the use of this graph are shown by following the line G to H. Here we see that the distance is constant at 1400 nautical miles. To travel this distance at 20,000 feet requires a 200-knot tailwind; at 30,000 feet, a 107-knot tailwind; and at 40,000 feet, a 40-knot tailwind. Distances that can be travelled with a constant headwind or tailwind can be read off on any horizontal line through the graph.

*

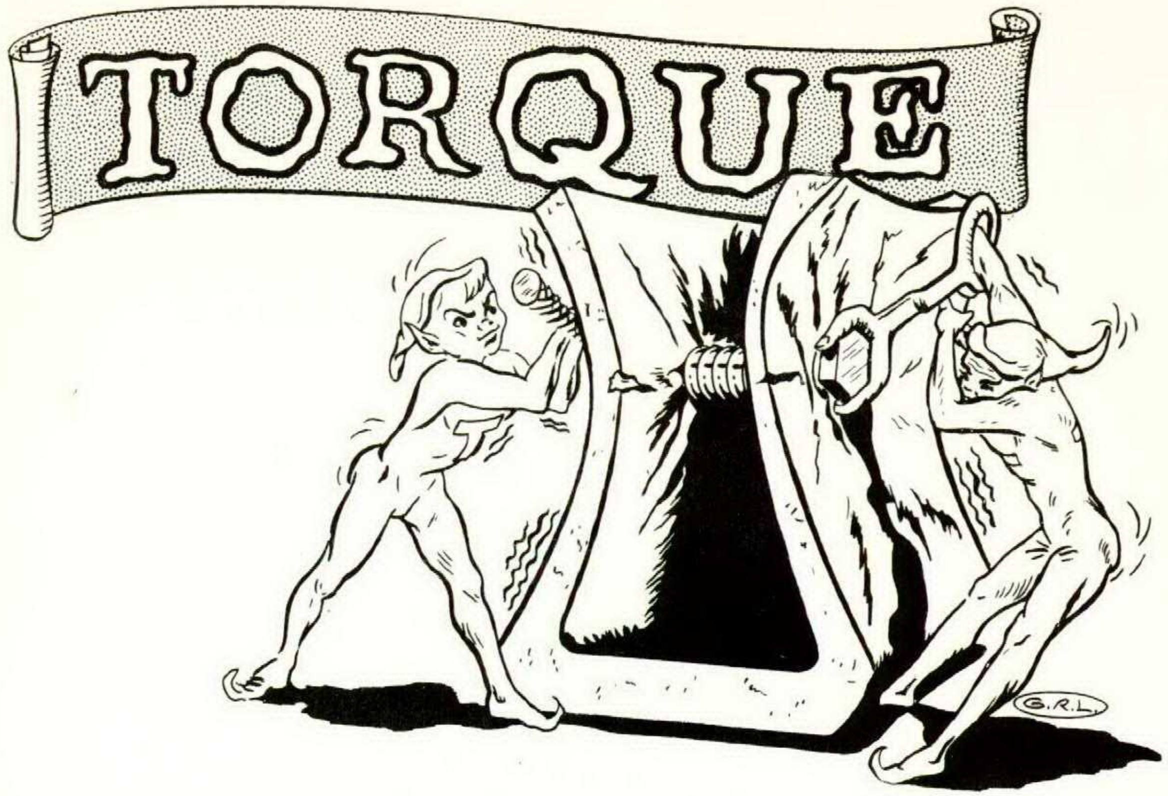
Met is a major factor in the success of a long range jet operation. The pilot's thinking on weather problems must stay out in front of his aircraft all the way. Sound weather planning is indispensable—and identifies the accomplished pilot.

COCKPIT VIEWPOINT

by Capt. R. C. Robinson

B-47 Backwash - On the practical side of the evaluation ledger was a recent experiment by one of CAA's airways flight inspection pilots who tried following a B-47 at various distances. Briefly he found that at one mile his Twin-Beech was violently uncontrollable; at two miles uncontrollable; at three miles violent, and at four miles barely possible.

Aviation Week



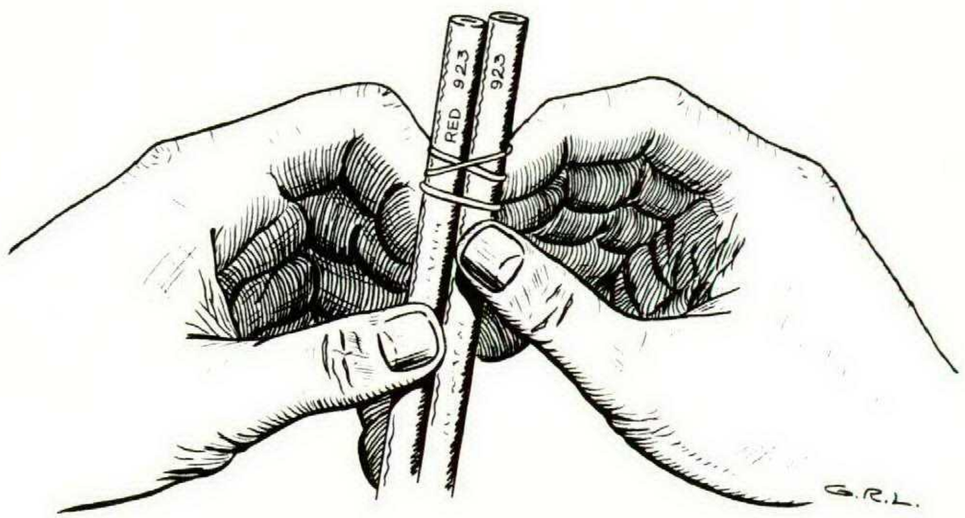
This issue of FLIGHT COMMENT carries, in the T-33 section of our Accident Resume, two similar reports of accidents resulting from over-torquing. Readers will therefore be interested in the views expressed below on this unsafe maintenance practice—ED.

It has been suggested that background information on the why and wherefore of torque requirements for threaded fasteners would be of interest to field personnel. The following discussion reflects the thinking of the Structures Section at North American on structural principles covering the torquing of threaded fasteners......A table of recommended torques included in (USAF tech order) AN 01-1A-8 is reproduced herein and will frequently be referred to in this discussion.

Before we analyze the information given by the torque table, a discussion of the basic purpose of applying specified tightening torques to threaded fasteners and the effects of this torque is appropriate. It is considered probable that, without limits on the torque applied to important structural threaded parts, either the parts would not be tightened sufficiently to provide rigid joints or the application of too much torque would overstress the parts or the adjacent structures. Let's take a closer look at the first of these conditions: insufficient tightening.

*

The fatigue life of a part depends on the percentage of load change encountered during operation. The lower the percentage, the longer the fatigue life. Therefore, the higher the initial tension in a threaded fastener due to initial torque application, the longer will be its fatigue life. To better understand this, take a rubber band and note that it stretches in direct proportion to the amount of pull up to its usual (elastic) limit. Any change in stretch shows a corresponding change in load; a constant amount of stretch shows a constant load.



Now, wrap this band tightly around two pencils. Assume that they are being held together with a force of two pounds. If you try to separate them with a force of one pound, what happens? Nothing that one can see—the pencils don't separate; the rubber doesn't stretch. And the rubber doesn't "feel" the pull. Why? The rubber band is preloaded to a greater force than you applied. The one pound pull only reduces the pressure between the pencils (from 2 pounds to one pound) and the rubber doesn't know the difference. It will not stretch farther until the pull is greater than two pounds. If the band is made of metal instead of rubber and a load exceeding two pounds is applied intermittently, it will fail eventually from fatigue. FATIGUE LIFE WILL BE GREATLY INCREASED IF THE PRELOAD IS EQUAL TO OR GREATER THAN THE ALTERNATING LOAD IMPOSED.

The solution to this problem sounds simple: Just apply and maintain proper preload. But in actual practice a few complications arise. First, the torque method, which is far from foolproof, is used to obtain preload on the bolt. Obviously, the more you tighten the nut, the more you pull the bolt. But will all the bolts holding the part get the same pull if each nut is tightened the same amount? Only if all conditions that resist the nut from turning are equal—thread cleanness, condition of the threads, condition of the mating surfaces, etc. It is important

to keep these conditions as uniform as possible by giving close attention to the physical condition of the mating parts and abiding by recommended assembly procedures. The torque method has its drawbacks, but it is much better than guesswork and the best method generally available in the field. It's the one to use until a better method comes along. But while using it, keep in mind that it's preload of the stud or bolt that we are after.

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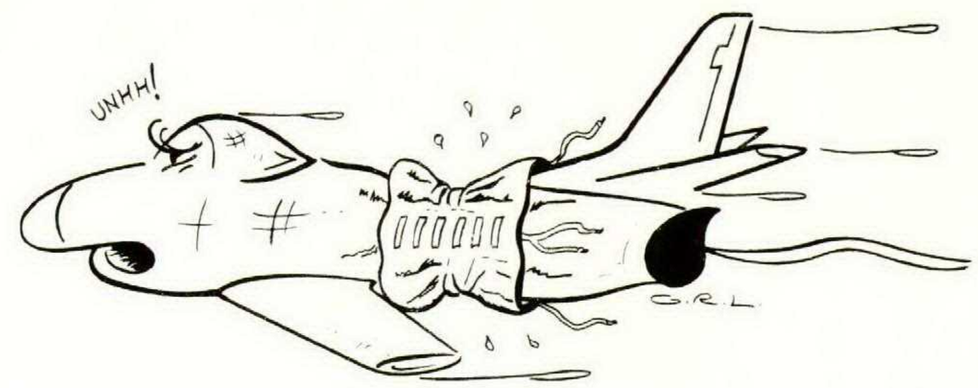


Now, let's consider the application of too much torque. The result in this case is more apparent. When a nut is tightened too much, it usually winds up in the mechanic's wrench and the problem is simply a matter of replacement. The application of torque given in column 2 of the torque table will develop approximately 40,000 psi in the bolt. Column 3 is simply 60% of the values given in column 2 and will develop approximately 24,000 psi in the bolt. These torques are intended for bolts loaded primarily in shear. Columns 4 and 5 list maximum allowable tightening torques. These torques are intended for bolts loaded primarily in tension. Column 4 values develop approximately 90,000 psi in the bolt; column 5 values develop approximately 54,000 psi.

Obviously, the torque limits given in columns 2 through 5 are all within the static strength of the 125,000 psi minimum ultimate strength AN bolt. What is the reasoning behind the application of one or the other of the torques? The answer is that when an airplane is in flight or landing, under certain combinations of shear and tension loads on a fastener, the tension load originally built up by torquing the bolt may be increased by externally applied loads. In such cases, the lower range of torque is used so that the two loads together will still not add up to the ultimate strength potential of the fastener. The higher torque values are standard for high-strength bolts, but are used for AN bolts only after it has first been ascertained that no critical combination of shear and tension loads exists that might exceed their ultimate strength. These special torque requirements are called out in the Maintenance Handbook for the airplane affected. Generally, if Engineering believes

TABLE OF RECOMMENDED TORQUES

CAUTION

THESE TORQUE VALUES ARE DERIVED FROM OIL FREE CADMIUM PLATED THREADS.

Tap Size	Tension Type Nuts AN365 and AN310	Shear Type Nuts AN364 and AN320	90,000 PSI in Bolts AN365 and AN310 Nuts	(60% on Column 4) AN364 and AN320 Nuts
FINE THREAD SERIES				
8-36	12-15	7-9	20	12
10-32	20-25	12-15	40	25
1/4-28	50-70	30-40	100	60
5/16-24	100-140	60-85	225	140
3/8-24	160-190	95-110	390	240
7/16-20	450-500	270-300	840	500
1/2-20	480-690	290-410	1100	660
9/16-18	800-1000	480-600	1600	960
5/8-18	1100-1300	600-780	2400	1400
3/4-16	2300-2500	1300-1500	5000	3000
7/8-14	2500-3000	1500-1800	7000	4200
1-14	3700-5500	2200-3300*	10000	6000
1-1/8-12	5000-7000	3000-4200*	15000	9000
1-1/4-12	9000-11000	5400-6600*	25000	15000
COARSE THREAD SERIES				
8-32	12-15	7-9	20	12
10-24	20-25	12-15	35	21
1/4-20	40-50	25-30	75	45
5/16-18	80-90	48-55	160	100
3/8-16	160-185	95-100	275	170
7/16-14	235-255	140-155	475	280
1/2-13	400-480	240-290	880	520
9/16-12	500-700	300-420	1100	650
5/8-11	700-900	420-540	1500	900
3/4-10	1150-1600	700-950	2500	1500
7/8-9	2200-3000	1300-1800	4600	2700

Note: The above torque loads may be used for all cadmium plated steel nuts of the fine or coarse thread series which have approximately equal number of threads and equal face bearing areas.

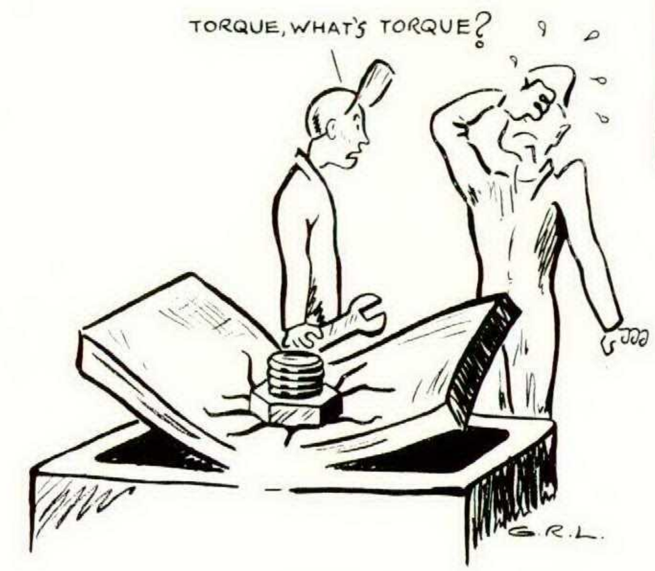
* Estimated corresponding values.

that a rigid joint will result from the application of the low range of torque (columns 2 and 3), and if there is no apparent reason for higher values, the low range is used, even though the fastener may be strong enough to withstand the high limits (columns 4 and 5). It is expected that, in any case where an installation does not result in a rigid joint, the discrepancy will be called to the attention of Engineering by field reports so that the possibility of raising the torque limits may be investigated.

From the mechanic's viewpoint, this simply means that he need only be concerned with the "standard" torque values given in columns 2 and 3 for AN bolts; the values in columns 4 and 5 are primarily used as standards for high-strength bolts and when called out in Engineering Orders for specific applications. When tightening castellated nuts on bolts, it is possible that the cotter pin holes will not line up with the slots

in the nuts for the range of recommended installation torques listed in columns 2 and 3. In such cases, a nut may be overtightened just enough to line up to the nearest slot with the cotter pin hole, as long as the limits in columns 4 and 5 are not exceeded.

Specified torques sometimes appearing in Engineering Orders and not yet mentioned are those which are lower than the values given in the torque table. In some instances, as exemplified by hinge bolts on control surfaces which connect a male and female joint which has clearance between the male and female members, application of torque above the specified limit may distort or break the attached parts. Therefore, when a torque range less than the range given in the torque table is specified, the upper limit of the range should not be exceeded. A



qualification expressed in the torque table is reiterated here. Unless the part is in a deliberately lubricated environment, torque values are for unlubricated threads.

To summarize, a loose joint is more detrimental than an overtorqued fastener. If a choice must be made between these two possibilities because of assembly difficulties not attributable to damaged, improperly made, or fouled parts, it is better from a structural point of view to overtorque the fastener with caution, immediate damage being the most serious consequence.

CANADAIR SIC

Accident Resumé

T-33

Over-Torquing

The student was receiving instruction on forced landings with power off. After the second practice try the aileron boost was selected "on". The cockpit filled with smoke for about half-a-minute and the hydraulic pressure fell to zero. Aileron boost was turned "off" and the instructor burned off tip tank fuel before landing, the pilot using emergency hydraulic pressure to lower the undercarriage. A successful landing was made.

Technical examination revealed that the flared end fitting between the hydraulic pressure line and the aileron boost filter unit had pulled through the sleeve fitting, causing loss of hydraulic fluid. In the plenum area the fluid produced smoke which entered the cockpit through the pressurizing system. The cause of this accident has been assessed "Maintenance", with over-torquing the villain. Hydraulic line failure resulted because someone over-torqued the flared end fitting during the last installation of the aileron boost filter unit.

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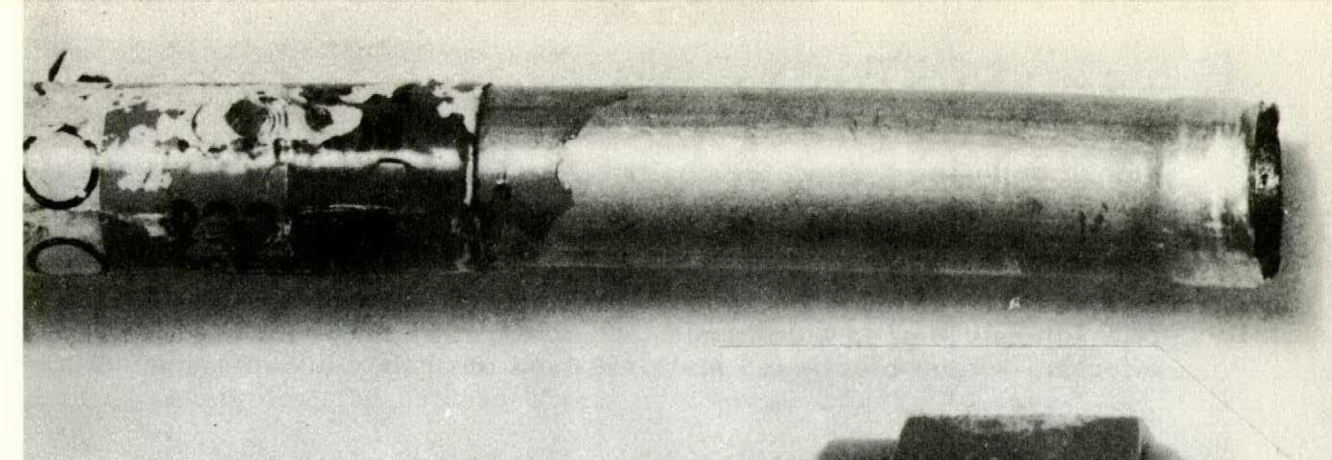
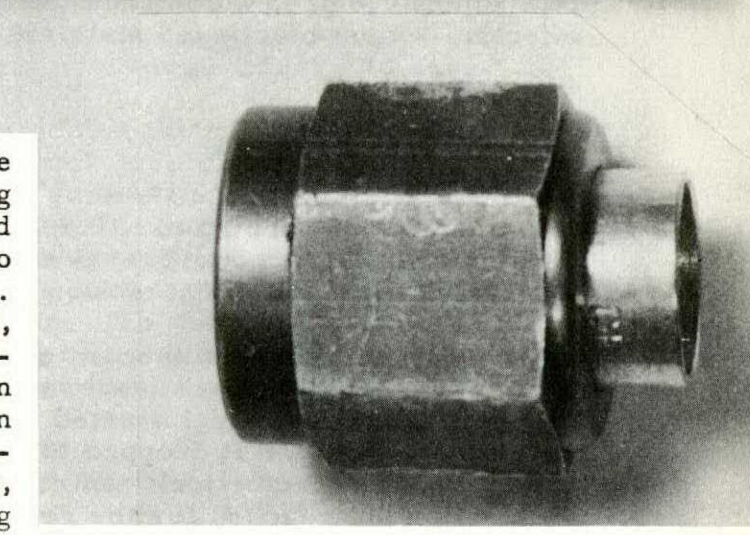
Another student was receiving instruction on T-33 aileron "boost-off" practice forced landings, when he accidentally selected aileron boost "on" for an overshoot and filled the cockpit with smoke and fumes. Taking control of the aircraft the instructor told the student to select 100% oxygen, close the head and foot warmers, and open the dump valve. The cockpit cleared almost immediately. The instructor performed a quick cockpit check and concluded that the trouble had been caused by a





ruptured hydraulic line, since the pressure indicator was reading zero. Aileron boost was selected "off" and the student instructed to do an emergency gear selection. When the emergency first occurred, the instructor set up a dumbell pattern so as to land from a straight-in approach. Tower was advised of an emergency landing, the undercarriage was locked down at 300 feet, and a successful "boost-off" landing was made.

The cause of the hydraulic pressure failure was the over-torquing of the nut on the T-connection of the line assembly to the aileron booster. The over-torquing pulled the flair off the line and the hydraulic fluid leaked into the engine and entered the cockpit pressurization system where it caused smoke and fumes.

The instructor in both these accidents combined good airmanship with a thorough knowledge of their aircraft's emergency procedures to overcome the obstacles that confronted them.

Readers are referred to the article "Torque"
in this issue of FLIGHT COMMENT—ED.

Cockpit Fumes

While practising flameout forced landings the student pilot smelled fumes when he closed the throttle. He selected 100% oxygen and received instructions for a straight-in approach. He maintained a high approach speed initially because of the fuel load carried but must have lost some of that speed through preoccupation with the problem of clearing the cockpit of fumes. Becoming aware of his situation too late, he mushed into the ground short of the runway.

The student did not take all the recommended actions for clearing smoke or fumes from the cockpit. Investigation revealed that he had switched onto 100% oxygen, closed the foot warmers, and opened the cold air vent; but he failed to close his own head warmer valve, neglected to close the head warmer valve in the rear cockpit before takeoff, and did not open the dump valve in the front cockpit to help clear the fumes. Safety demands that emergency procedures—to be fully effective—must be studied and practised until they become instinctive.

Prematurely "Up"

Student pilot and instructor were briefed to fly as number two in a four-plane T-33 formation. The pilot included an undercarriage lever shake test in his pre-start check and the formation takeoff run proceeded smoothly to the point of takeoff.

Once in flight, number two noticed that his aircraft was beginning to overtake the formation leader, so he reduced his power setting. At this point the nosewheel started to shudder and skip. The aircraft's nose was high; when it dropped to the level position it continued to go down. The instructor took control and pulled the control column fully back. Next he reached for the gear handle—and found it almost in the full "up" position. Then he raised the undercarriage lever all the way and applied full power in the hopes of becoming airborne. It was too late, however, and the T-33 settled to the runway and slid to a stop on its belly.

No technical failure was discovered. The student pilot had erred in moving the undercarriage lever out of the full down-locked position either during the shake test or sometime during the takeoff roll.

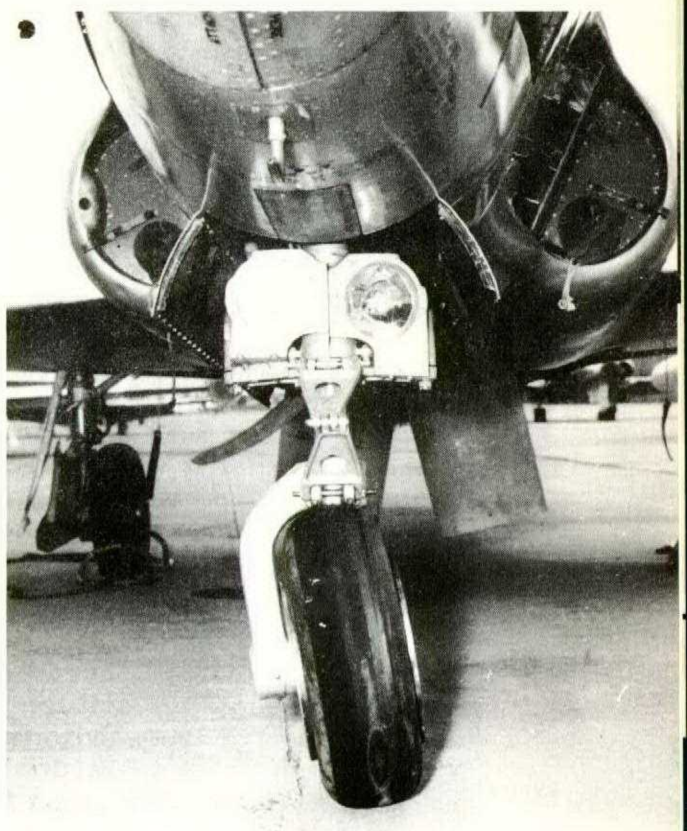
Loose Panels Can Be Deadly

Prior to takeoff the captain of a T-33 completed an external inspection and found everything satisfactory. In flight the second pilot proceeded to perform certain instrument exercises. While the latter was under the hood doing a standard jet letdown, an unusual vibration in the rudders was felt at about 7000 feet. A visual check revealed nothing wrong, but the captain wisely proceeded directly to base.

Inspection on the ground revealed that the upper access door to the port engine had been torn and twisted back for a distance of approximately four feet and the plenum chamber door was missing. The access door is directly behind the cockpit so the damage was not visible in the air. Primary cause of the incident was maintenance error because groundcrew are the only persons who would remove the access door and someone had not secured the fasteners. The pilot erred in not checking the fasteners before takeoff. Readers are referred to the article in the Jan - Feb '55 FLIGHT COMMENT, entitled "Loose Panels".

Pilots Must Be Current

The pilot completed an air test on a T-33 and landed fast, touching down on all three wheels. Then he tested the brakes. When he released them the nose wheel left the runway and the pilot pushed forward on the controls to hold the nose wheel down. This move induced porpoising, so the pilot applied full power and pulled back on the control column for a go-around. He was unable to get airborne before hitting heavily and damaging the nose gear. His second landing attempt was successful, no further damage being done to the aircraft. The pilot erred in landing too fast and then made the mistake of trying to pin the nose gear on the runway when it bounced in the air. One mitigating factor was that the pilot had not flown a T-33 for three months prior to this flight.



The benefit of keeping current on type is obvious. If for any reason a pilot has been off flying for a while a dual checkout will do him no harm. A little pride can be dangerous otherwise.

VAMPIRE

DVA

The pilot overshot from a dummy approach and rejoined the circuit on the downwind leg. His approach was so fast that in the light wind the aircraft floated one-third of the runway length before touchdown. Because of inexperience on type the pilot failed to use full braking power. When an over-run appeared imminent, he swung the aircraft off to the left into the rough. During his pre-landing cockpit check he selected flap but only moved the lever from "Up" to "Hold", which resulted in a high approach speed and a long float. A visual check of the flap position indicator would have permitted the pilot to correct at once and so prevent an inadvertent flapless approach.

CANUCK

Oleo Extension

The instructor and student took off on a dual exercise. The undercarriage was raised and the pilot was satisfied, after several selections, that it was locked in the "up" position. Air speed was then increased to 400 knots prior to climbing. At about 400 knots, instructor and student both felt a jolt. After landing and shutting down, it was noticed that the nose wheel door had been torn off.

A close check revealed that the nose oleo extension was under the minimum recommended length, a fault which caused the failure of the door pickup to engage with the hook on the leg. High speed subsequently ripped off the nose wheel door. Faulty maintenance, coupled with a drop in temperature, prevented the leg from extending fully. There have been a number of similar accidents, so the correct extension of a Canuck nose oleo is plainly vital.

MUSTANG

What Thought Did!

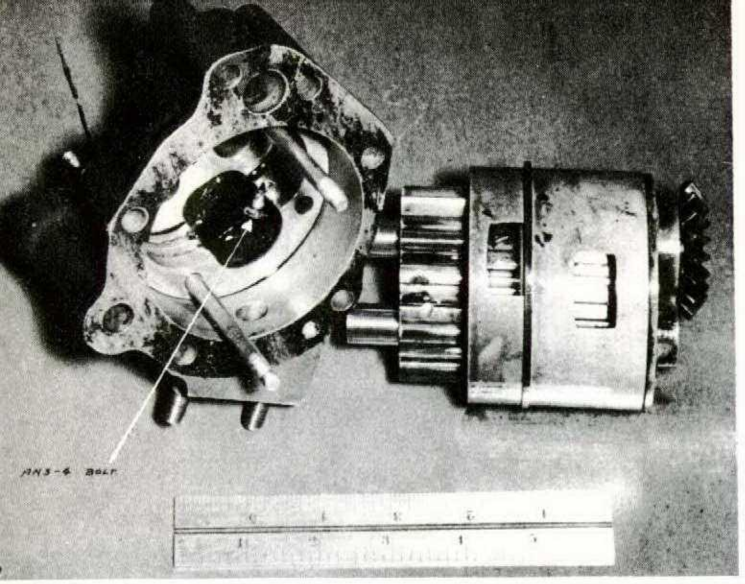
The pilot was returning from an air-to-air gunnery exercise as number two in a two-plane Mustang formation. Over the runway the leader called for a flat break and a stream landing. Number two reduced airspeed prior to lowering the undercarriage, but when he realized he was too far behind his leader, he delayed lowering the undercarriage until he had gained the correct formation landing position. The pilot remembers lowering full flap and thought he had lowered the undercarriage previously. Continuing the approach, he was rounding out for landing when another pilot in the circuit warned him that his undercarriage was up. He promptly applied full power for overshoot but his propeller tips scraped the runway before the Mustang was able to climb away. The pilot then completed a circuit and landing.

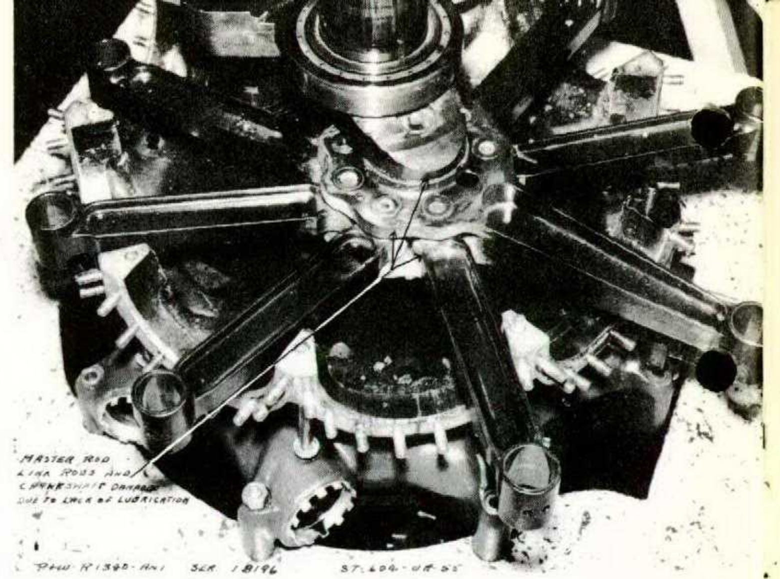
"Thought" is renowned for its power, but one thing it will never do is lower an undercarriage. The idea may originate between the pilot's ears but unless his hand carries out the mechanics of lowering the lever, he will hear that embarrassing scraping sound.

HARVARD

Foreign Bodies

The pilot was on a routine training flight and had completed three high speed stalls when the propeller went to full coarse pitch. Height could not be maintained and the aircraft was cleared for an emergency landing. In spite of the fact that no power was available for the last two miles of the approach the pilot was able to make a wheels-down landing on the aerodrome.





Technical investigation revealed that an AN3-4 bolt had lodged in the oil pump, shearing the magneto drive shaft. The engine suffered considerable internal damage because of excessive heat. The incident has been charged to maintenance. Responsibilities of repair personnel may be likened to those of a surgeon whose inventory of equipment should be the same after as before the operation.

Hidden Hazard

During the landing run following a crosscountry navigation exercise, the student pilot experienced trouble in keeping his aircraft straight on the runway. He lost 45 degrees of direction and tried an overshoot. After covering about five hundred feet of the infield, the aircraft struck an unused sewage drain just before becoming airborne. The obstruction broke off the right wheel and oleo and forced the pilot to make a belly landing. These unnecessary obstructions can be expensive. Have you looked at your airfield lately?

Ode to an Accelerometer

Oh, wicked tattle-tale of this modern jet age!
You negative, positive, monstrous gauge!
You have placed us pilots in straits quite dire
Since you've stooped to wearing that locking wire.

Yes, we pilots of Air Div–once aggressive and keen–
(Before you rated a D14),
Ordinarily don't care much for dials and clocks,
But place you, G-meter, in a class with the pox.

To'day's fighter pilot, flying hi-level tac,
Discovers its easy to put up a black,
He encounters a section, he scissors and flicks,
(You're past the red line but to you its mox nix)
Fighting most bravely, he can't even sneeze,
For one little twitch can produce multi-Gs;
Doing aerial battle, and sorely taxed,
With one eye on you he gets thoroughly waxed.
His heart's heavy on landing, his flareout is late,
And you, gentle instrument, ease up to plus 8.
Watch him sign in, so thoroughly depressed,
'Cause his needle announces the kite's overstressed.
The OC informs him, its Trenton for sure—
That night at the bar our boy's right on the door.

And so, my old nemesis, won't you please think,
Of all the young pilots you're driving to drink?
We're only human, not mechanical like you,
And bound to commit the odd error or two.
So slow down your needles, or raise your red lines
Or we'll all be back in those Trenton Salt Mines.

(Found attached to a D14)

DFS