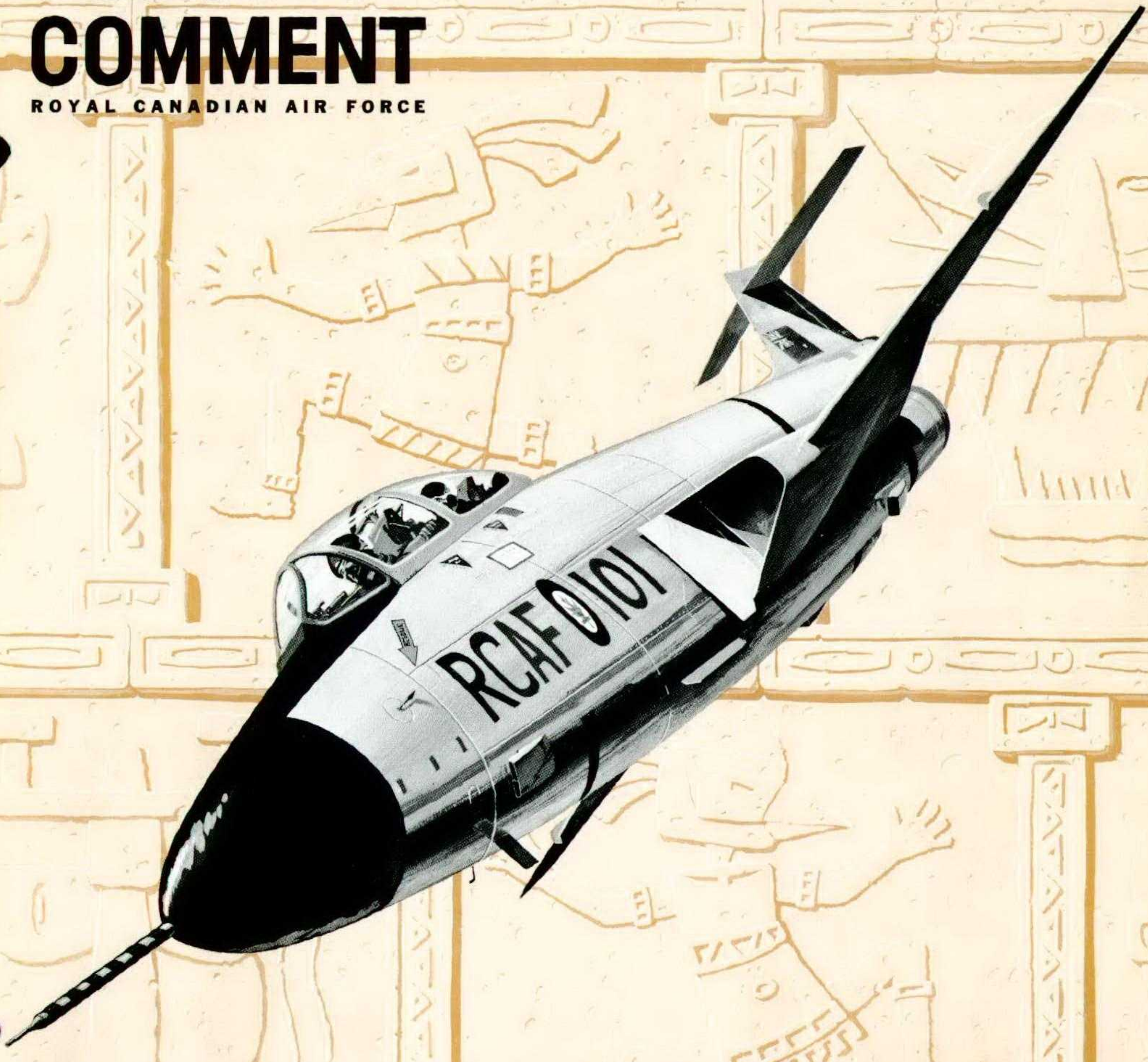
FLIGHT COMMENT

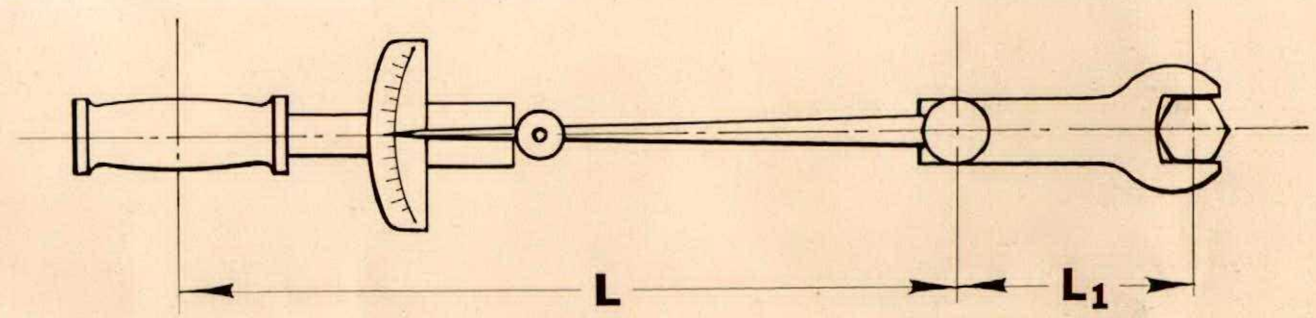
ROYAL CANADIAN AIR FORCE



NOVEMBER • DECEMBER • 1961

TORQUE READING CORRECTION FORMULA

When the adaptor or extension is used in a straight line with the torque wrench, and the torque arm is increased or decreased, use of the formula is mandatory. If the adaptor or extension is fitted at right angles to the torque wrench, the formula is not required



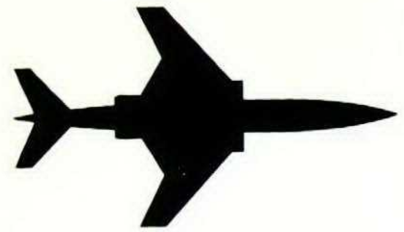
$$\frac{\text{ACTUAL OR SPECIFIED TORQUE} \times L}{L + L_1} = \text{DIAL READING}$$

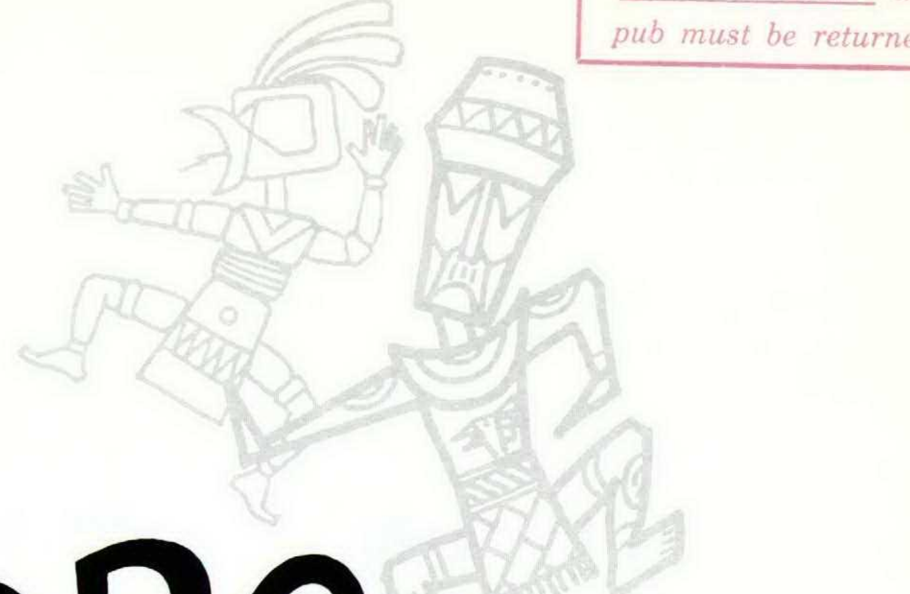
When substituting values in formula, use inch units throughout to obtain answer in inch pounds. Use foot units throughout to get answer in foot pounds. Wrench and adapter centerlines must aline.

Refer to E.O. 05-1-3/25 (Fig. 22)

Suggested by: Sgt MP PLATT AMC

See "TORQUE", pg. 7





VOODOO

The CF101B recently introduced into the RCAF fighter inventory is a strikingly versatile and effective air defence weapon. It is the first aircraft capable of level supersonic flight with afterburner to go into Canadian squadron service. This is a hot aeroplane but its flight characteristics are not too different from other high-performance aircraft. It's from the new generation of fighters, yes, but it flies the same. It just does everything faster.

The aircraft is a swept-wing (35° sweepback) two-seat supersonic jet. It is 67 feet long with a 40 foot wingspan and a height of 18 feet. It weighs in at around 40,000 lbs., and is powered by two Pratt & Whitney "J57" jet engines, which develop 30,000 lbs. of thrust with afterburners.

You are handling more thrust per pound of aircraft than you have ever felt before, so it is especially important that you stay ahead of the aircraft and be prepared for the very rapid acceleration and high rates of climb possible.

The CF101B has a very high wing loading (110 pounds per square foot at normal takeoff gross weight) which means that for certain conditions, particularly high gross weight takeoffs and landings, you must handle this aircraft with care. There's a tremendous amount of thrust available, and plenty of control, but you can't expect to cowboy this aircraft with gay abandon at low airspeeds.

The maneuverability of all fighters you've been flying was restricted by structural strength; the CF101B is no different. You must follow the flight envelope as per the dash one. The level-flight acceleration of this big bird is impressive at all altitudes; you will also like the maximum level flight speeds attainable by the aircraft. Flying qualities are stable and control characteristics are positive throughout the speed envelope. No wing drops or transonic speed effects are encountered. You will notice a faint airframe buffet around 0.90 Mach. Supersonic flight, however, is completely smooth.

The CF101B carries 13,000 pounds of internal fuel; you will like the amount of burner flying available without having to stay in the vicinity of base. It is capable of flying at speeds anywhere from 160 kts. to 1200 kts. at altitudes in the 40-50,000 ft. range, and, depending on the use of the afterburners, the CF101B will fly for 1 plus 45 hrs. to 2 plus

15 hrs. with reserves, giving good range/endurance performance.

The CF101B has been designed with a high safety factor. When the aircraft was introduced into the USAF, it achieved the lowest accident rate of any operational aircraft during its first years of service. The experience of the USAF in the operation of the F101 indicates that most of the accidents can be classified into two groups: running off the runway, and pitching-up in flight. Running off the runway is usually the result of locked brakes, tire blowouts, or pilot error, and can terminate in a write-off. Blown tires on takeoff or landing rolls can normally be handled by the pilot. The F101 has been landed with a flat or blown tire with only minor damage to the wheel hub and gear door, and no damage to struts or airframe.

A number of accidents and incidents have resulted from "pitch-up". Pitch-up is not a new term to the RCAF, but it is perhaps not fully understood, and—without being too technical—a brief look at the problem in supersonic aircraft will be of some help.

We all know the old "stall" routine with its buffetting, airflow break-down, nose-dropping, and loss of directional control. Some swept-wing aircraft, however (the CF101B is one), do not stall in the conventional manner. From a strictly aerodynamic standpoint, the CF101B does not stall, because another phenomenon known as pitch-up, involving high sink rates, nose-high attitudes, and complete loss of control occurs, before the stall is fully developed (stall occurs after the aircraft pitch-up but the pilot is too busy to notice).

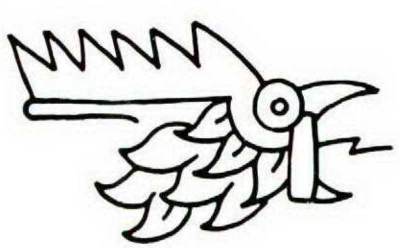
The onset of this pitch-up condition during subsonic flight is recognized by sink rate, nose-high attitudes, and the need for constant directional corrections. Above .9 Mach, or supersonically, there is no aerodynamic warning.

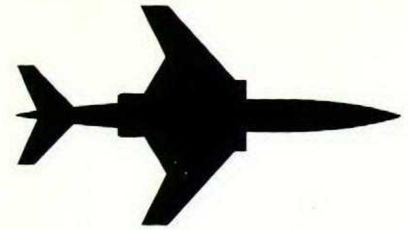
Briefly, pitch-up is that condition wherein the aeroplane assumes a more nose-up attitude with no increase in elevator deflection. It occurs because, as the wing-tips stall, the center of pressure moves forward on the swept wing, giving nose-up moments. The downwash on the tail is increased since the lift on the wings in front of the tail is increased. This gives a nose-up moment. The tip vortex moves inboard striking the tail, further increasing the nose-up moment. These sudden nose-up moments are so strong that the pilot cannot prevent the aircraft from pitching-up out of control if he allows it to progress to the critical point. If he does the result is very similar to a T33 "tumble".

Safety devices including a warning horn and pusher have been incorporated to assist the pilot in staying away from pitch-up. It might be noted that in some accidents/incidents where pitch-up occurred, these warning devices were either inoperative or otherwise bypassed. Because of its association with angles of attack and airspeed, pitch-up more often occurs through mismanagement of the controls; in most cases the aircraft must be subjected to considerable abuse and neglect. Standard "by-the-book" recovery action from pitch-up is successful. The full story on pitch-up will be the subject of an article in an early issue of Flight Comment.

If pilots fly the CF101B in a precise manner they will stay out of trouble, but if basic flight safety principles are ignored, or harsh and abusive techniques are adopted, the CF101B can be very unforgiving.

In summary, the CF101B is big, fast, and impressive. It has excellent operational capabilities. It can carry many and varied external stores, i.e., fuel and armament, and is equipped with the latest navigational, airborne interception, and fire-control systems. Flown by RCAF aircrews in a professional manner, and given good maintenance, this aircraft will be a valuable air defence weapon.





Century Series Systems and Components

by
Roy E. Pryor, Manager
USAF Aircraft Programs
Marketing Operations
General Electric Company

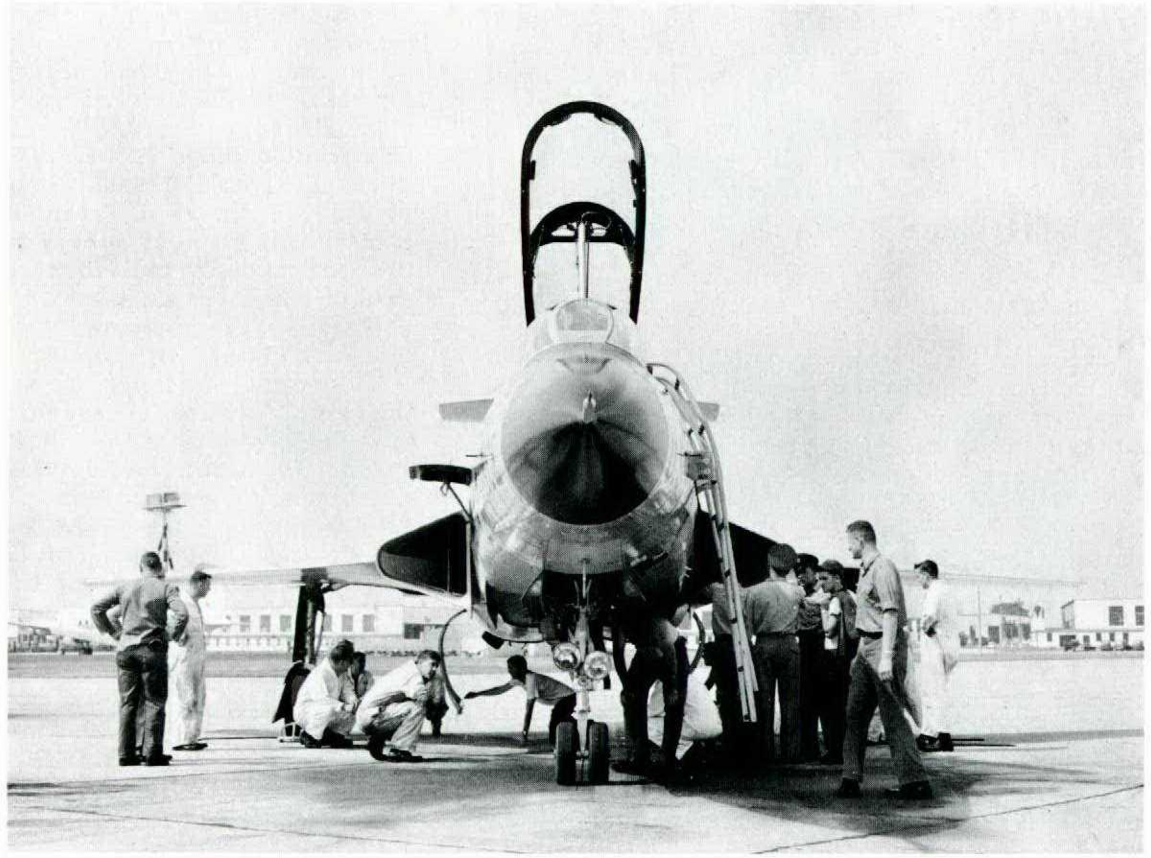
The emphasis on training of Century Series ground and flight crews should be directed toward analysis of systems and functional characteristics of components. From a pilot's viewpoint, training philosophies vary greatly. A large percentage of the pilot training today, however, is based on the ability of the pilot to memorize procedures and operating instructions. Few pilots recognize that memory is the first thing that fails when an emergency arises. Training should be based on knowledge of the equipment and understanding functional characteristics rather than on memory of procedures.

Knowing and understanding the functional characteristics of the engine is the only sure way of making the right decision when the gauges indicate an abnormal condition. The pilot should recognize the full significance of all instrument readings. These readings can give you a lot more than a "go or no-go" indication. Learn to read for meaning. This doesn't mean the pilot is required to keep one eye on the instrument panel waiting for something to happen. Actually, the converse is true. Once the pilot has developed an orderly sequence of monitoring, less time is required to be devoted to the engine instrument panel.

There is nothing that gives a pilot more reassurance than knowing and being able to predict what the instrument response will be for any throttle change or change in flight conditions. With this knowledge, it is easy to note any abnormal engine instrument readings.

Engine functional characteristics differ somewhat from model to model, but once the pilot knows and understands these functional characteristics it is relatively easy to develop a monitoring procedure for each flight condition. Reading the engine instruments for meaning is no different than reading flight instruments during instrument flight conditions. Many pilots without adequate training will read the instruments individually rather than comprehending them as a whole. As a result, their response patterns may be characterized by delays and bad decisions.

A proper training program can resolve these difficulties by teaching the pilot to use his instruments as a unit or co-ordinated group. The pilot should monitor engine instrumentation in an orderly sequence based on requirements. When the throttle is advanced for takeoff, the item to check is response characteristics of the engine—basically engine RPM. The next item is a quick check of limits: temperature, engine speed, and oil pressure. Finally, a performance check or thrust indication. This could be a direct reading thrust indicator, a pressure ratio indicator or a combination of instruments to give thrust indication. If properly organized, this monitoring procedure should take only a few seconds during the initial takeoff roll.



After takeoff when the throttle setting is reduced, the pilot should note the response to determine normal operational characteristics of the engine. During cruise, which constitutes about 95% of the operating time on the engine, periodic checks of specific instruments is all that is required to ascertain normal operating conditions.

Very often a good evaluation of in-flight conditions can prevent long maintenance time on the ground when an early evaluation of a minor difficulty is made. From a flight safety or accident prevention standpoint, the pilot should recognize abnormal instrument indications and know what corrective action should be taken.

Another important aspect which could be a complete subject in itself, but is mentioned briefly, is an engine trend-analysis program. This analysis should be made from in-flight information from the pilot as well as from the ground maintenance personnel. Accurate data and records pertaining to any particular engine can be a great asset to predicting engine difficulties.

There are many things a pilot and a well organized maintenance crew WORKING TOGETHER can do to insure maximum utilization of equipment and at the same time insure a greater degree of reliability and safety. Minor discrepancies should not be allowed to accumulate. A positive corrective program is necessary to insure a high degree of reliability.

In looking at training programs from the standpoint of accident prevention, it is worthwhile to investigate statistics of past accidents and incidents. One extensive investigation in this area revealed that 68-70% of the errors involving near accidents were related to interference of one habit pattern with another. The extent to which one habit pattern interferes with another is more pronounced in the more experienced crew member, when they are transferred from one type of equipment to another. The reluctance of many experienced airmen to learn new procedures reflects a more-or-less conscious recognition of the increased hazard from this phenomenon.

The general experience level of a pilot should never be relied upon as a substitute for training. The development of check lists that incorporate logical sequences of action and monitoring of action is the best way of preventing past experience habit interference. These factors should be given serious consideration with the present transition from the subsonic fighter to the Century Series fighter. This is not to say that the new Century Series fighter is any more difficult to fly; in fact, I'm sure most pilots will agree that the converse is true, that new jet aircraft offer many advantages from a pilot's viewpoint in operational characteristics and ease in flying. It is a new airplane, however, and does require proper indoctrination of new procedures before a successful operation can be achieved.

The fundamental objective of any training program should be to indoctrinate each pilot and crewman to cope with the new requirements and situations with skill and confidence. It should be emphasized that the achievement of this goal requires not only the knowledge of the technical aspect of aircraft and equipment operations but also an understanding of the human factors. In measuring the adequacy and effectiveness of a training program, it should be determined how well the functional characteristics are understood and not how well the procedures are memorized.

To emphasize the importance of this factor, a group of pilots who had just completed an intensive training program on a new aircraft were given an examination to analyze the results of the training. In nearly all cases they could quote established procedures with a high degree of accuracy. However, when asked to describe the same situation in a slightly different manner, it was found that they had little or no knowledge of the functional characteristics which made these procedures important.

Another example which emphasizes the results of an effective training program can be made in the comparison of three operating squadrons using identical equipment and flying the same type of mission during an 18-month period. One squadron had a completely accident-free record during this period with high utilization time on their aircraft. In both of the other squadrons the incident and accident rate was high.

In analyzing the complete operation, it was evident that the success of the one squadron could be contributed largely to a well organized maintenance and training program. At this squadron, every pilot received a complete indoctrination on functional characteristics of the aircraft and equipment before he flew. In the maintenance area, there too, a real conscientious training program was conducted on a continuing basis to insure maximum integrity of maintenance operations performed.

Knowing your airplane and equipment can mean the difference between the successful operation and a bad decision which ultimately leads to an accident. If I were to relate the many experiences during my flying career as a chief test pilot that have contributed to additional grey hair and prompted me to take out additional insurance, but otherwise have been completely successful, I could not honestly say that the success of any one of them was a direct result of superior pilot technique.

Instead, in every case the success has been the direct result of knowing and understanding the aircraft functional characteristics. I feel confident that any pilot with the same knowledge and understanding of the aircraft systems could have made the right decisions under the same adverse situations.

F/L B.C. DIMOCK

At the end of a GCA run at about 200', F/L Dimock opened the throttle to approximately 90%, selected dive brakes in, wheels up, flaps up, and informed the tower that he was remaining local for 30 minutes. As he finished the transmission, there was a slight yaw accompanied by a loss of power--the RPM was unwinding through about 60%.

Because he was just crossing the far end of the runway at 500', F/L Dimock called MAYDAY, and informed the tower that he was ejecting. When he looked ahead, he noticed that he would be bailing out over a river, and because the aircraft was mushing quite slowly, he flipped on the ignition and emergency fuel switches, and pulled back the throttle. He felt no further loss of power and pushed the throttle outboard.

The engine relit immediately. F/L Dimock opened the throttle; noticing that the RPM was building up through 40 - 50%, he told the tower that he had a relight and was landing right away. Altitude at this point was 350 - 400'. IAS at flameout was estimated at 225 kts. F/L Dimock left the ignition and emergency fuel switches on until shutdown, cruising only 75 - 80% during the return for landing.

Post-flight analysis revealed that the port engine-driven fuel pump drive shaft was sheared, and might have been sheared for some time. This, however, would not be apparent because the engine will operate on a starboard pump alone with no evidence of port pump failure. But during the overshoot procedure the FCU also failed and the engine flamed out.

F/L Dimock displayed good airmanship in estimating that there was not a sufficiently high rate of sink to prevent him from attempting a relight before reaching minimum eject altitude. By turning the emergency fuel switch on he bypassed the FCU and was able to relight and land safely. The FCU and port pump were replaced after the incident, and the engine operated satisfactorily.

Flight Comment commends F/L Dimock for his sound judgment in assessing the situation, and his quick action, which averted a serious accident.

F/L R.M. CUNNINGHAM

Returning to the base in an H21B helicopter at about 500' above terrain, F/L Cunningham heard several loud noises in the rear of his whirlybird. He went into the autorotation immediately, and carried out a successful forced landing in the field. There were no previous indications of engine malfunction.

Investigation revealed that chips of metal were contaminating the oil; further probing showed that the piston in #7 had broken away from the connecting rod. The accident was assessed Obscure pending further investigation and a strip report.

If the engine failure had occurred 1000 yards away—in any direction—from the place where it happened, a serious accident would have been almost inevitable because of exceptionally rough terrain.

F/L Cunningham's quick action avoided a serious crash in any case. This deserves a good show from Flight Comment.

TORQUE—What's Torque?

(The following article was prepared by North American Aviation, Inc.—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.

Before we analyze the information given by the torque table, a discussion of the basic purpose of applying specified tightening torques to the 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 enough to provide rigid joints, or the application of too much torque would overstress the parts.

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 because of initial torque application, the longer its fatigue life.

To understand this better, take a rubber band and note that it stretches in direct proportion to the amount of pull-up to its useful (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 2 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 further until the pull is greater than 2 pounds. If the band is made of metal instead of rubber, 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 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 conditions of the mating parts, and abiding by recommended assembly procedures. The torque method has its drawbacks, but it is much better than guess-work, 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.

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 about 40,000 psi in the bolt. Column 3 is simply 60 per cent of the values given in column 2 and will develop about 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 about 90,000 psi in the bolt; column 5 values develop about 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 torque? The answer is that when an airplane is in flight or is landing, under certain combina ations 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 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 aircraft affected. Generally, if Engineering believes that a rigid joint will result from the application of the low range of torque (columns 2 and 3), and 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 where an installation does not result in a rigid joint, that 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.

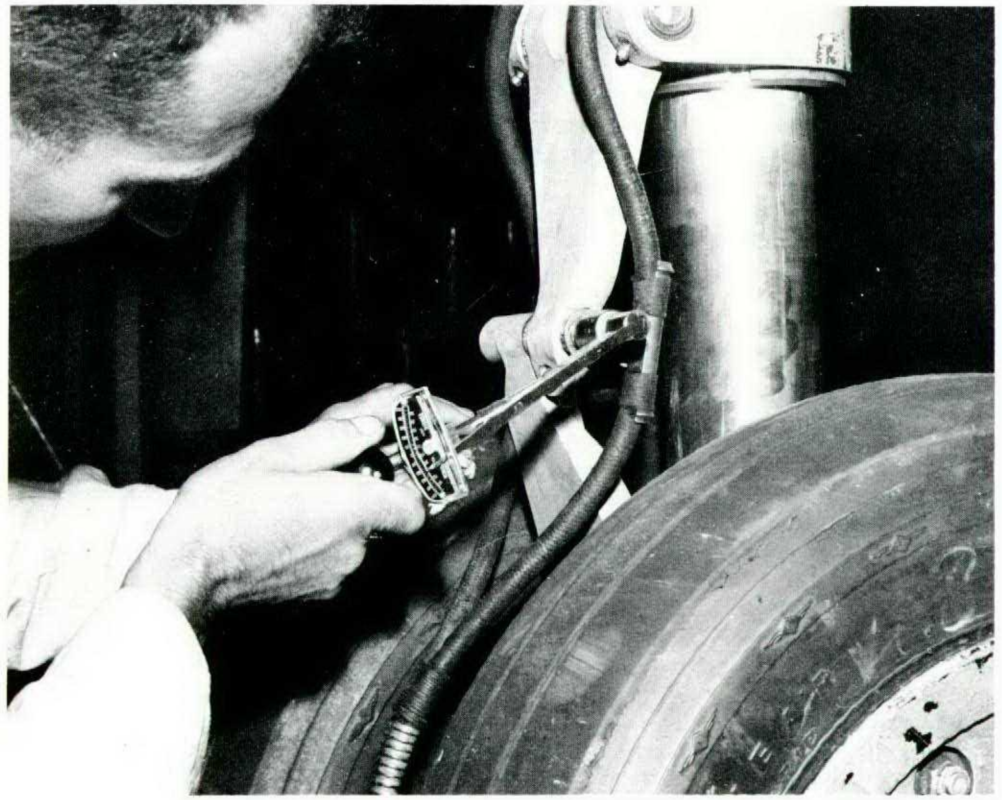
From the mechanic's viewpoint, this simply means that he need only be concerned with the standard torque values given in columns 2 and 3 for AN bolts; the values in columns 4 and 5 are primarily used as standards for high-strength bolts and when called out in the maintenance manual for specific applications. (In specific applications requiring special torques, the maintenance handbooks list such torques. Where torque values are not called out in the handbooks, it is to be assumed that standard torque is required).

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 case, 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.

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. Lubricating threads is equivalent, roughly, to increasing the upper torque limit, since less of the torque is resisted by friction. On unlubricated bolted connections tightened from the nut side, about 50 per cent of the torque is used to overcome friction. The remaining 50 per cent is responsible for the residual tension imparted to the bolt.

To summarize, a loose joint is more detrimental than an overtorqued fastener. It is better from a structural point of view to overtorque the fastener with caution, since immediate damage is the most serious consequence.



Continued on page 10

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[1]	10000	6000
	1-1/8-12	5000-7000	3000-4200[1]	15000	9000
	1-1/4-12	9000-11000	5400-6600[1]	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.

[1]Estimated corresponding values.

Flared Tube and Flex Hose Torque Values (Except Oxygen Lines)

	Tube O.D. Inches	5052-0 AL. Alloy Tubing		Flex Hose Assem. and 6061-T6 AL. Alloy Tubing		MIL-T-6845 Stainless Steel Tubing	
		IN. LBS. MIN.	IN. LBS. MAX.	IN. LBS. MIN.	IN. LBS. MAX.	IN. LBS. MIN.	IN. LBS. MAX.
"B" NUT TORQUE TABLE	1/8	20	25				
	3/16	25	35	30	70	90	140
	1/4	40	65	70	120	135	185
	5/16	60	80	70	120	180	230
	3/8	75	125	130	180	270	345
	1/2	150	250	300	400	450	525
	5/8	200	350	430	550	650	750
	3/4	300	500	650	800	900	1100
	1	500	700	900	1100	1200	1400
	1-1/4	600	900	1200	1450	1500	1800
	1-1/2	600	900	1550	1850	2000	2300
	1-3/4	700	1000	2000	2350	2600	2900
	2	800	1100	2500	2900	3200	3600

TORQUING "B" NUTS

So far we have considered the problem of torque as applied to threaded fasteners. Of all torque problems affecting aircraft, however, the proper tightening of "B" nuts has probably caused more headaches than the maintenance of all other airplane fasteners combined. What is the answer to the question: How is a "B" nut properly tightened?

There is only one sure way to properly tighten a "B" nut: USE A TORQUE WRENCH. Torque is a convenient way of measuring the preload (static load placed on the fitting and threads) of a nut. When a nut is correctly torqued, the preload is enough to prevent leakage or turning of the "B" nut. The preload provides a sealing pressure, because metal is held tightly against metal.

Applying muscle to make certain that connections are tight is NOT a satisfactory way to prevent undertorquing. Overtightening "B" nuts may severely damage or completely cut off the tube flares. If tightened properly, a tube fitting may be removed and torqued many times before reflaring is necessary.

Correct torque for a "B" nut is determined by the tubing material. The material from which the fitting and nut are made is not a factor. Therefore, torque tables for "B" nuts are based only on tubing material.

Torque values are not the result of guesswork. Engineers determine these values through a series of tests. "B" nuts on tubes of varying diameters and different materials are tightened to various torques and the lines are then pressure-tested. Satisfactory torque is enough to provide a seal, but not enough to cause damage to the flares or fittings. Tests also are conducted to make sure that prescribed torque values will result in a good seal, even when there are slight maladjustments, such as a misalignment of "B" nut and fitting.

Maximum torque value is low enough to prevent damage to flare of fitting. Minimum torque value is high enough to result in a good seal.

A "B" nut should never be tightened when there is pressure in the line. This tends to cut the flare, without adding any appreciable torque to the fitting.

LEAKAGE OF TUBING CONNECTIONS

Leakage at "B" nuts frequently occurs on new aircrafts even though these nuts may have been properly torqued before delivery from the manufacturer. Vibration tests to seat the flare on the end of the line to the cone of the fitting. When seating takes place, the torque value of the "B" nut becomes lower.

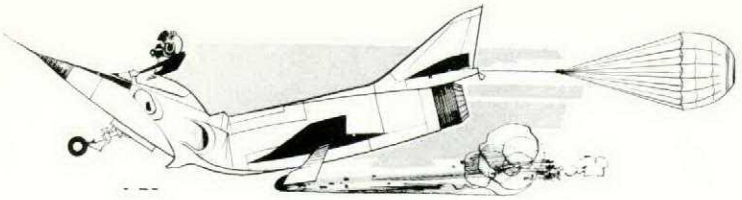
If leakage occurs at a "B" nut, dump hydraulic or pneumatic pressure in the particular system where the leakage occurs; then use a torque wrench and retorque nut to values given in the torque table included in the applicable maintenance manual. If leakage persists, loosen the "B" nut and inspect the fitting cone and inside of the flare for scratches, nicks, or splits. Inspect the sleeve for cracks, and make sure that the sleeve is concentric with the flare.

If the fitting, sleeve, and tube flare appear to be in good condition, reassemble the connection in accordance with instructions given in the systems maintenance manuals. If the connection still leaks, replace the fitting and/or line assembly.

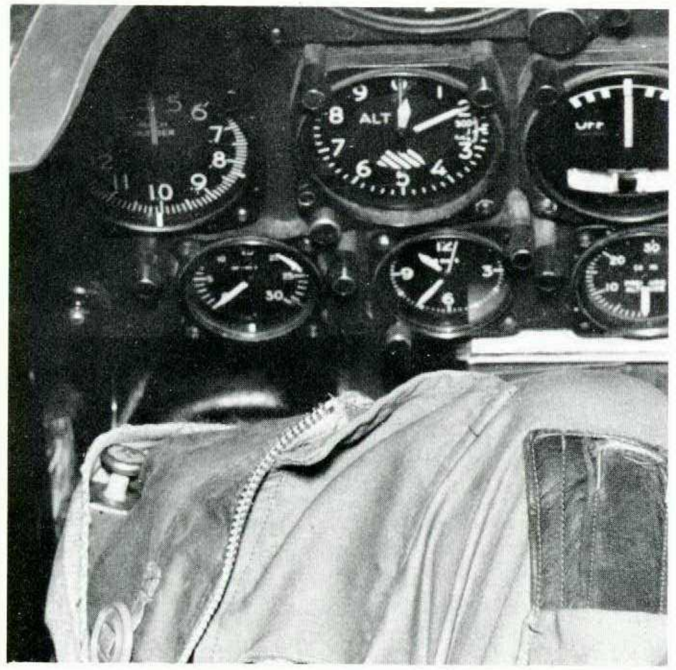
We have seen that vibration is one of the principal factors for the loss of torque. Others may be movement and flexing of airplane structure during flight, pressure surges, etc. How then, can correct torque be maintained? The answer is the proper application of the correct torque value at the time of the original installation through the use of that all important torque wrench.

On new types like the B-70, the answer to ultimate capability in aircraft operating at maximum performance can be summed up in two words—maximum reliability. This so-called "M-R" program has for some time now included an intensive study of various aircraft components toward a design that will actually ensure maximum reliability. As such, those little old "B" nuts have come in for a complete diagnosis. The result? A new type of self-locking "B" nut that will maintain its correct torque value permanently. Thus, it will be seen that the problem has been recognized, dealt with, and our design studies indicate that this particular problem of "B" nut leakage will not be a factor on new airplanes (self-locking "B" nuts are not used on the A3J-1).

We can only hope that this first aid information may be of some help while we're waiting for the doctor. In the meantime, the best home remedy we can prescribe are those old-fashioned cure-alls: (1) a torque wrench, and (2) correct torque.



OPERATIONAL HAZARD



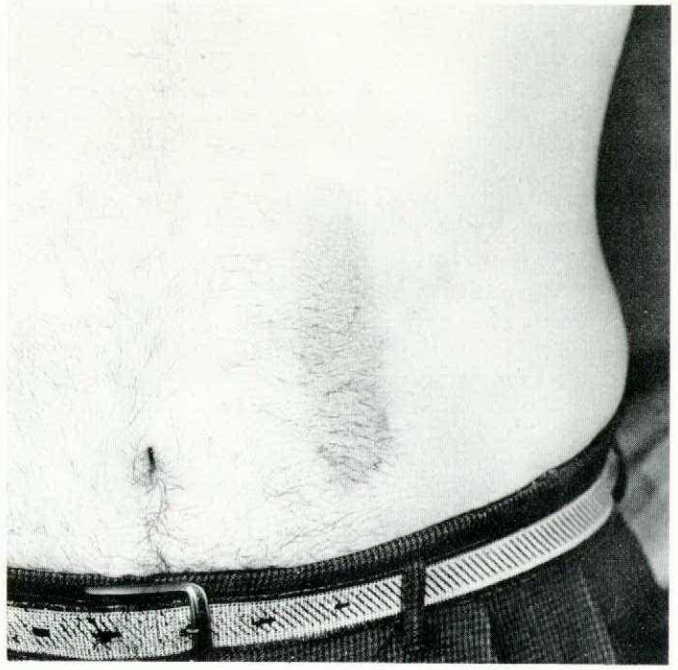
EMERGENCY/PARKING BRAKE

Damage to CF100 tires and undercarriage has been caused by the inadvertent application of the emergency/parking brake by normal movement of the pilot's left leg.

Apparently the leg retaining-strap works loose in the air and snags the brake lever, or bulky articles carried in the lower pocket of the flying suit catch the lever. In any case, the result is the same; it is well known that a small movement of this lever is sufficient to lock the wheels.

To eliminate the possibility of leg straps working loose, the addition of a strip of "Velcro" tape has proved satisfactory, and all leg straps should be modified now.

Pilots flying the CF100 should remember that even if leg straps do not work loose, bulky articles in the pocket may cause the brake lever to be applied inadvertently.



LIGHTER-FLUID BURN

Immediately after levelling off at 20,000' from a normal jet climb, an officer noted a stinging sensation on his lower left breast in the vicinity of the flying-suit's left breast pocket. His lighter, of the common one-dollar type, had leaked its fuel into the pocket. The lighter was quickly removed and placed elsewhere.

Upon landing a large, red, welt-like mark was noted on the skin. This red area, although it was causing some discomfort, was not shown to an MO until four days later—when it had started to blister. Normal superficial burn treatment was successful.

Of more immediate concern, however, is that the lighter fuel venting took place directly below the oxygen hose junction. It is worthy of investigation because of the possible fire hazard.

It is believed that the fuel venting was caused by a pressure differential between the lighter wadding and the outside air. The relatively high pressure inside the lighter casing caused the explosion of the fluid.

(The photo was taken 10 days after the incident, when healing was largely completed).

FLYING THE DISTRESS PATTERN

by F/L R. J. Ball

So there you are—no radio—up the proverbial creek—flew a triangle—no intercept—found a hole and with "rots of ruck" land, all in one piece. You proceed to the crew room and in no uncertain terms give vent to your feelings regarding "scope dopes," and their obvious lack of education in simple geometry. At the same time "scope dopes" are inferring, rather guardedly of course, that the aircrew just can't fly a pattern with any resemblance to a triangle....

Well, let's take a look at the problem and see if we can't help it to work better. What about the radar itself? Radar is pretty good these days, and generally very reliable, given half a chance—but it does have limitations. Radar range is limited, and, of course, the country is not completely covered. Any pattern done either beyond the range, or outside the areas covered, will be a waste of time. Some aircraft, because of size and shape, do not "paint" well on the scope, and may be missed.

To eliminate this problem somewhat, don't forget your IFF. Areas of bad weather and precipitation have certain masking features on the scope, and any pattern should be flown away from these areas. Busy terminals in IFR weather, where several aircraft are in holding patterns, present a particularly congested picture. A pattern done there may be missed in the gaggle of blips on the scope.

Now would be a good time to find out all you can about radar, its coverage, range, and limitations—so that if you're faced with flying the triangle, you will have a pretty good idea of the best areas to do it with a reasonable chance of success.

Altitude is an important part of this business: it affects not only the radar, but the intercept portion too. The higher we fly our pattern, the greater the range in which we can be picked up by radar, but some limits should be placed on "how high" to assist the intercept.

For instance, jet aircraft should fly in a contrail level if possible; it is readily apparent how this will assist the interception. If this is not possible, fly at 35,000' or "1000 on top", which ever is the more practicable. Piston aircraft should fly at the highest practicable level.

Probably the most important point affecting the triangular pattern and its recognition as such, is the affect of wind at altitude. A triangle flown without consideration of wind may appear on a scope as just about anything at all, and any resemblance to a triangle will be strictly coincidental.

Figure 1 shows, perhaps a little exaggeratedly, what can happen when you fly a triangle without compensating for wind. Consider that on the scope, your aircraft may disappear in the turns, or show up better on some legs than others. Add a couple of more aircraft doing other procedures, and perhaps the scope dope won't recognize it as a distress pattern!

From preflight briefings you should have some idea of the wind at your altitude and in your area, and even if your hands and head are full of your present predicament, it should be relatively simple to make some allowance for wind so that your pattern will resemble a triangle.

Figure 2 shows a chart with suggested times and corrections for wind. After working out various wind problems, for all practical purposes the situation can be resolved into two categories as shown—Low and High winds.

Low wind conditions are 10 to 25 kts. for piston aircraft and 10 to 50 kts. for jets. High wind conditions are 30 to 50 kts. for piston and 60 to 100 kts. for jets.

The first leg is flown into wind, or as near as you can guesstimate it, which gives a heading with little or no drift. The only problem here is timing. The direction of the turn will be in accordance with your pattern, whether "receiver only", or "no radio". On the second leg the problem is drift, and corrections suggested are 10° for "low wind" and 20° for "high wind". The timing is normal as shown.

The third leg is the same as the second, but don't forget that the correction goes on the other side this time. Using these figures, you should complete the triangle pretty close to where you started. Then do the triangle over again. The reason for the second triangle is simple: a scope operator may have seen your first triangle, but may be waiting for a second one to confirm his suspicions before he starts the ball rolling.

You will note at the top of Fig. 2 that two speeds are given: 150 kts. for piston, 240 kts. for jets. These are desired speeds and the chart is based on them. If you cannot achieve these speeds, make an allowance of one second for each knot difference. For example, if you're thrashing along in the old "Gooneybird" at 120 kts., add 30 seconds to each leg. This will keep your pattern uniform and large enough. The pattern should look like Figure 3.

These procedures will use up about 5-1/2 minute's fuel for jets, and 8-1/2 for pistons, in the low wind situations. In high winds, they will take about six and 10 minute's respectively.

All this is fine for the aircrew, but what about the radar ops? A few words to them should be in order. Be on the alert at all times. We are confident that you will recognize a well-executed triangle if the track has penetrated your area of concentration. But, what about the track classified "friendly", which is not flight-followed? A check on it and a little grease pencil may someday save an aircraft and its crew. We know the frustration that follows the "check-up" of a pattern that resembled a triangle, but wasn't. If one of these days one effort pays off, you've earned yourself a pat on the back. Remember, when you see a strange pattern, the operator up the line may be getting a better paint, and they say that two heads are better than one.

This article has been written in the hope that with a better understanding of the problems, and a concerted effort by all, we can make the distress pattern work.

Remember the distress pattern is only the last resort, to be used only when all else has failed. Pilots should note that cool, logical thinking, with a thorough knowledge and use of emergency procedures, coupled with a preplanned course of action, may successfully conclude the emergency long before the need for a "triangle".

FIG. 1

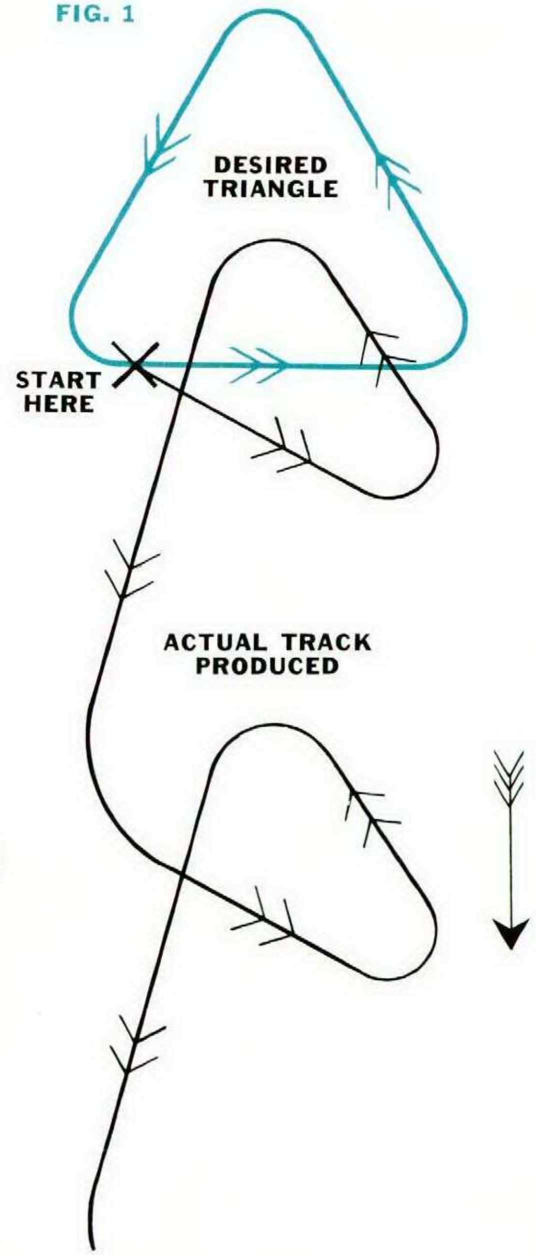
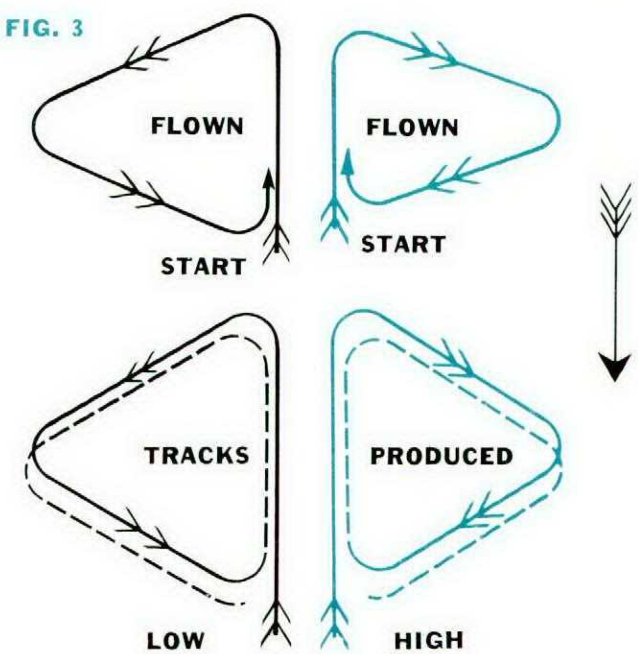


FIG. 2

	TAS	Wind Categories Low	Wind Categories High	Normal Leg Time
Piston	150K	10-25K	30-50K	2 min
Jet	240K	10-50K	60-100K	1 min

Instructions	Wind	Time Piston	Time Jet	Wind Correction
1 Turn into wind to fly first leg.	Low High	2:30 min 4:00 min	1:30 min 2:00 min	0° 0°
2 Turn R or L for second leg.	Low High	2:00 min 2:00 min	1:00 min 1:00 min	10° 20°
3 Turn R or L for third leg.	Low High	2:00 min 2:00 min	1:00 min 1:00 min	10° 20°
4 Turn into wind to repeat triangle.	Low High	2:30 min 4:00 min	1:30 min 2:00 min	0° 0°

FIG. 3



FLYING WEATHER AT COMOX

by B. V. Benedictson
SMetO RCAF Station Comox

Broadly speaking, the weather at Comox B.C. can be divided into two patterns—summer and winter.

The Summer Regime

Mid-March to mid-September is characterized by good flying weather; clear or partly cloudy skies with good visibilities and very little rain are general throughout this period.

The Winter Regime

The period mid-September to mid-March is generally one of much cloudiness and rainfall and some fog, and consequently restricted visibilities and low ceilings are prevalent. The weather at the beginning and end of this period is, however, quite variable.

Synoptic Pressure Patterns

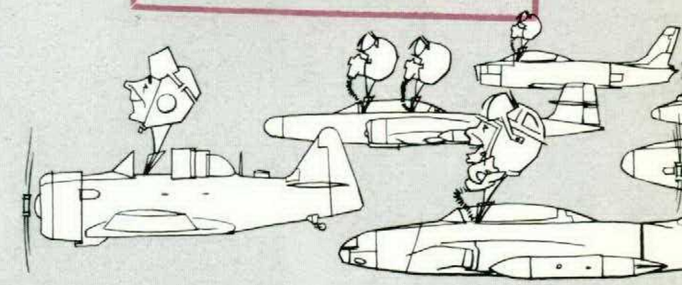
In summer, Comox lies mainly under the influence of a northward extension of the California high pressure system. During the winter period, it lies more or less directly on the path of the transient lows and troughs which are carried in the broad southwesterly flow between the California High to the south, and the Aleutian Low to the northwest. This distribution of pressure, together with the topography, provides a predominance of light northwesterly winds in summer, and stronger southeasterly winds in winter. As the California High moves southward in the fall, the frequency of the transient lows and troughs reaching the B.C. coast gradually increases in late September to attain a maximum in November, and then levels off during December and January. In February, this frequency decreases slightly, and then more rapidly in March as the High moves northward in the spring.

Weather

While the most violent weather at Comox is associated with the winter lows and troughs ("southeasterns"), seldom do the ceiling and visibility drop below 600 feet and 1 to 2 miles with these storms. In advance of these systems, the ceiling lowers steadily, the wind increases, frequently exceeding 50 mph, and with the commencement of precipitation, the visibility drops. The ceiling and visibility almost always fall below VFR limits, but rarely below the IFR range. There are, however, two noteworthy exceptions to this rule. The first is the common formation of stratus and fog on the approach to runway 110 during the height of the "southeaster". This condition extends up to the button of the runway, and often reduces the approach ceiling and visibility to as low as 100 feet and 1/4 mile. The second exception occurs when cold Continental Arctic air lies along the coast, with an overrunning moist flow aloft. This produces precipitation in the form of snow, or rain and snow mixed, which reduces ceilings and visibilities to near zero. After the passage of the frontal system, or trough line, conditions improve only briefly if the wind flow aloft remains southwesterly. However, if the winds aloft veer to the northwest, then rapid improvement immediately behind the front can be expected.

Commencing in late September, slow moving or stagnant high pressure systems, which have become moist in the surface levels, are common to the area. Extensive patches of sea fog and radiation fog are often associated. If fog forms over Georgia Strait, it can be carried on to the airfield by any on-shore breeze. Experience has shown this to occur most often whenever a light northerly wind prevails over the airfield. Under the same regime, radiation fog frequently forms in valleys and over low marshy ground surrounding the airfield, but generally the airfield itself remains fog-free under these conditions. However, it has been noticed that the chances of radiation fog forming on the airfield are increased if the ground becomes wet with rain on the previous afternoon. The frequency of radiation fog at Comox is highest during October, the extensive burning of slash piles during this period being a likely contributing factor. As the season advances into November, there is always an abundant supply of moisture in the surface levels, and any light wind gradient situation has a fog and low stratus potential. This holds true for the remainder of the winter. After a series of Pacific lows and troughs have moved through the area, the flattening of the pressure gradient is usually a sufficient basis for forecasting fog and low stratus. On rare occasions, a stalled warm front to the south and southwest can be depended upon to produce near IFR conditions.

In summary, IFR and below IFR weather are not common at Comox. The situations most likely to produce these conditions, however, occur with flat pressure gradients and moist air in the surface levels. While "southeasters" produce abundant amounts of cloud, rain and wind, critically low conditions are unusual. However, they sometimes occur in the wake of these storms as the wind subsides.



HEADS-UP FLYING

WIDE AWAKE

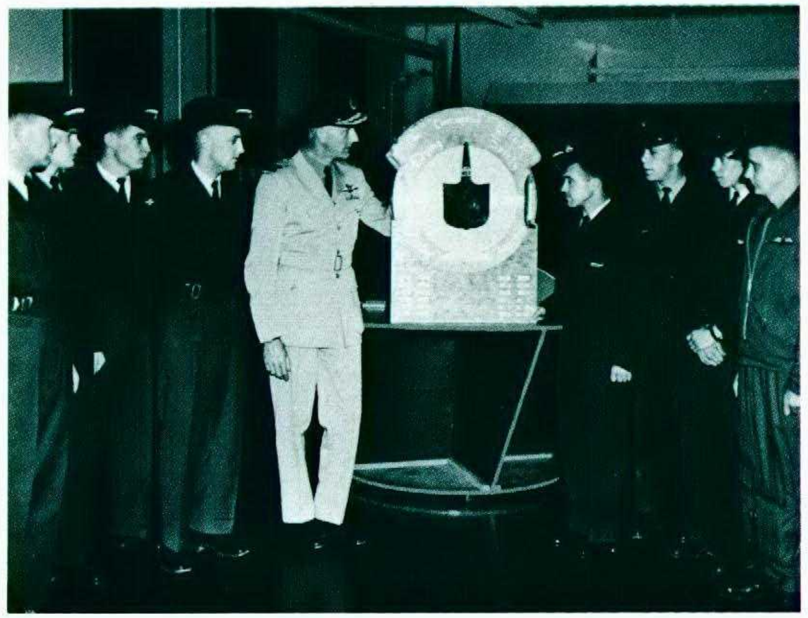
An Otter, under the command of F/O RG Wallace, was being flown at normal cruising power when the engine began to run rough. Failure of the right magneto was first suspected because it was causing considerable radio noise, but a magneto check showed satisfactory operation.

Just then, the engine quit entirely. F/O Wallace carried out the G.M.S. check, turned on a booster pump, and reselected the gas tank—but the engine cut in and out intermittently.

Then, in the words of the pilot, "Since insufficient power was available to go any further, a forced landing was carried out without further incident."

Investigation revealed that the engine had excessive oil in the induction system. The oil sump screen was clear and impellor bearing oil seal failure was suspected; the engine was changed; and the accident assessed Materiel pending on the results of a strip report.

F/O Wallace was wide awake; he made a correct decision; and he carried out a perfect forced landing. His heads-up professional airmanship merits commendation from Flight Comment.



PROMOTING SAFETY IN THE FIELD

A successful safety program must operate at all levels—from the CAS down to the unit. But what of the student pilots undergoing training today? They get their safety training through their instructors, and, to a limited degree, from the Station Flight Safety Officers. Fine up to a point, but sometimes the student who is told what-not-to-do doesn't really understand why.

At 3AFS Gimli students are made more aware of flight safety implications through a Display Competition. The AFS is one of the final stopping-places for Wings candidates, prior to OTU and Operational employment.

Underlining the need for more safety education at the training level, senior students at Gimli were given flight safety projects about 10 months ago, to indoctrinate them further, and to introduce them to the analyses, causes and prevention of accidents and incidents. These projects take the form of displays which dramatize potential dangerous events or situations—or incidents which could have been prevented if more information had been available, or if the pilot had understood the situation better.

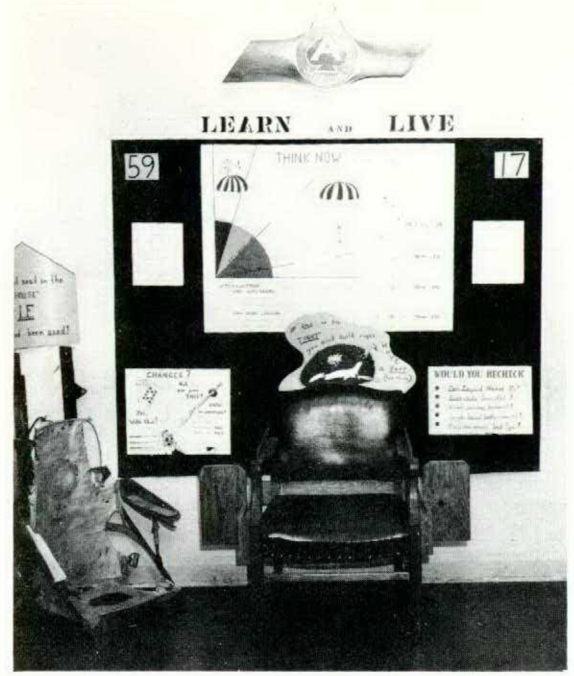
Each Flight of senior students must complete, during the final six weeks of the course, a competitive Flight Safety Display. The display can cover anything connected with flight safety; the students are asked not to duplicate existing posters, but to originate their own.

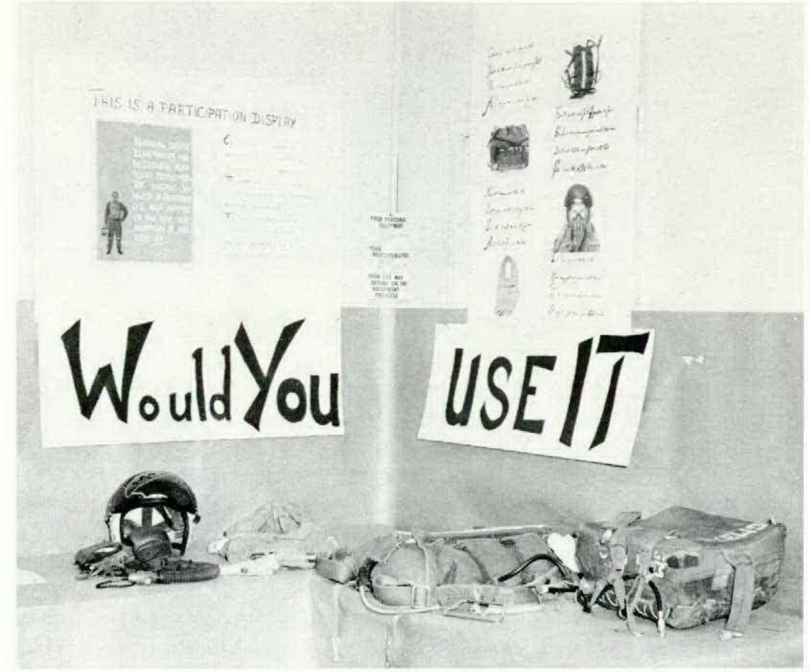
To make the competition sharper, completed displays are judged by the CO, G/C HR Studer, and the OC 3AFS, W/C LJ Liggett. To the winners go the congratulations of the CO and the OC 3AFS, along with the Commanding Officer's Flying Safety Display Award. The losers must stare at the inscription, "We goofed--'A' or 'B' (as the case may be) won this time!"

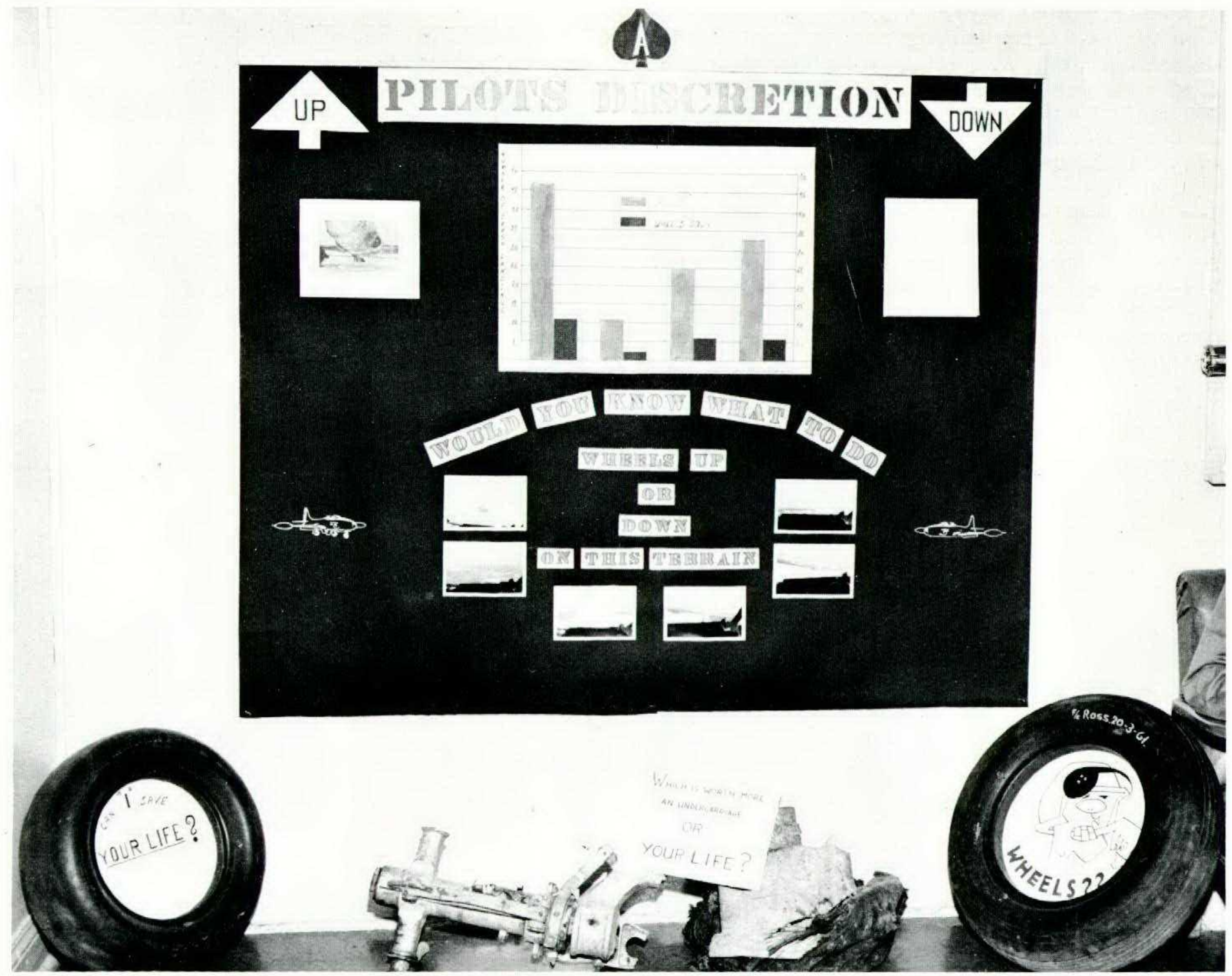
The popularity of the competition—and the increased safety knowledge of both staff and students—have increased considerably since the introduction of the program. A recent competition was judged by a visiting dignitary from the Royal Air Force, A/C HEC Boxer.

The CO and the OC 3AFS support this flight safety program wholeheartedly. Little wonder why: in a recent six-month period only one D14 was entered!

(3 AFS has come up with a program which produces results. How about YOUR unit? What are YOU doing about a safety program? Flight Comment will print similar reports—so set 'em up and send 'em in! —Ed.)







FLIPPED

On the first of July a change in the "FLIP" program affecting Canadian users was made. The old GPH 240 - Radio Facility Handbook was retired, and can now be filed in the corner of your locker along with the "SFID." The airways system has been divided into two: Low and High Altitude, and three new publications are now in use.

The first is the GPH 205 FLIP—Enroute Supplement—Canada. This is a grey-covered booklet which fits into your flying-suit pocket, designed for both Low and High Altitude users. It contains much useful information, covering Canada and the North Atlantic with some United States overlap. It includes alphabetical listings, and all information pertaining to any station or facility together in one place (saves hunting around), Ocean Station Vessels, distress procedures, and many other goodies.

The next publication is GPH 206 FLIP—Enroute Low-Altitude—Canada. There are 10 charts printed back-to-back on five sheets (see fig. 1) designed for use in the Low-Altitude airways system in Canada (below 23000'). Chart #10 (not shown) depicts Iceland, Bermuda, and the Azores.

The 206 contains all the necessary information for enroute navigation; the symbols used are those developed by international agencies for use both by civil operators and the military.

To complete the series is GPH 207 FLIP-Enroute High-Altitude—Canada. Two charts (see fig. 2) are used with the high-altitude airways system (above 23000') in Canada. These are printed back-to-back on one sheet. They depict the aids on which high-level airways are designated, and all airfields for which letdown plates are carried in GPH 201. Additional information on tracks and distances to airfields lying outside the high-level airways system will be found on the approach letdown plate.

These three charts or publications will be amended in the form of complete re-issue about every 35 days. The GPH 205 Supplement is designed solely for use by the military; the enroute charts will be used by civil as well as military pilots.

One important benefit of a common civil/military product for Canada is that traffic controllers will be using the same chart as the aircrews.

These products are all new, and time should be spent on becoming familiar with the general layout and symbols. Any errors or omissions noted should be entered on the NOTUN postcard in your letdown book, and dropped, postage free, in any mailbox in Canada.

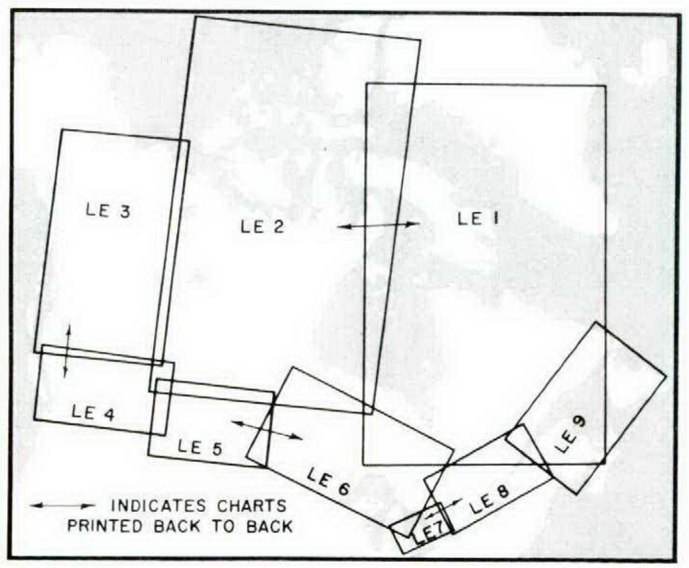


FIG. 1

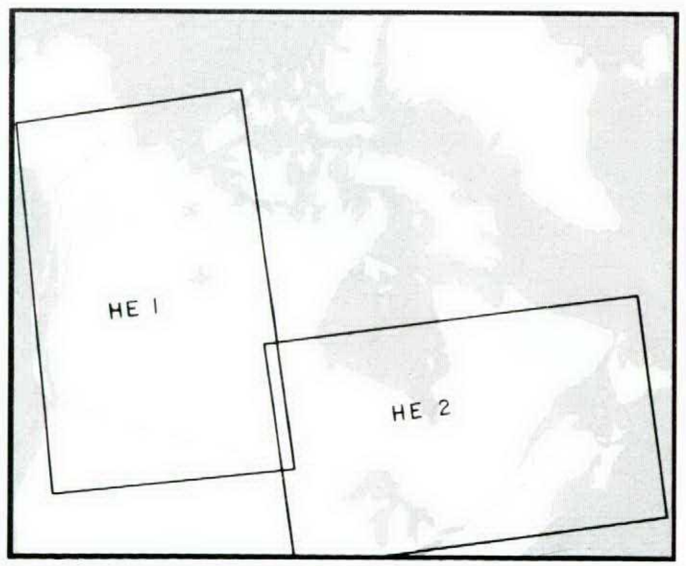


FIG. 2

ARRIVALS and DEPARTURES

TOWING THE DAKOTA

A C47 was hangared at an isolated base after a transport trip. The aircraft was towed into the hangar with a D12 tractor. In the morning the aircraft was being pushed out of the hangar, using the tailwheel tow bar, when the aircraft's wheels encountered a mound of snow at the entrance of the hangar. The airman on the tractor depressed the accelerator pedal to ease the tractor over the mound. The front of the tractor lifted approximately four feet of the hangar floor and jack-knifed, damaging the elevator and the tailcone of the aircraft.

Because the D12 tractor is a light vehicle, the unit modified the tractor by adding 500 pounds of lead to the front end to prevent a recurrence of this type of accident. This might be a good idea, but we are overlooking the contents of EO 05-35A-2 which states, "Do not attempt to push the airplane forward by means of a tailwheel tow bar". If the aircraft had been pulled from the hangar, using a towing bridle, the accident wouldn't have happened.

It seems that pushing the Dakota, using the tailwheel tow bar, is accepted as common practice. The order prohibiting it was written for a purpose. The accident proves the purpose.

NOT DEAD YET

After a prolonged session of aerobatics in a Harvard, during which the parking brakes had been set, to prevent—in the pilot's own words—the loss of hydraulic fluid during inverted flight, the aircraft was landed, apparently with one brake still on. During the ensuing struggle to keep the aircraft straight, it flipped over on its back, causing consider-

able damage, and some injury to the pilots.

The accident was caused by aircrew error. There is no factual basis for putting parking brakes on during aerobatics. This procedure seems to have crept into the system by unknown means. Further, the pilots failed to do a complete pre-landing check in that the parking brakes were not fully released prior to touchdown.

As a result of this accident all TC units have been advised that parking brakes are not to be in the "ON" position during flight.

(Old aeroplanes never die; pilots bend them that way. While the Harvard may be old, really old, and has no teeth, it can still bite —Ed.)

"OVERTORQUE"

After a practice touch-and-go landing in a Harvard, a student noticed the undercarriage was still down, although selected up. After recycling several times with nil result the student landed and shut down.

Inspection revealed that an hydraulic line in the port wheel well had failed at a joint. This failure allowed complete loss of hydraulic pressure and fluid. The flared end of the hydraulic line had become reduced, allowing it to pull through the sleeve. This reduction could have been caused only by maintenance personnel overtorquing the fitting when checking for tightness, or correcting minor hydraulic leaks at some previous time.

Torque values, while not covered in the relevant Description and Maintenance instructions, are covered generally in EO 05-1-3/25. Precautions to be observed when torquing fitting nuts on flared lines are outlined in EO 05-1-3/12, paras. 12 and 13.

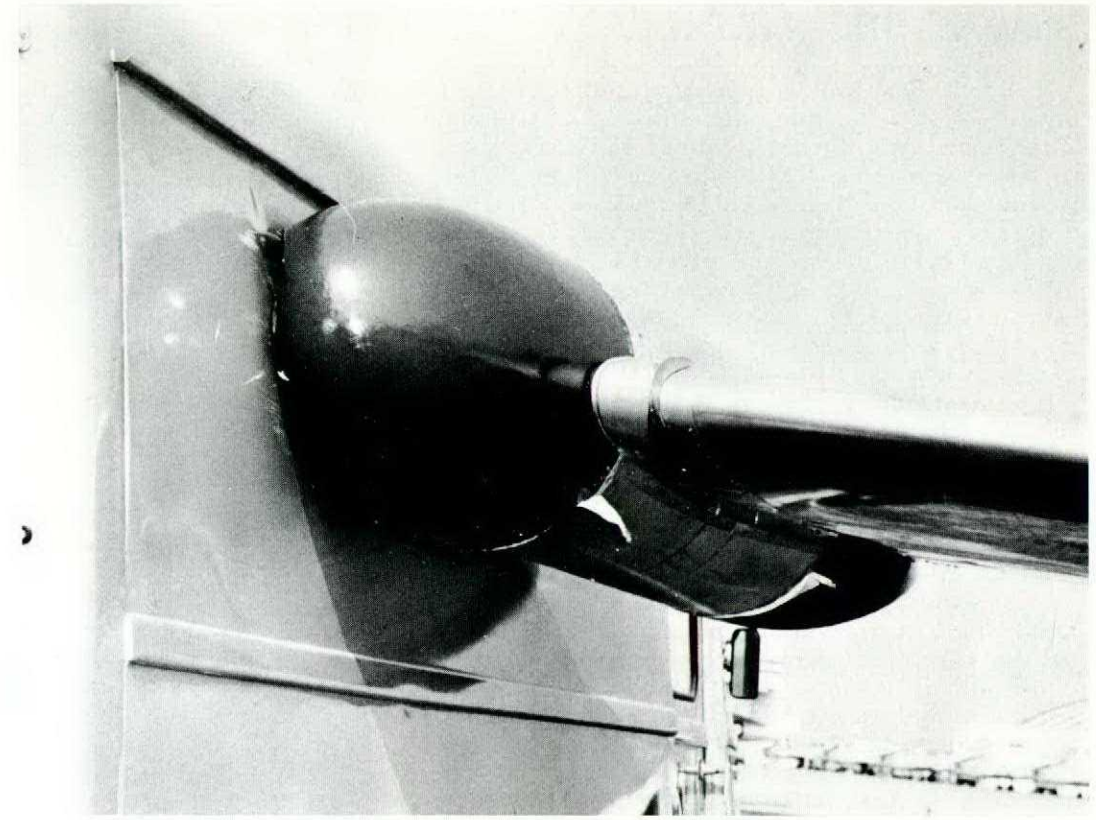
NO ALIBI HERE

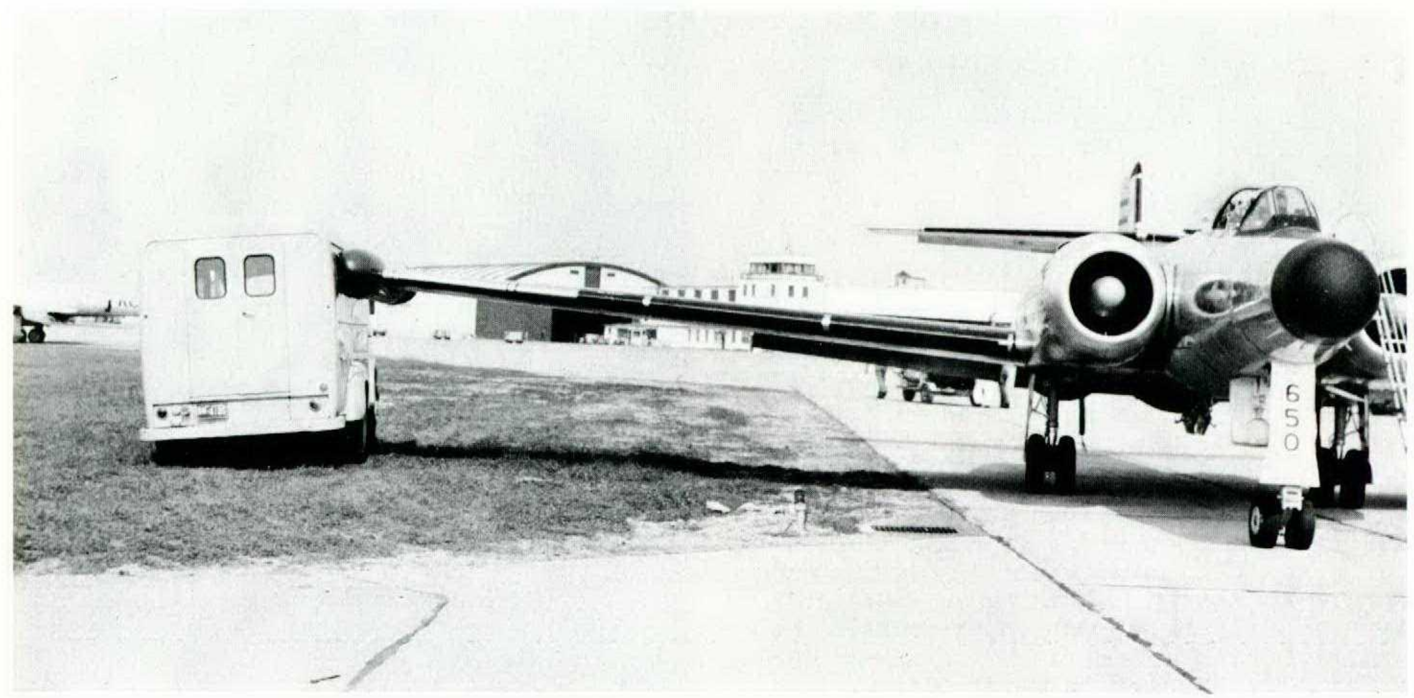
It was a beautiful day: weather CAVU, temperatures 70, field dry. Squadron was on detachment; the pilot was experienced—aircrew vision with no restrictions. The crew had been on a normal no-sweat intercept mission. Coffee was served in the crew room...a vehicle provided at the door for transportation to dispersal...dispersal congested, but the crew knew it.

Start up, cockpit checks, all okay...taxi clearance obtained...and, to continue in the words of our aspiring birdman: "having accomplished getting the aircraft centered on the yellow taxi reference line after rolling out of a very tight parking area and seeing the airman marshalling me ahead indicating that there was clearance between parked aircraft on my port wing, I continued rolling...

"...and then the aircraft seemed to slow down and I suspected that my starboard brake may be stuck tighter than the port brake, so I simultaneously applied more power and the aircraft yawed to starboard so I looked starboard to see why the aircraft would not move forward and I noticed the starboard rocket pod had come in contact with a parked vehicle."

Aircrew suffering from "tunnel vision" should be reminded again that most aircraft in service use have two wings (one on either side of the fuselage). Head-bone swivelling on the ground is just as important as in the air. In this instance, both crew members, on invitation of the CO, "donated" $75 each toward the total damage to the vehicle and the aircraft.





RUNWAY UTILIZATION?

A North Star made a normal approach to a runway 14,000 ft. long, and into a 22 kt. wind. Touchdown was normal, about 1,000 ft. from the approach end. The nosewheel contacted the runway almost immediately, and the pilot commenced braking, with "regular gentle pumping action of the brake pedals."

The tower at this time informed the pilot that the starboard wheels appeared to be on fire, and a loud report, indicating a blown tire, was heard in the aircraft.

Investigation revealed that the starboard outer tire had blown and marks on the runway indicated this wheel had "locked" on, at, or shortly after, the point where brake had first been applied. Apparently the pilot's "gentle pumping action" was not in fact releasing the brake on the starboard wheel.

Poor airmanship was displayed here. With 13,000 ft. of runway ahead of the aircraft, plus a 22 kt. wind, the pilot's hurry to begin braking action as soon as the nosewheel was on, does not seem warranted. It would seem more reasonable in this situation to allow the aircraft to slow down of its own accord, with only minimum braking required, at a very much reduced speed.

BRAKE DRAG

The pilot was assigned to do a compass swing on a Sabre; at the same time he was to check the brakes, because the previous pilot had reported them dragging slightly. It required about 7% more RPM to keep the aircraft moving at a normal taxiing speed, so the pilot said the aircraft was still unserviceable. He was told that the brakes were new and was asked to do a high speed run on them.

On the runway, he accelerated to 100 knots, and then pulled power off, doing a normal landing roll. On the acceleration, when the nosewheel steering was released, the aircraft pulled to the left quite badly. Much more right brake than left was necessary. Taxiing back to dispersal, the aircraft still tended to pull to the left; on shutdown, the left brake began to smoke, and about two minutes later burst into flame.

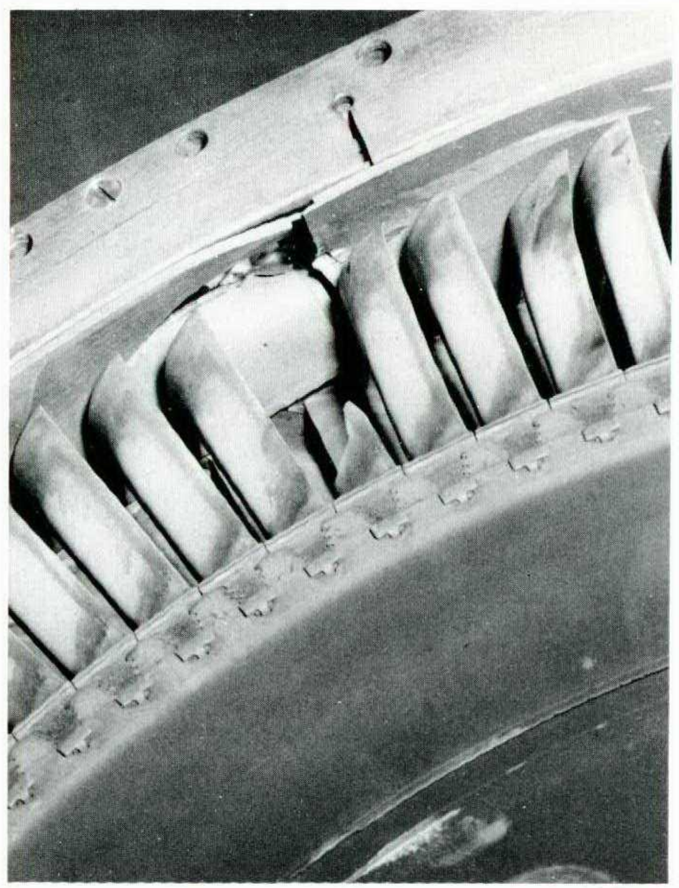
It's true that the pilot was not properly briefed by groundcrew personnel, but his experience and knowledge of the aircraft should have stopped him from taxiing that way. Primarily responsibility was considered to rest equally on pilot and maintenance staff.

BROKEN BLADE

About 5 minutes after takeoff in a Sabre, sudden engine vibration was noted. The vibration continued regardless of power settings; temps and pressures were all normal. At the onset of the vibration the pilot had turned back toward base, set up a forced landing pattern and landed.

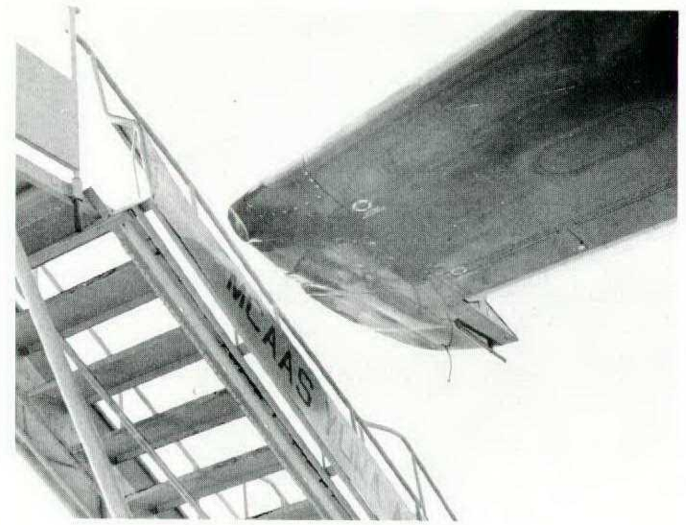
Investigation revealed a broken blade which had punctured the shroud ring, 12 other blades nicked and broken, and a small hole in the exhaust cone.

(A straight case of materiel failure very well-handled by the pilot—Ed.)



AIRCREW—CARELESSNESS

After parking a "Yukon" aircraft with the aid of two inexperienced marshallers under poor light conditions, and at a time when the marshallers were preparing to move the ramp into position for unloading, the captain decided to turn the aircraft through 180° and park facing the other way. During the turn the starboard wing collided with the loading ramp. The ramp and the wing-tip sustained minor damage.



The decision, owing to the aircraft's obstruction of a certain area of apron, was no doubt justified. The method employed, with no warning and with the marshallers out of sight, did not display too high a degree of airmanship, and would appear to fall far short of the professional standards expected of RCAF aircrews.

The hazards of moving large aircraft without adequate marshalling, and the danger to ground personnel from propellors and wheels when their whereabouts are unknown, cannot be over emphasized. A recent accident involved a similar aircraft — a Brittania knocked over a loading ramp, pinned and fatally injured a civilian employee.

ICY FINGERS

While flying at 27,000 ft., the pilot of a CC106 "Yukon" noticed a stiffening of the aileron control. This condition progressed to the point where the ailerons locked, and aileron control was lost. A descent was commenced, controlling the aircraft with rudder, until at about 21,000 ft., it too locked, and rudder control was lost.

An emergency was declared and descent was continued controlling any tendency to turn with rudder trim. On several occasions where rudder trim was insufficient and the possibility of a spiral dive threatened, differential engine power was used to control the aircraft.

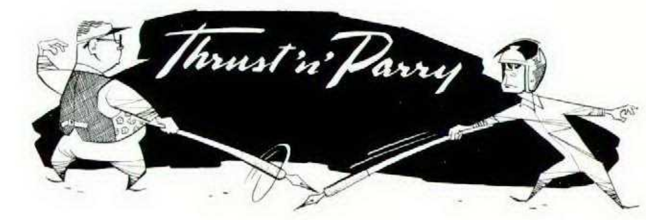
Setting up an approach to a suitable runway involving minimum turns, the descent was continued until at about 3500 ft. aileron and rudder control was regained, and a normal approach and landing completed.

Investigation after landing revealed 1 to 2 inches of water on the rear washroom floor, and a quantity of water and ice (2 to 3 inches thick 4 hours after landing) in the front area of the rear baggage compartment.

Water was observed dripping onto the flap torque tube and the aileron/rudder interconnect torque tube, when the aircraft was pressurized on the ground. A leak was discovered at a hose clamp on the inlet tube to the shutoff valve.

In this particular incident, it is considered that the pilot's action in putting down 15° flap during this approach, did in effect break the ice formed around the tubes, freeing the aileron and rudder controls. The aircraft was not in "above freezing" temperatures long enough to allow much natural thawing to take place

(Congratulations to this crew on their professional handling of a rather sticky situation—Ed.)



LETTERS TO THE EDITOR

Dear Sir:

As an AM Supt, the picture on the inside of the front cover of the Jul - Aug 61 issue of Flight Comment from a safety viewpoint is loaded with accident potential.

Note the two lads on the right side of the picture. They are both wearing rings contrary to EO 00-80-4 para 20. In addition, although the EO does not state watches should be removed, any technician with experience will not wear a watch either. Secondly, the lad in the lower right side of the picture is wearing coveralls that are too large and require folding up of the cuffs and this makes good accident potential as outlined in para 21 of EO 00-80-4. In the third instance, notice the lad standing on tool boxes and in addition, it is possible that a UCR should submitted proposing a modification to the stand itself. Fourthly, it looks as though the lad in the lower left of the picture has no lace in his boot or it is not done up properly.

If you multiply the scene shown in this picture by the number of periodic inspections in progress in the RCAF for one day, it can readily be seen that the ground crew accident potential is very high.

N. MacLeod FS
RCAF Station
Portage la Prairie, Manitoba

Touché—Ed.

Dear Sir:

The author of "Are You Sure of Your Altitude" published in the July-August 61 issue of "Flight Comment" has a good point, but in making this point, he has unequivocally labelled certain statements as being false. On the contrary, these statements are generally true, and the conditions under which this is so are outlined below.

It should be noted that:

"The pressure altimeter reads approximate true altitude if the current setting is maintained" is true if the instrument is correctly calibrated and the temperatures of the air below the aircraft are the same as those in the standard atmosphere.

"A high altimeter setting (high surface pressure) means that the aircraft is higher than indicated" is true if the temperatures below the aircraft are the same or higher than those in the standard atmosphere, and

"True altitude may be computed in flight by correcting for flight level temperature" is true when the difference between the mean actual temperature and the mean standard temperature below the aircraft is the same as the difference between actual and standard temperatures at flight level.

In his article, the author has referred to the "normal" height of the 700 mb surface, but it is believed that he meant the "standard" height, ie, 9880 feet, the height at which the 700 mb surface occurs in the standard atmosphere. The need for care in avoiding confusion over these terms is apparent if, for example, a flight in the Thule-Alert area were considered. Here, in January, the "normal" height of the 700 mb surface is about 8800 feet which is approximately 1000 feet below its height in the standard atmosphere.

CJ Stead
DAirS/S4-3

FLIGHT
COMMENT

ISSUED BY
DIRECTORATE OF FLIGHT SAFETY
R.C.A.F. HEADQUARTERS • OTTAWA • CANADA

November • December 1961

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OTTAWA, 1961

BIRD WATCHERS' CORNER

MIGRATING NEST-FOULER

This scruffy species may be found cadging a ride, then stuffing garbage in any old crack or cranny of the aircraft. A lack of disposal cartons makes him more messy instead of extra-neat. Pours grease down galley drains, deposits airsickness bags (filled) in remote locations, spills coffee on radio consoles, and jams retro chutes with miscellaneous corruption.

CALL: I'MAMESSYBIRDI'MAMESSYBIRDI'MAMESSYBIRD

PEST CONTROL MEASURES: SUCK INTO GIANT VACUUM-CLEANER ALONG WITH MESS, OR PROVIDE PROPER CONTAINERS FOR SCRAPS.

SPECIES IDENTIFIED AND REPORTED BY: Sgt DI Shade
404 MP Sqn
Greenwood

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