FLIGHT COMMENT

THE FLIGHT SAFETY DIGEST OF THE CANADIAN ARMED FORCES

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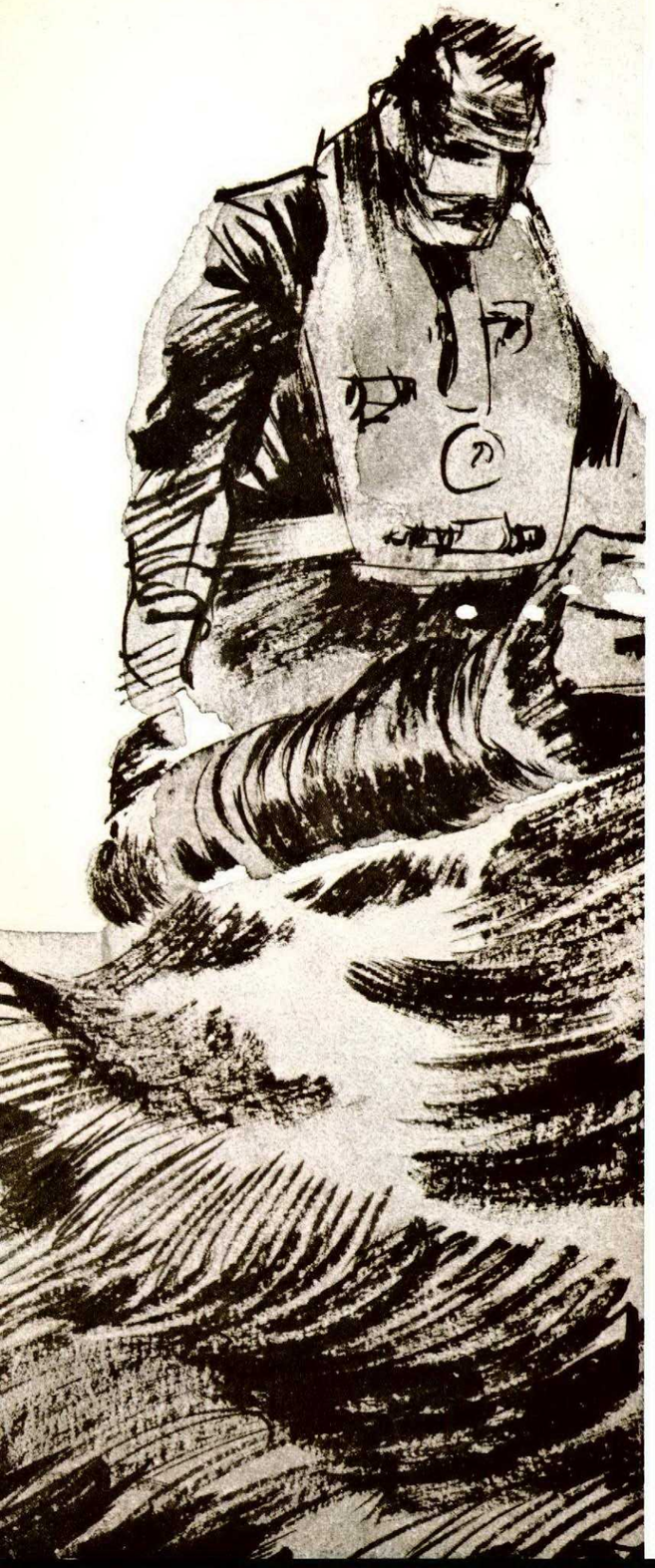


THE OPINIONS EXPRESSED IN THIS ARTICLE ARE THOSE OF THE AUTHOR AND ARE NOT TO BE INTERPRETED AS DFS OR CANADIAN FORCES POLICY. WE PRESENT THIS ARTICLE "FOR THE SAKE OF ARGUMENT". EDITOR.

ONE MAN ON A RAFT

A short time ago, a helicopter pilot came into my office and informed me that he had asked to be temporarily removed from flying duties. I was rather shocked by the news since I have known this young man for several years and have always respected his ability and drive. He had considerable experience in the Destroyer borne helicopter programme, and had recently been made a Crew Commander.

On pursuing the matter further, I found that he had never really been comfortable flying at night from a Destroyer, and had serious doubts as to his ability to land and take-off from the ship at night, particularly when there was any deck movement. Despite these doubts and fears, he had soldiered on for nearly eighteen months hoping that with added experience he would gain confidence. When this didn't happen, he went to his Commanding Officer, explained his position, and asked to be temporarily removed from flying duties. He explained that his decision was based on Flight Safety considerations. Over the years he had read many Flight Safety articles which in essence said that if you had any personal problems, or weren't comfortable with what you were doing, then you should stop and ask for help. Our young pilot asked for help, because, as he put it, he could visualize the day when he would find himself alone in his liferaft, with the rest of the crew dead or missing due to his inadequacy. I respect his decision, and admire his courage in making it. I would hope that every pilot would have the sense to ask for help under similar circumstances.

Encouraging pilots to ask for help, however, is not the whole story. There are still unanswered questions. Firstly, why does this situation arise in the first place? Secondly, once it has arisen, what do we do about it? I don't know the answers but I am willing to put forth some opinions and suggestions.

How did we arrive at the situation where a pilot has asked to be relieved of flying duties? What went wrong? If you consider this, I think that you will come up with several other questions rather than an answer. Is the operational role too demanding? Did we ensure that the man had sufficient training to perform the operational tasks? Did we select a man with the right physical and mental makeup in the first place? Perhaps I have oversimplified, because we could give an unqualified yes answer to all these questions, and still arrive with a disturbed pilot, simply because we cannot eliminate all of the stresses and strains of everyday life. I will, however, discuss that aspect later.

To start with, is the operational role too demanding? In this particular instance I would say no. Landing a ten ton helicopter on a 40 by 80 foot moving platform is a challenging task; at night it becomes very challenging; and under less than ideal conditions it becomes a challenge which generates tension, fatique, and yes, fear. For day-in, day-out exposure I would classify it one of the most demanding, unforgiving roles facing a CF pilot in peacetime. I have had some experience in this role myself, and I can guarantee that there is nothing like a night landing to a rolling Destroyer deck for stirring the adrenalin and tightening the sphincter muscle. Yet despite the demands of the role, and the frequency of exposure, we have had only two Air Accidents in many thousands of Destroyer landings and take-offs. Obviously then, the demands of the role are within the capabilities of today's CF pilot. I do think, however, that we must continually assess and monitor the difficulty of the variety or roles that are assigned to our aircrew. There is an increasing tendency to diversify the tasks of our equipment, and operators. In our efforts to meet these tasks we must guard against allowing the demands of the role to exceed our capabilities. It would also be wise to monitor exposure rates, as there is little doubt that frequent exposure to a demanding task over a period of time, will lead to a build up of tension, and accumulated fatigue. Either situation is potentially disastrous.

Was the pilot's training adequate? To this question, I would give an unqualified affirmative answer. In the past few years there has been great progress in measuring the effectiveness of our flying training programs. Course Training Standards give the Instructor levels of performance that his student must reach both in Training Command, and at the Operational Training Unit Level. At the Operational Level we have imposed Standards Checks, Proficiency Checks, and Upgrading Checks. At every level we have established the means of defining the standard of performance our aircrew must meet, methods to ensure that they reach that standard, and periodic tests to prevent backsliding. The one thing we can't measure is the pilot's confidence in his own ability. Ensuring that the pilot can perform the required manoeuvre, in the required manner, for the required number of times may well satisfy the examiner that he has reached the desired standard, but it will not necessarily ensure that the student has reached the standard he has mentally established for himself. The result could be feelings of inadequacy, and fear. Our young helicopter pilot is a case in point. He passed every test along the way, and his operational performance was such that he was selected for Crew Commander, yet throughout most of this period he had serious doubts about his ability. How we could ever solve this problem, I don't know. I would suggest, however, that a more personalized student/instructor relationship might be some help, particularly in identifying this lack of confidence in the first place. Perhaps psychological testing during the training period, and at regular intervals during the pilot's aviation career would be of some help. It certainly wouldn't hurt.

What about our selection processes? I have been assured by a senior medical officer that our initial aircrew selection procedures are very good. Basically, they ensure that our aircrew trainee is physically sound, has the mechanical skills required, is aviation motivated, and possesses the level of intellect required, without any gross psychological problems. That is a good start, but I strongly suspect that we are not as thorough in matching the strengths and weaknesses of the pilot with the role he will have to perform. How do we select who will go to high performance aircraft, who will end up in Transports, or Rotary Wing, or Long Range Patrol?

Have we progressed to the professional thoroughness in this decision process that marks initial selection? I suspect that we have not. A few years ago I flew with a young co-pilot who was chronically seasick, to the point where he required hospitalization. He had known of his problem before coming to Maritime Command and had objected to his posting. I understand he is now doing well in another Command. I know of a Navigator who has a deep fear of water, due to a near drowning in his childhood, yet he too was flying in Maritime Command. Surely we can do better than that. If we must ensure that a valid testing procedure is established to get the right aviator in the right job. Selection by academic and flying grades, or by element of service, or age, is just not good enough.

In the preceding paragraphs I have attempted to throw some light on some of the areas that could lead a pilot to make the decision to stop flying. In so doing, I have completely ignored the possibility that the decision could be the result of the stresses and strains of everyday life. There has been so much written on this aspect, that there really is nothing to add, except to admit that these factors may, in fact, have been the source of our young pilot's problems. In any case, it is now time to move on to the second part of our problem.

When the pilot does ask to stop flying, even temporarily, what do we do about it? Basically, there are only two courses of action, either we get rid of the pilot, or we get rid of his problems. I would submit that too often we take the first course and get rid of the pilot. The rationale appears to be that there is no room in an aircraft for anyone who has any qualms about what he is doing. That I will accept. The "let's get rid of him" school then concludes that having once admitted to fear or doubts this pilot can never be trusted again, and we must expel him from the fraternity. That I cannot accept. It is a rather Draconian measure, somewhat analgous to amputating your foot to cure an ingrown toenail. In one fell swoop we waste the hundreds of thousands of dollars it has cost us

to train this man, face the additional cost of training his replacement, cause him serious financial loss, and probably do irreparable harm to his self-respect, and his image in the aviation community. I know we all say "I sure admire old Jack for having the courage to quit flying", when what some of us really believe is that old Jack couldn't hack it so he is somehow inadequate and inferior, and we better get rid of him before he contaminates the rest of us. More seriously, the sight of old Jack being shunted off to aviation oblivion, will very likely result in other pilots hiding their problems rather than suffer the same fate.

Happily, the number of times that the pilot, who asks for help, gets the boot is very small. Obviously then, some people would rather try to get rid of the problem, than get rid of the pilot. I heartily endorse this approach, but I don't particularly care for the way it is normally done. I'm sure we can all recall occasions when a pilot has gone to his Commanding Officer with his flying problems, and shortly thereafter he has been quietly switched to Base Ops for a rest. In many cases this approach is successful, but I would suggest that in many cases it has not solved the problem, and we have ultimately lost the patient. What this approach does is to remove the nail that caused the infection, but then leave the infection to cure itself. Sometimes it does cure itself, but I feel that more often it does not. It is my opinion that we must face up to the fact that tension, fatigue, feelings of inadequacy, and inordinate fear, are medical problems, and must be treated as medical problems. When a pilot breaks an arm we don't fire him, or hide him in some dark corner to heal himself, we give him the best medical treatment available, and get him back into the air. Our approach to emotional problems should be the same. The administrative procedures for handling a pilot who requests to stop flying do include a medical examination, but only as an adjunct to the administrative process. In most cases, the medical examination is performed by the Flight Surgeon member of the Board of Inquiry. With all due respect to the training and knowledge of our flight surgeons, I submit that medical examination and treatment should precede and be separate from any administrative action, and should be carried out by accredited psychologists and psychiatrists. Only if treatment is not recommended or is not successful should we proceed to the Administrative action required to reclassify or release the patient. In this way we would cut our pilot wastage by salvaging the curable, and would demonstrate an approach to the problem that would encourage the troubled pilot to come forward.

In this rather lengthy narrative I have tried to say that when a pilot comes forward with a request to stop flying, we should conduct a search of our whole selection and training process, and of the operational role itself, firstly to ensure that we selected and trained the right peg for the right hole, and secondly to ensure that we haven't made the hole too big for the peg. Concurrently, we must recognize that we are faced with a medical problem, and attempt to cure it, rather than reclassifying or releasing the pilot. If we fail to do so, I can foresee the day when we will find that one man in a raft.

Toughts for the Swivel Chair Warrior

or Assume Your Position

THE DEATH knoll has just sounded, or so it seems. Your assignment for the next 3 years is to pilot papers. For 8 hours a day you can look forward to taxiing your swiveling wheel chair into and out of a modified sixdrawer casket. The whole idea is enough to make any tiger turn in his stripes! But it's really not all that bad. First, the job must be necessary or you can make a contribution by suggesting its elimination.

You're bound to make a contribution if you're half the tiger the Army thinks you are. One thing that will help you at your desk is to consider your body position. Psychologists have found a correlation between body positions and thought processes. These are basically three – standing, sitting and reclining.

A person is supposed to be more receptive to ideas and information in the sitting position. Consider, for example, a classroom or trustees' meeting. A person is supposed to have more creative ideas in the reclining position, a hard position to achieve at a desk, though some seem to manage. The last position is the one we are most concerned with for you as a decisionmaker. This is the standing position. The shrinks tell us decisions are easiest to make on your feet.

The evolution of this process can be seen as a correlation to evolution itself. Animals are the only class of living things that can relocate on the basis of their decisions. Even a number of quadrapeds stop and assume an upright position from which they can better decide which way to go. But only when man stood on his hind legs was this capability to relocate, or to implement decisions that we had rather be in some other place, fully exploited.

Good management encourages decisionmakers to get out on their feet for a few hours a week, realizing from experience that this position is beneficial to their work, regardless of the activity.

Lawyers who must make razor-sharp conclusions affecting lives and imprisionment plead their cases standing up. What would you think if your defense attorney sat down to argue the facts? People with problems go for long walks. Helmsmen who must keep their ships on course regardless of the wind make their decisions on their feet. Chariot drivers with slashing knives on their wheels stood at the reins. If cockpit sizes and restraint mechanisms ever permit, we may find aviators fly better if they are less folded over.

In summary, when you find yourself assigned to a desk job, remember the positions most conducive to your work. Stand up! Get off your swivel! Make better decisions!

U.S. Army Aviation Digest

Give a Guy a Challenge

by Maj William M. Douglas

My first assignment out of pilot training was back to the "Tweet" as an instructor pilot. At the time I wasn't sneaky, devious, and cold-hearted, so I had to get a waiver; but these necessary traits soon came along, and I could join the ranks of my peers. I remember with moist eyes the first time I raised the flaps on a student in the roundout, thereby winning a coke and the coveted, "Gee, sir, it looked just like yours except for the touchdown!"

Anyway, it wasn't long after I passed my last phase check and was certified as a full-fledged "Air Training Commando" that I learned most students can out stick-and-rudder most IP's in certain areas. A lot of people with 1600 hours in the "dog whistle" couldn't fly as good a "vertical S" or "chandelle" as one of their students.

There were several ways to handle this: One – you tried to fake out the student and told him that yours was still better, and changed his hypothesis about your ancestry to a definite conclusion; or two – you gave him a few verbal hints on how to make the specific maneuver still better, then you waited! For what? You waited until Mobile called that the runway was closed; waited until he was faced with something he hadn't seen or expected. Then, you reasserted your superiority.

Now, what is my long-winded introduction leading to? Look around! You'll see that more than half of the United States population is less than 28 years of age. This statistic repeats itself, in the rated portion of our Air Force, and explains why a lot of people in USAFE are not too far removed from Training Command. Sure, it's going to take more to confuse them than it does a UPT student. But, it can happen. The bad news is that now the individual may not have someone in the cockpit to help him.

What can be done? First, acknowledge that a guy who is through pilot training, OTU, and phase training is pretty unique. Give him all the help he needs, and make sure he is progressing. But, if he deserves trust, give him your trust. Let him be challenged!

POINTS TO REMEMBER

I know a former wing commander (now a major general) who walked into the command post on a "weather" day; and after ascertaining that the Wx was at and expected to stay at Cat I minimums with good alternates, had some rather pointed remarks for the Operations people. His point was this: If a man has been certified by competent authority to be able to perform to certain standards, then let him. His ancillary point: If we don't give a guy a challenge now and then, he will stagnate or retrogress, when what we want is for him to progress and become experienced. He did not mean to certify everyone to "200 and 1/2."

Another sore point is the tendency for a lot of old heads to talk down to a new guy and keep him in his "rightful place" until he "earns his spurs." I am a great believer in tradition; and as I said earlier, a man must show that he is deserving of his weather category or flight lead status, or whatever. But some of the old timers around the command remind me of a Tarzan movie. In short, the road to experience and broad expertise is founded on challenge and the necessary trust that allows this challenge.

There is another side to the coin. I know of one wing where virtually all newies are restricted to white ticket limits. To my mind, that's a good rule. I also know one headquarters type who says, "I have 3000#%?/!! hours, and I can bust 300 and one any #@S%// time." He is wrong.

You show me a newie type who is getting the bare minimums, and I'll show you someone who has no business anywhere near 300 and one. Every time I hear one of these guys on an ego trip trying to bull his way around a squadron, I think fondly of an examination for mental incompetence.

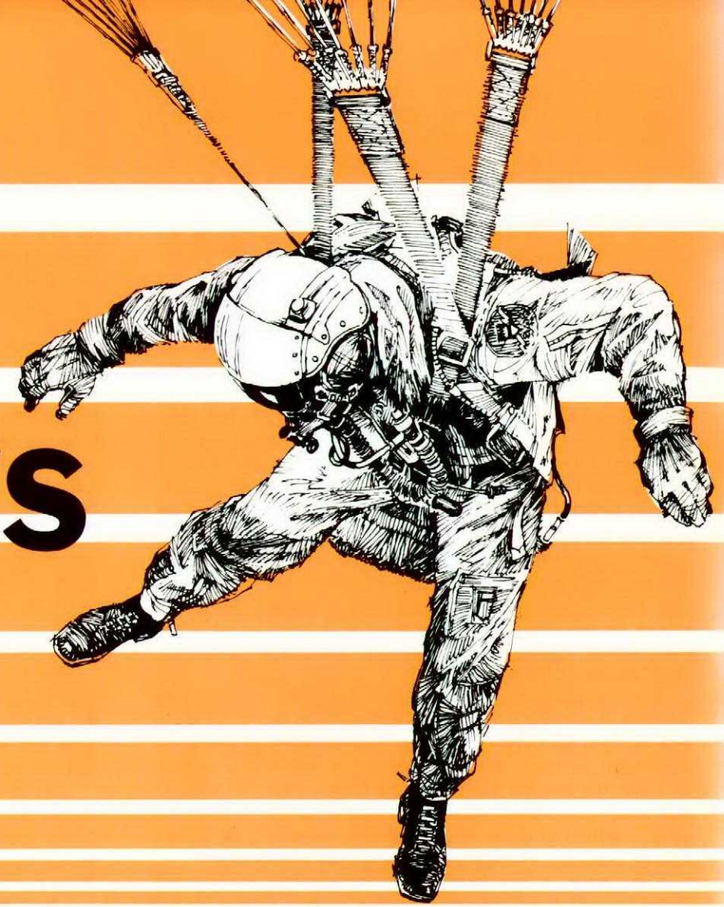
EXPERIENCE NOT EVERYTHING

To paraphrase Voltaire, the general statement that experience alone qualifies an individual for a specific task is inherently wrong (the headquarters type mentioned thinks Voltaire is an electric car). A guy who is filling his staff square is going to have to face up to the fact that he can't usually satisfy two masters. Currency in the U.E. aircraft may be essential to job performance; but except in rare instances, his ability to yank and bank is going to be somewhat degraded. If he confuses this with the flunking of a virility test, he has already flunked a maturity test.

What does all this mean? I believe that the evolution from neophyte to veteran is based on successfully meeting challenge. Take away the challenge, and you slow down or stop the evolution. But, to caveat, once a veteran, one is not always a proficient veteran. Our younger, less experience pilots are not going to develop unless they are given the maximum freedom consistent with established directives. It is also axiomatic that the older heads sometimes need to be returned to speed before their developed and tested skills can be safely used.

Air Scoop

ITS ALWAYS COLD UP THERE



If you fly supersonic at very high altitudes and haven't wondered what you would do if the bird became uninhabitable in a hurry, then you are a very trusting aviator, indeed! On the other hand, considerable pondering may not have provided you with any satisfactory solutions, and you may have taken refuge in the thought that it just can't happen.

The problem is that it can. I remember sweltering on a summer afternoon while watching the sky for the appearance of a parachute. Its wearer had ejected following a collision well above 35,000 feet, the chute had deployed almost immediately, and he descended for many minutes before we saw him silhouetted against the sky in his summer flight suit. And that hurt, because while we stood in 100-degree temperatures, it was 155 degrees colder where his parachute ride had begun, and the cold almost took his life.

Consider the plight of the crew flying a full-profile functional check flight in an F-4. They start at 38,000 or 40,000 feet to Mach 2. Then they zoom to 48,000 feet to check burner relight and pressurization. If the bird starts to fall apart as the Mach nears the peg, or if a bad fire develops, what do they do? They need to slow the aircraft down – if it's possible. They need to lose a great deal of altitude – if they can. Certainly they need to know what they will face if they punch out immediately, and should be able to weight their chances against staying with the bird despite its difficulties.

Don't Freeze to Death

We know that man needs heat and oxygen to survive, and that there is precious little of either above 30,000 feet. This is a good reason to dress warmly and wear flight gloves despite sweltering ground temperatures, and to preflight the emergency oxygen supply. There is also very little air pressure at high altitudes, and ejection above 45,000 to 50,000 feet without a pressure suit exposes the crew member to decompression, with the possibility that the blood will boil – with fatal results.

But assuming that the crew member clears the aircraft intact, he still faces the prospect of either a long free fall or an extended descent under a deployed chute. The latter is by far the more hazardous since the emergency oxygen supply lasts only 8 to 10 minutes (In the F-4 system the emergency oxygen stays with the seat, and is lost all together.), while parachute descent from 45,000 feet to 15,000 feet can take as much as 24 minutes. In addition, the period of time with chill factor temperatures below -25 degrees, even in summer at medium latitudes, would be at least 20 minutes – ample time for frostbite on exposed flesh, or death by freezing.

This should be reason enough to let the seat and chute do their thing automatically at lower altitudes. But waiting can be very suspenseful, especially while you are plummeting towards a surface obscured by darkness or clouds.

What Happens!

How long does it take to free fall from 40,000 to 15,000 feet? You can figure about 120 seconds. So, if you can remember to hack your watch before you pull the handle, and can read the luminous dial on the way down, you can put away your anxiety. Even without the watch, you have little chance of passing that preset barometric aneroid setting without knowing it. Its reliability is amazingly high, and odds of its working exceed those for arriving alive on a drive from your house to the neighborhood bratwurst stand.

Can you expect to be aware of what's happening after you pull the handle? Probably, but much depends on seat stability. Crew members have survived ejections in open seats from as high as 78,000 feet (in pressure suits). However, between 20,000 and 50,000 feet the probability of initial pitching or tumbling is quite high; and at 40,000 feet, the tumbling rate, which is double that at sea level, can produce negative and positive G-forces.

While you can expect only low seat-spinning rates to develop at lower altitudes due to the shorter equipment operating times, high-spin rates above 40,000 feet have produced serious disorientation, vision blurring, and nausea during past escapes. Flat spins may develop at high altitudes, causing the seat to rotate in a horizontal plane, with or without an attached drogue. Pendulum effect is also a possibility during extended descent periods, and may be aggravated by abnormal body movements.

Know the System

So, while a person ejecting at low altitude can expect a rapid onset and short duration of unstable movement, high-altitude ejections will produce more severe movements – particularly those of a disorienting nature.

Post-ejection seat movement should not be cause for alarm, providing the crew member has a working knowledge of the seat system. But attempting to influence seat stability by waving the arms during descent, or overriding automatic seat separation devices to go manual (expect where TO's recommend it), will probably worsen the situation.

Unless there are commanding reasons for other actions, the escape equipment should be given a chance to complete its normal operating sequence, and crew members should not allow gyrations to lead them into precipitate actions.

The Effects of Speed

Ejecting at 500 knots would be like stepping out into the granddaddy of all hurricanes, with winds four times greater and dynamic forces 16 times larger than a Florida headliner. A few Kansas tornadoes have lifted boxcars off the rails. At 500 knots, the same boxcar could pull five G's.

You would hardly believe that the human form could survive exposure to such forces. But that's not the case at all. Man has been thrown into airstreams of 500 knots or higher more than 100 times and stayed together amazingly well.

Generally, any airstream of 400 knots or better is capable of bruising the skin, and at higher speeds it can cut or tear. When speeds exceed 500 knots, the flailing of arms and legs can cause major injuries and fatalities. (Leg restraints and education on body position have reduced these injuries during recent years.) Above 600 knots the airstream pressure exeeds 1,200 pounds per square foot, and is capable of caving in the chest. Obviously, the crew of a stricken bird should do everything possible to slow it down to the 400-knot range before punching out.

This shouldn't pose a problem in most cases. Ejection experience has shown that when an emergency occurred at high speed or high altitude, there was usually time to slow the aircraft down appreciably, or descend to a lower altitude before ejecting. Should there not be sufficient time, ejection is the only alternative for survival, and the choice is already made. More than one person has gone out above 600 knots without serious injury.

There has not been a single ejection fatality in the USAF definitely attributable to parachute opening shock. The relatively few high-speed, high-altitude ejection fatalities that have been recorded were attributable to either severe flailing and/or ram air pressure which occurs before parachute opening. Even in these cases, extensive chute damage has been remarkably low.

What Do You Do!

The threshold value for lethal injury resulting from ram air pressure is approximately 8.5 psi, which is equivalent to an IAS of approximately 600 knots. Lethal injuries from flailing could occur at slightly slower speeds. In the event of an ejection at high speed, the forward velocity of the seat-man mass will decelerate from 25 to 50 percent during the first one or two seconds after separation from the aircraft. Thus, the chute will deploy near or within its structural limitations as well as within man's physiological tolerances.

So what do you do when faced with a dire emergency at high speed and high altitude? If possible, get below 500 knots and 40,000 feet before punching out. If that is not possible, get below 600 knots at altitudes up to 45,000 feet. Assuming that you have emergency oxygen, and the system will work as designed, altitude is less critical up to 45,000 or 50,000 feet than ram air pressure at speeds in excess of 550 to 600 knots IAS.

Above all, know your equipment. Take the bird down to reasonable escape parameters at the first indication of trouble, then allow your expert knowledge and the equipment get you safely out of a cold place.

The most startling finding is the number of extremely high speed (combat) ejections. Of those cases in which speed at time of ejection was known or reported, almost one-half occurred at speeds above 450 knots indicated. There were 18 between 450-499 knots indicated airspeed (KIAS) with four major injuries, one of which was attributed to windblast/flailing; 44 were initiated at between 500 and 599 KIAS. There were 20 major injuries in this group, with seven being related to windblast/flailing; finally, there were nine ejections in excess of 600 KIAS. Four of six major injuries in these cases were due to the effects of windblast. Thus, of 71 total ejections at speeds above 450 knots indicated, 30 crewmen received major injuries, and only 12 were directly attributable to high Q-forces. Noncombat experience has consistently shown a very limited exposure in the higher speed ranges. For example, in a recent three-year study of 325 noncombat ejections, only seven were initiated at speeds of 450 knots indicated, with one related injury. The combat experience quite dramatically illustrates the effectiveness of open ejection seats at high speed.

Aerospace Safety

Our thanks to Michael Grost, Martin-Baker Field Representative for some of the information in this article.

The Bends

by LCol R.W. Fassold

One tends to associate *the bends* with diving activities, but aircrew, as well as divers can be bent (besides at the bar). Recent physiological incidents and subsequent discussions with aircrew suggest a review of this topic is warranted. High altitude or aviator's bends is one form of *decompression sickness* and this can be a serious hazard for some of our CF flying fraternity.

Decompression sickness is a disturbance in the body resulting from the pressure differential between surrounding barometric pressure and that of the gases dissolved in the body tissues and fluids, including the blood. When the pressure surrounding the body is reduced sufficiently and rapid enough, body gases (principally nitrogen, oxygen, carbon dioxide and water vapour) come out of solution and form tiny bubbles. These bubbles, either directly, can reduce or stop the normal blood circulation and, therefore, the function of the area involved. Exactly what happens depends on a multitude of factors, including the size of the bubbles and where they lodge. Due to certain characteristics of bubbles and where they they are difficult to redissolve, unless the surrounding pressure is increased to at least the pressure that existed before they developed. Pressure differentials are rarely great enough to cause decompression sickness below an altitude of 25,000 feet, although cases have occurred as low as 18,000 feet. There is an important exception to this rule: following scuba diving (even to only 20 feet or so), decompression sickness can occur at altitudes as low as 5,000 feet e.g. in pressurized aircraft or driving up a mountain!

Four manifestations of decompression sickness are commonly described:

(1) bends

(2) chokes

(3) central nervous system symptoms

(4) skin disturbances

By far the most common manifestation of high altitude decompression sickness is *the bends*, a term used when bubble formation produces pain in the joints, bones or muscles. This pain is usually described as being steady, deep, dull, boring or aching and, in fact, is often similar to that suffered by many of us following a TABTD shot. The usual location is somewhere in the arms or legs, particularly the knees or shoulders. The pain often is mild, starts gradually and is more annoying and distracting than incapacitating. Sometimes, however, it may appear suddenly and be severe, causing a loss of normal function of the joint. What happens next with bends is very variable. If the altitude is maintained (or increased) the pain remains, gets worse or, rarely, eases or goes away completely. However, this easing or disappearance of the symptoms does not indicate disappearance of the bubbles, nor reduce the risk of recurrence of the pain or the later development of a more serious form of decompression sickness. If one descends immediately, however, (causing compression of the bubbles), bends symptoms will usually disappear during or shortly after the descent. Occasionally, a residual weakness or soreness may persist for a day or so (like a mild sprain or bruise). The bends, in itself, is not an immediately hazardous condition, *but* it indicates you are suffering from decompression sickness, are set up for something more serious, and should get to a lower altitude as soon as possible.

The term *chokes* is used to describe the second most common manifestation of decompression sickness–a condition which can result if bubbles lodge in the small blood vessels of the lungs. The symptoms are a tightness or discomfort deep in the centre of the chest, a dry cough and difficulty in breathing, with a sense of suffocation and apprehension. This can be an extremely dangerous condition because not only can hypoxia develop quickly, but the respiratory and cardiovascular impairment can lead to complete collapse. If you suffer the chokes, an immediate emergency descent and landing for medical attention is essential.

The other two less common manifestations of high altitude decompression sickness, *central nervous system symptoms* and *skin disturbances,* are usually, (but not necessarily), preceded by the bends or chokes and are serious conditions. It should be fairly obvious that if bubbles reach the central nervous system (brain and spinal cord), the results may be pretty weird and frightening–if not fatal. Fortunately, this rarely occurs in high altitude decompression sickness but when it does, the list of possible effects is long and complicated. These include visual defects, vertigo or dizziness, confusion, loss of coordination, numbness or tingling of the extremities, paralysis and unconsciousness. The picture is complicated by many of these symptoms being similar to those found with hypoxia and / or hyperventilation, and they usually are temporary and disappear on descent. Unfortunately, there is a risk of the condition progressing to unconsciousness before a controlled descent can be initiated.

Skin disturbances can be deceptively innocent in that they may indicate wide dissemination of the bubbles and the imminent risk of something more dangerous happening. The symptoms are usually an itchy, prickling and/or painful rash which begins suddenly and sometimes is accompanied by hot or cold flashes. The commonest location is the skin of the abdomen, chest or thighs. (There can be a rash or mottling of the skin which is either not uncomfortable, or only tender to touch).

We must note a final, uncommon, but most dangerous outcome of decompression sickness–a complete collapse. This is usually preceded by one of the conditions we have described, but the catch is, in some of these cases, it can occur at ground level many hours after all symptoms of the initial condition have disappeared. It has been known to happen suddenly at altitude *without any warning,* but this is extremely rare.

What determines whether or not an individual will suffer decompression sickness? Well, of course, the altitude is the most important single factor. Although there is some individual variation in susceptibility, everyone will succumb if

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KNOW YOUR POSITION

by Maj Charles L. Pocock Jr.
Directorate of Aerospace Safety

My first day under the hood of a T-6 wasn't particularly satisfying. I remember very little about the experience except that afterwards I felt very inadequate. During the debriefing, however, my instructor told me something I will never forget. "Instrument flying is a lot like getting along in the Air Force and life. Attitude and position are everything. Your attitude must be positive and under control and you must be absolutely certain of your position before moving ahead to another."

Aircraft instrument developments over the past 20 years have made attitude control accidents very rare. Gyros don't tumble now, stand-by gauges are installed, electrical systems have become redundant, failure warning systems have been added, and so on, and so on. Position accidents, on the other hand, continue to occur with agonizing regularity. Aircraft position can be thought of in four simultaneous relationships to a point over the ground: Longitudinal, lateral, vertical and time. The use of all available navigation aids to accurately determine the aircraft's position is essential to long life and a successful career.

The most humble person I ever heard of was the airline pilot who mistakenly landed his 707 on a 3500 foot private strip near Columbus, Ohio. After the passengers had been transported to their destination by bus, he personally apologized to each for the inconvenience he had caused them. Humble but courageous.

I was talking to the fire chief at Chu Lai shortly after a contract carrier captain landed his DC-8 on the 3000 foot strip at Marble Mountain instead of the 10,000 foot runway at Da Nang. The chief said: "That man was a pretty poor navigator, but one hell of a pilot". Both of these pilots were lucky to be alive, but, being "a hell of a pilot" is little consolation if you can't position the aircraft at the right runway.

There are two C-141 crews who are lucky to be alive, because they knew their position relative to an airport and were able to position their disabled aircraft over the runway before it touched down. The first was on a formation training mission when the thrust reversers deployed on three engines. All efforts to close them were futile. With one engine shut down, two in reverse idle, and one at TRT plus, the pilot was able to maintain just better than stall speed with a 6000 foot per minute rate of descent. As the aircraft came out of the 10,000 foot overcast, the pilot put the gear down and flaps at APPROACH. A minute and one-half later, with a tremendous flare, the aircraft was safely on the ground at Baker, Oregon, Municipal Airport.

In the other case, the aircraft was on downwind for a VFR approach to Addis Ababa IAP when a hard over aileron condition materialized. The pilots fought the roll with aileron and rudder. The airplane completed 180 degrees of turn and was sliding out of the sky with nearly 90 degrees of bank. As a last resort the pilot firewalled the low engines and idled the high engines. The airplane grudgingly responded and as it came to a wings level position, touched down 3000 feet down the runway. The pilot deployed the spoilers and jumped on the brakes, completing the landing without even catching a wing tip. This was a fortuitous coincidence of aircraft and runway positioning that would befuddle the odds makers.

A bet no odds maker would touch is one on the pilot who doesn't respect MEAs, MOCAs, minimum sector altitudes. Keep in mind that in a non-radar environment the pilot is solely responsible for terrain avoidance. Many of us have flown and trained in a radar environment so long that we mistakenly use the same procedures when suddenly presented with a non-radar situation. In a non-radar environment there are only three times a pilot may descend below published MEA, MOCA, or minimum sector altitudes, regardless of the clearance received: (1) When you are VMC and can remain VMC until landing, (2) after station passage and established on the published outbound course, (3) when established in a published holding pattern. Pilots who didn't follow these three rules have scattered airplanes over the landscape of the entire world.

A DC-8 pilot received a clearance, "cleared for an approach", and started descending to the initial approach altitude. The IAFA was several thousand feet below the MEA and the minimum sector altitude, and the aircraft was several miles out. The last item on the cockpit voice recorder was the co-pilot stating, "according to the radar altimeter we're 400 feet above something".

A heavy jet transport was descending for approach. At 24,000 feet and about 4½ minutes out he received a clearance to descend to 18,000 feet, which was the initial approach fix altitude. Two and a half minutes later the aircraft crashed into a 20,000 foot mountain at the 18,600 foot level. The minimum sector altitude was 24,100 feet and the MOCA was 24,000 feet. Unless you are on radar vectors, a clearance to descend does not mean you will be clear of terrain.

"Check your watch or make seven-hundred-twenty degree turn to right" was my clearance when I incorrectly reported my position and time at MIHO radio. I had glanced at the clock and the minute hand was clearly pointing at four, but I had a mental short circuit and erroneously reported MIHO at "Two Five". The alert FSS operator immediately challenged the 5 minute error to maintain airway separation. Now, I try to "Check my watch" closer.

The crew of a C-124 obviously didn't "Checkee their watch" when they impacted the jungle, wings level, 22 miles and more than 5 minutes past the missed approach point. They were apparently concentrating so hard on tracking outbound from the NDB and looking outside for the runway in the night fog that they lost track of the missed approach point.

ADIZ and ATC violations for being off track are unpleasant enough; but a track violation by mother earth can ruin your whole life. From the Spad to the F-111, pilots have tried to argue with mountains. None have won and few have survived to claim second best. Position may not be everything but it sure beats being out of position.

Aerospace Safety

GOOD SHOW

CPL C.C. COX

While carrying out a turnaround inspection on a CF104 Cpl Cox noticed what appeared to be a crack located on the nose strut cylinder at the attachment point for the drag strut. Closer examination convinced him that it was a crack so he informed his supervisor. NDT personnel were called in and they positively confirmed the crack. Had this aircraft been flown with this crack it is most probable that the gear would have collapsed on take-off or landing causing serious damage to the aircraft or injury to the pilot.

The following day while doing a turnaround on another aircraft he again found what he thought to be a crack on the main landing gear. This time NDT personnel determined that it was not a crack but a scratch or casting flaw.

These two instances of very close and meticulous inspection by Cpl Cox are indicative of the professional manner in which he carries out his work.

CPL B.F. BUOTE

While carrying out a daily inspection on a J79 engine installed in CF104 aircraft number 714, Cpl Buote noticed a small damp spot on the aircraft main fuel line where it is welded to another line. This weld is in a difficult place to see, which makes the finding of this damp spot the result of a thorough inspection. In order to determine if it was a major unserviceability Cpl Buote applied power to the aircraft and operated the fuel booster pumps then returned to investigate the damp spot and found a steady flow of fuel from this area. Closer examination of the subject line revealed that it was cracked at the weld. Had this fuel leak not been found, it could have developed into a serious fire hazard.

The thorough manner in which Cpl Buote investigated this Flight Safety Hazard is indicative of the professional approach which he continually exhibits in carrying out his various duties and assignments.

CPL J.A.P. PARENT

During an exercise Cpl Parent was detailed to assist the Voodoo Servicing Section. In the course of a "B" inspection he observed the second row of compressor blades of the right engine to be damaged. As this was not his trade and the damage difficult to determine in the second compressor stage, he immediately advised an AE Tech who confirmed his findings.

No doubt Cpl Parent's alertness and extra effort in the performance of his duties prevented an airborne emergency and saved costly repairs of the engine.

Cpl W.C. Harker

MCpl H.J. Clark

Cpl B.F. Buote

WO S.E. Johnson

Cpl C.C. Cox

Cpl J.A.P. Parent

CPL W.C. HARKER

While returning to the servicing blister after completing "A" checks on the flight line, Cpl Harker discovered a spring lying on the tarmac. The spring was identified as part of the Tutor aircraft nosewheel steering mechanism that prevents the nosewheel from engaging while using rudder.

All aircraft on the flight line were visually checked serviceable and airborne aircraft were alerted of a possible steering malfunction on landing.

While no abnormalities resulted when the aircraft with the problem landed, the alertness and initiative displayed by Cpl Harker prevented a possible accident.

WO S.E. JOHNSON

"WO Johnson was a member of the fire fighting team which responded to a 'hot-brakes' situation on a CF101 Voodoo. During the cooling off period, WO Johnson noticed a scrape on the right oleo leg and pointed it out to the Aircraft Servicing Officer. Investigation revealed that the oleo retraction linkage bolt had been installed improperly causing the nut and the end of the bolt to rub on the oleo leg. If the situation had gone undetected it could have resulted in a serious undercarriage problem. WO Johnson is to be commended for his alertness and sense of responsibility."

MCPL H.J. CLARK

While carrying out an "A" check in the CH136 Kiowa helicopter MCpl Clark discovered two small cracks in the skid tube saddle assemblies. The cracks were located on the inside lower portion of the assembly and were covered by a light coating of mud. He took extra time and wiped off this area finding the cracks.

The extra attention to detail by MCpl Clark during a routine check undoubtably saved the aircraft from further damage.

CPL E. MELVILLE

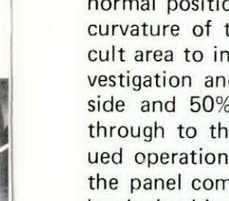
During inspection of the engine intake area of a CC130 Hercules during a primary inspection, Cpl Melville noticed a portion of the wire hinge that secures the torquemeter shroud panel protruding from its normal position. The relatively small area and upward curvature of the intake makes it an extremely difficult area to inspect, but Cpl Melville expanded his investigation and discovered that 95% of the left-hand side and 50% of the right side hinges were worn through to the point of being noneffective. Continued operations of the engine would have resulted in the panel coming loose and possible ingestion of the hard-wire hinge with catastrophic destruction of the engine.

His awareness and thoroughness was instrumental in averting a possible in-flight engine failure and brought to light an unsuspected trouble spot.

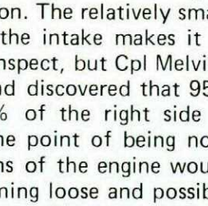
CAPT R.G. KIGHTLEY

While conducting an ASW mission twenty miles from the ship, the number two engine failed. Check list procedures were followed and as the aircraft closed the ship, stores were jettisoned, fuel was dumped and emergency gear was made ready in the event the aircraft had to ditch. The ship reported 60 knots of relative wind with slight deck motion. A power check revealed that a minimum of 37 Kts could be maintained with 100% torque on the number one engine. Because of the small power reserve, Capt Kightley elected to execute a no hover free deck landing with the beartrap removed from the flight deck. Capt Kightley flew a picture perfect single engine approach to touchdown—a feat that has only been done once before in the history of helicopter/destroyer operations.

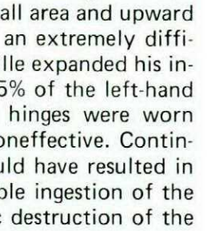
Capt Kightley displayed a high degree of professionalism and skill in returning a valuable aircraft from a very hazardous situation.



Cpl E. Melville



Cpl B.S. Campbell



Pte E. DeClara

Cpl
J.M.J. Lessard

MCpl
J.L. McCormack

Capt
R.G. Kightley

CPL B.S. CAMPBELL

Cpl Campbell was assigned line duties and had just completed a "B" check on a Tutor. While waiting for the next aircraft to be parked, he went beyond the "B" check requirements and did a thorough check of the aircraft. In doing so, structural abnormality was found in the tail pipe. Further investigation revealed a four inch crack in one of the tail pipe flanges.

Cpl Campbell's keen observation and his diligence in going beyond the requirements of the check, averted a possible aft section fire.

CPL J.M.J. LESSARD

During towing operations of a CF101 Cpl Lessard heard an unusual squeaky noise coming from the aircraft. He had the towing stopped and tried to isolate the area of the unusual noise. After repeated starts and stops the noise was located in the nose wheel area. The nose wheel was removed and it was discovered that the bearings were dry and on the point of seizing.

It is this form of conscientiousness and extra effort that prevents accidents and saves costly repairs.

PTE E. DECLARA

While performing a routine start on a visiting CF133 aircraft Pte DeClara noticed that the solo pilot had neglected to remove the rear canopy safety pin before strapping in. He removed the pin and gave it to the pilot. Were it not for Pte DeClara's alert removal of the pin, efforts by the pilot to eject the canopy during an in-flight emergency would have failed.

Pte DeClara's alert attention to duty and knowledge of visiting transient aircraft could have prevented serious injury or perhaps loss of a pilot had a bailout situation occurred.

MCPL J.L. MCCORMACK

MCpl McCormack, an airframe technician, was conducting a periodic inspection of the Labrador helicopter rescue boom. During this inspection which was being done with a tilted mirror and a flashlight through a small hole in the aircraft flooring, he found what looked like a scratch on the underside of the pivot tube support assembly.

Further inspection with the aircraft floor boards removed revealed one crack 7½ inches long and another one inch long in a radial direction around the pivot support. Nondestructive testing confirmed the cracks with an eddy current test. Left undetected, these cracks would have eventually caused the rescue boom to fracture, very likely causing an in-flight emergency with serious injury or death to a para-rescue specialist.

MCpl McCormack is to be commended for his alertness and thoroughness of inspection in preventing a potentially serious incident. His action exemplifies the contributions made to flight safety by conscientious technicians.

CAPT D.J. LEONARD

Capt Leonard was conducting a low level training mission in a CF104 aircraft when the "Oil Level Low" light illuminated on the Annunciator Panel. He immediately retarded the throttle to 88% to ensure maximum engine life, activated the Emergency Nozzle Closure System, and selected the Oil Level Switch to low. The "Oil Level Low" light remained on which indicated that there would be a severe loss of engine oil. Capt Leonard quickly dialed in Munich Radar on the UHF and advised them of his intention to carry out an immediate landing at Erding, the nearest military airport. After being advised that Erding was closed he requested vectors for a straight-in precautionary approach at Munich. By this time the oil pressure was fluctuating 10 psi and he could smell fumes in the cockpit.

Capt Leonard conducted a successful approach at Munich using 88% power. After touchdown the oil pressure was observed at zero. The entire emergency had lasted approximately three minutes from first indication to successful landing.

Capt Leonard's immediate response to this critical emergency prevented the loss of a valuable operational resource. He is commended for his high standard of professionalism.

CAPT V.L. OLSEN
MCPL R.H. HARTWELL

On Sunday, 12 October 1975, Moose Jaw ATC was alerted by Regina Control that the pilot of a Stinson on a VFR flight to Regina was trapped above an overcast cloud layer 2,000 feet thick based at 1500 feet AGL. The pilot estimated that he would arrive at Moose Jaw with a twenty minute fuel reserve, but was unsure whether he could reach Regina. Since the pilot has only flown in cloud once, and that was to get on top, he was very apprehensive towards letting down. The aircraft was not equipped to navigate and communicate at the same time, and this resulted in lengthy communication gaps. Due to this communication problem the team of Cap Olsen and MCpl Hartwell had a difficult emergency to handle. Initial radar contact was made thirty-three miles to the west by MCpl Hartwell, but the aircraft was in the navigation mode and no positive identification could be made. Verbal communication with the pilot was difficult which led to the pilot not being able to understand the instructions that Capt Olsen was attempting to give him. Eventually Capt Olsen achieved visual identification by vectoring the Snowbird T-33 to the observed target.

The aircraft was now switched to radar frequency in preparation for descent. MCpl Hartwell assured the distressed pilot that his descent through cloud would be gradual with no turns. The aircraft penetrated cloud without incident and soon after the pilot reported visual contact with the runway lights.

The team of Capt Olsen and MCpl Hartwell handled this potential air accident in a highly professional manner.

MCpl B.J. Short

Capt D.J. Leonard

Capt V.L. Olsen
MCpl R.H. Hartwell

Cpl G.J. Aube

CPL G.J. AUBE

While Cpl Aube was working on the wing of one aircraft he noticed the vent mast of the adjacent CF101 to be slightly off of it's proper position. A closer investigation revealed that 3 of the 4 attachment points of the vent mast were broken and on physically checking other aircraft in the hangar he found several others to be loose. Based on his observation and discoveries a special inspection was initiated and all Voodoos were inspected. Loss of the vent mast in flight would result in the collapsing of the external fuel tanks.

There is no doubt that Cpl Aube's alertness and extra effort in the performance of his duties prevented an airborne emergency and loss of valuable resources.

MCPL B.J. SHORT

During a primary inspection of an Argus engine MCpl Short discovered a crack in one of the engine mounting ring secondary support tubes. The location of the crack was such that only a very oblique viewing angle was possible and the cracked area was very difficult to illuminate. Also an accessory clamp was positioned on the tube immediately adjacent to the crack such that visual detection of the crack was extremely difficult even when its location was known.

Although not fully qualified on all aspects of Argus operation, and still under OJT, MCpl Short demonstrated a very professional approach to his task, and his attention to detail in finding the crack possibly prevented a very serious in-flight failure.

CPL S. ROBERTS

While inspecting the starboard aileron during a primary inspection on CP107 Argus aircraft 10713, Cpl Roberts found a little play in the # 1 aileron rudder interconnect tab. Further investigation of the tab push pull rod indicated some play in the tab end and the connecting bolt. Not being satisfied that this was the fault, Cpl Roberts removed the access panels to the aileron gear box and found the push pull rod from the gear box to the tab bellcrank had loose rivets and elongated rivet holes in the eye end of the push rod. Cpl Roberts reported the situation to his superiors and proceeded to rectify the problem. Cpl Roberts displayed an exceptional degree of alertness and skill in what seemed to be insignificant play in the tab control system.

While inspecting the flaps on Argus 10742 during a primary inspection, Cpl Roberts noticed corrosion forming on the attachment end of the flap asymmetric switch cable. Further investigation by Cpl Roberts revealed that corrosion had caused seizure of the end of the attachment cable to the flap attachment bolt, preventing it from rotating during flap movement which caused the end to break at the turnbuckle . The lockwire used to safety the attachment to the turnbuckle barrel was all that held the attachment end to the operating cable. Had this condition gone undetected, it most certainly would have resulted in a serious air incident.

CPL J.R. BRIAND

While carrying out a daily inspection check on aircraft 114156, Cpl Braind noticed what appeared to be a ruptured gasket on the left side of the engine combustion chamber inspection panel.

Bearing in mind that it would take a keen eye to observe such a problem with the particular area being so confined, further investigation with his flashlight revealed that the gasket was indeed ruptured.

Cpl Briand immediately entered a major unserviceability against the aircraft which consequently resulted in the removal and replacement of the gasket. Had this aircraft been allowed to fly an airframe overheat surely would have been indicated thus aborting a mission and possibly affecting the safety of the crew.

Capt J.C. Parker

Cpl L.E. Christianson

Cpl J.R. Briand

Cpl J.G. Richarz

Cpl S. Roberts

CAPT J.C. PARKER

Capt Parker was the instructor pilot in a Tracker aircraft returning from a navigation training exercise. Approximately twenty miles from Base both pilots heard a loud explosion from the port engine area. The engine instruments showed that the oil pressure had immediately dropped to zero and the port tacometer needle was indicating zero RPM; however, the propeller was rotating. Capt Parker immediately feathered the port engine, but the propeller refused to feather although the ammeter readings confirmed operation of the feather pump. An emergency was declared and shortly thereafter, with the port prop still windmilling and the aircraft undergoing moderate vibrations from the dead engine, Capt Parker carried out a successful single engine landing at Shearwater. Subsequent investigation revealed that the engine had undergone a catastrophic failure that had caused almost immediate seizure while the prop continued to rotate, shearing bolts in the engine and on the propeller mounting, possibly even damaging the engine mounts themselves.

Faced with an emergency situation not covered in either his AOI or emergency checklist, Capt Parker reacted cooly and skillfully, and as a result was able to recover the aircraft without further damage. The high standard of professionalism he displayed is a fine example to his student and fellow Tracker pilots.

CPL J.G. RICHARZ

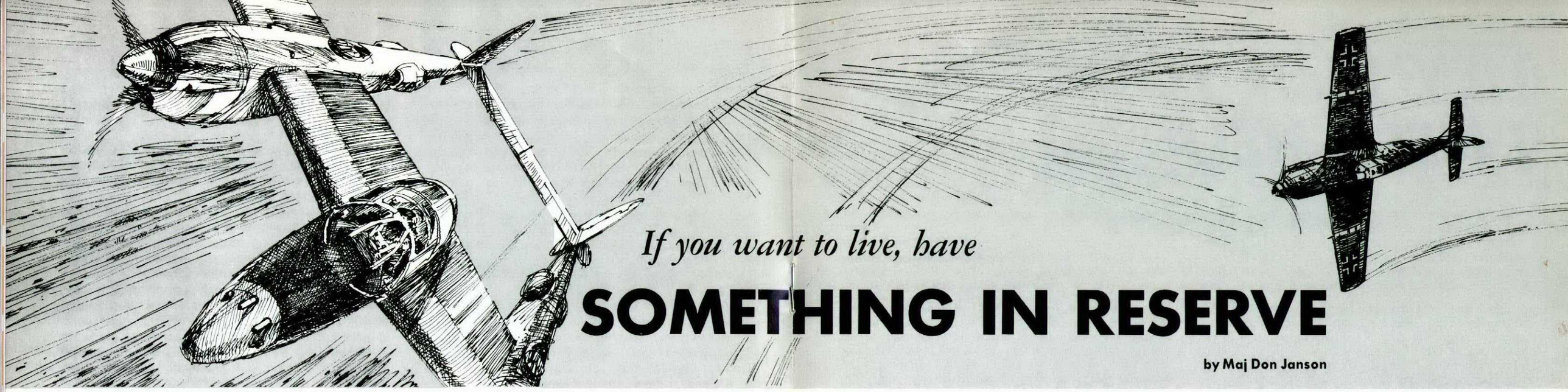
On start up of a recent Otter pilot trainer, Cpl J.G. Richarz, stopped the engine start up procedure just prior to the pilot engaging the starter. Cpl Richarz had noticed a small amount of fuel emitting from the bottom of the engine cowling. The pilot was informed, and an engine tech was summoned to investigate. Fuel was discovered all over the top of the engine. A split primer line was found to be the cause. If the engine had been started, a serious fire could have occured.

Cpl Richarz careful attention and timely precautionary action averted a potentially dangerous fire situation.

CPL L.E. CHRISTIANSON

While carrying out a Daily Inspection on a Tutor aircraft, Cpl Christianson noticed what he thought to be a hairline crack on the first weld from the forward clamp of the tailpipe. During further investigation by Aircraft Snag Section, the thermal blanket was removed and a crack approximately six inches in length was revealed.

Cpl Christianson's keen observation and professional approach to his job averted further aircraft damage and a possible in flight incident.



If you want to live, have

SOMETHING IN RESERVE

by Maj Don Janson

He was an old fighter pilot who settled in the neighborhood, and he had made the Ace category a couple of times over. The other kids and I would crowd around when we could to hear his stories of wild combat over the skies of Europe; and I suppose it's more than coincidence that several of us latter joined his club and vaulted over the clouds in fighters of our own.

And if his stories inspired our careers, they also formed a foundation for our survival. Consider, for example, the story he told about his first encounter.

"What I didn't know about flying," he began, "was an ocean of darkness on which my 230 flying hours bobbed like a cork. But I knew that I didn't know much, and literally camped within hearing distance of the few old heads around.

"Anyway, four of us took off over the sands of North Africa, and promptly ran into a couple of new ME-109's. Totally obedient to instructions, I latched my P-38 to my leader's wing and hung on grimly as a 109's tracers reached out past me and set him ablaze. Then I broke away hard, and found myself in a tight spiral, looking across a 300-yard void at a 109 trying to tighten in and close on me. We were near the deck in no time; and with full power and all the back stick the birds would take, the two of us still stood on wingtips on opposite sides of the circle, neither able to close, and each knowing that to break the ring would bring quick death.

"I don't know how many times we went round. I do know that it became unbearably hot inside the greenhouse canopy, that I grew soaking wet with fear and perspiration, and that my right arm ached from pulling on the stick.

WHAT *WAS* IT?

"And all the time, my mind was searching back through classes I had attended; the lectures I had heard on aerodynamics, lift, and drag; and manuals I had read. I was searching for something extra – for that additional little scrap of knowledge or experience which was the reason for hours of reading, for hundreds of sometimes laughed at questions, and many evenings listening to stories and exploits that were mostly just hot air. Out of that mass of words and ideas there had to be one speck of information that could help me now.

"And then it came, sounding clear and joyous above the noise of glasses and laughter in a London club.

"I'd bet 'im five pounds 'e couldn't get away from me," said the red-faced Australian at the table next to mine. "But once I fastened m'self on 'is tail, 'e suddenly starts to turn in tighter. When I try to follow 'im, my bloomin' Spitfire snaps. Back on the turf I learn the devil 'as cranked a little flaps in when the speed's got down a bit."

"With my eyes glued across the circle, and still holding all the turn that I could get, I reached my left hand down beside the seat and set the flaps lever to the first notch. Nothing seemed to happen at first. But ever so slowly my props began to eat away my half of the circle. Then I could see the nose of the 109 pull in slightly, see the bird oscillate a little, then settle back to the same arc.

"It took at least three full turns to bring him through the top of my windscreen, plus another turn and a half to bring him down to the sights reticle. And during that last little time, I couldn't understand why he just held that turn while I lined him up inch by inch. But he was still turning, with the top of the canopy glinting and his face turned back towards me over his shoulder when the bullets exploded in a trail across him.

"Flying back, when my arm quit twitching and the blood quit throbbing on the side of my neck, I understood what had happened to the other guy. He had exhausted all his knowledge. He had never learned a law that became almost sacred to me – that you've gotta have something in reserve!"

MY TURN

Many times in the ensuing years I had occasion to remember that advice. And many times it snatched me away from tragedy. Take the night the turbine blew.

It was late, and very cold. I told the crew chief to check the flight surgeon's parachute, and strap him into the back seat of the T-33 while I did a fast walk-around inspection. Then I started to climb in, but thought better of it, and decided to personally check my passenger. That little bit of attention would make him feel easier during his first ride in a jet aircraft. And oddly enough, I discovered that the leg straps of his parachute harness had not been connected!

We took off and climbed through a jet black night to 36,000 feet, and had just settled for a long night's drive when an explosion shook the bird, and the sky around us brightened. Looking back, we could both see jets of fire spraying into the windstream, and I knew that the turbine wheel had thrown some buckets out the side.

I cut the throttle and master fuel switch, and put the nose down sharply until the flame died out; then shallowed to a long, dark glide. There was plenty of time. We had 20,000 feet to lose, and I used it to calm the panic in the passenger, and to plan the altitude at which we would leave the bird.

On a winter night like that, there was no desire to punch out high and dangle freezing for a long descent. The book said 1,500 feet would be about right. Then I remembered the fighter ace, and seemed to hear again his words: *"You've always got to have something in reserve!"* So I jacked up our exit altitude by another 2,000 feet.

The passenger was thoroughly rebriefed by the time we approached the chosen altitude; our dark visors were down, and I had a flashlight trained on the instruments. As I pulled the jettison lever and felt the canopy go, I had high hopes of a perfect ejection. Through the rush of noise over the intercom I told the passenger to place his head against the headrest, put his feet into position, and squeeze the ejection trigger on the armrest. Then I waited for the blast. Five seconds passed, and he was still there!

"You have to do it. Squeeze it now!" I repeated.

His very frightened voice caught me by surprise.

"I have! Nothing happened!"

"Squeeze it again!"

blast from the back seat. Then his voice rose towards panic.

"I've tried and tried. It won't work!"

"You're sure you are squeezing the ejection trigger under the handle on the right arm rest?"

His answer was a high-pitched *"Yes!"*

SOMETHING MORE

My mind had gone far beyond the conversation. I couldn't punch out without him, and there was no way he could survive an attempt to climb out over the side and parachute manually. Yet, to ride the bird to the ground in total darkness was a forbidding prospect. Then I searched for something extra, and as we ate up the altitude I had thrown in for reserve, I found it.

It came from a conversation I had with a flight surgeon during the noon break at a pressurization chamber.

"Under conditions of stress," he had said, "a person who is not trained to handle a bad situation can become so tense that his muscles almost freeze up, and he can't perform simple actions."

In the dull beam from my flashlight the altimeter unwound dangerously, but I managed to speak with calm forcefulness:

"Listen carefully! Do exactly what I tell you. Put your head against the headrest. Put your feet in position! Put your right hand around the ejection trigger. This time, don't squeeze! Instead, jerk it toward you heavily. Now!

There came a sudden explosion, and then the intercom was silent. My passenger was gone. Five seconds later I squeezed the trigger on my ejection seat, and was blasted clear of the aircraft.

There was no time to read the altimeter just before I left the aircraft, and so I can't calculate the closeness of our escape. But I do know this: after the chute opened it was a very short descent to the farmyard where I landed – much too short to have compensated for the delay in our ejection had I not planned that extra reserve.

And I also know that the altitude would have made little difference to the passenger had I not taken the extra time and double-checked his straps before starting the engine. With two undone, he would have fallen to his death.

As it was, his parachute draped across a power line and gently stopped him just a foot above a concrete highway. He stepped to the surface, caught a ride with an attractive coed, and had the best steak of the house, free, at the restaurant where he waited after calling the base.

But I failed to tell him that he owed the ride, and the steak, to an old fighter ace who taught me that the unexpected can pile upon the unexpected – and that when it does, you can *die* unless you have something in reserve. ***Air Scoop***

HEY BLUE FOUR, I NEED HELP

by Maj Charles Barr
Directorate of Aerospace Safety

I don't know who first said it, perhaps we would have to go all the way back to Francois Pilatre de Rozier to get to the source of origin. But there is a certain ring of truth to the age-old saying that flying is hours and hours of boredom intermingled with moments of stark terror.

Fortunately, our training and our aircraft systems give us, in most serious in-flight emergencies, the tools with which to cope and, more often than not, we are able to return our air vehicles to their intended point of landing with no more than another good bar story to be told. There is, of course, one very insidious malfunction that, given the right time and circumstance, could cause that moment of terror and might rather abruptly terminate your existence – said failure being that unrecognized attitude indicator/attitude director indicator failure.

Historically, Air Force aircraft average one hundred ADI failures per year. Fortunately, most failures are successfully dealt with in flight and therefore only remain incidents. However, over the last six and one-half years we have had eleven accidents in which ADI failure was indentified as either causal or contributory.

There is nothing unique about the ADI failure, in that it can and does occur in all types of aircraft. What is unique is the total inability by some of our pilots to handle this emergency in flight. Fortunately the record shows that in the majority of cases this is not true.

There are some good stories around about people who challenged the system and won. I personally know of a couple that are not reflected anywhere within Air Force records but still remain true. Both stories relate to bomber class aircraft and both by coincidence involved the island of Guam. For the first story we have to go back a few years, to the days when the B-47s were reflexing to this island.

The flight involved a night take-off for a redeploy mission to the states. Takeoff roll was uneventful through lift-off at which time the instructor pilot recognized he had experienced an attitude indicator failure. In his own words, he knew it was no sweat and that he could handle it. In fact he did for a minute or two, on partial panel. He was actually feeling pretty good for this brief time period, knowing he had everything under control. Suddenly, from the rear cockpit, the copilot asked, in a typical copilot's voice: "Hey boss, what the hell is going on."

The feeling of euphoria was broken, the instructor pilot realized he was in trouble and he informed the copilot that he had lost his attitude indicator and transferred control of the aircraft to him. Circumstances certainly played a significant role in this story. A night takeoff, attitude indicator loss detected at or near lift-off, the ability to detect the failure, adequate schooling in partial panel flying, an observant copilot who was willing to speak when he realized things were going from bad to worse quickly and, finally, the realization, by the instructor, that he was in trouble and needed help.

The other story occurred some years later, during the height of the Vietnam conflict and involves two close personal friends of mine who, I hope, will forgive my relating this story here. The mission was a bomber deployment from the ZI to Guam. Shortly after coast out the first ADI failed. In consideration of the forecast weather and daylight flying hours, the pilot, again an instructor, elected to continue the mission. Subsequently, with Hawaii under his wing tip, the second and last ADI failed.

Here's the situation: both ADIs inoperative, destination weather forecast good, day visual meteorological conditions enroute and an operative auto pilot. The decision: continue to destination. Judgment – not good, for two reason: (1) everyone can use a day or two in Hawaii, and (2) the unknown 3000 miles ahead.

Lady Luck was riding with this crew this day and, in fact, the trans-Pacific crossing was routine. However, at Guam – you guessed it – the weather was less than optimum. Much to the surprise of Guam Approach the pilot requested a no-gyro GCA which was immediately rejected with words similar to, "We don't approve practice no-gyro approaches here." And, I am sure Guam was equally surprised at the next response they heard crackling through their earphones: "Hey babes, I don't think you understand. This ain't for practice." Suffice it to say the approach was flown and the aircraft landed safely.

Can we challenge this pilot's judgment? Sure – I have and he has himself. What we can't challenge is his ability and his deeply founded understanding of partial panel instrument flying techniques, techniques gained through many hours of partial panel flying and simulation. Those techniques that were taught in the old school, of fifteen years ago; that I'm not sure are being taught or practiced today.

There are of course those incidents where ADI failures result in a catastrophic loss of life and equipment. It would be subjective on my part to say that, in all cases, the loss of the ADI was detected in time to change the sequence of events leading to the accident. However, in one case, of which I am personally aware, this did occur. In that case the pilot, following a presessing ADI, flew his aircraft into a bank/pitch attitude from which he was unable to recover. In my opinion more than adequate verbal/visual cues were being provided in that an excessive altitude loss was being announced (1000 feet every four to six seconds) which should have alerted the pilot to some unusual problem. Additionally, a second pilot, who was well as the first pilot, had access to a completely operable ADI and yet they either disregarded or failed to note the differences between the two systems. As a result, the aircraft crashed and four lives were lost. Why? Loss of control, sure; but why loss of control? Perhaps a couple of reasons. One being that the initial ADI failure was insidious in that no "off" flags were visible, and maybe the second was the inability to revert to a basic partial panel technique which probably could have stopped the sequence before it really got started.

There are other indications, in other aircraft, of this same inability to revert to basic partial panel flying techniques when loss of an attitude indicator occurs. In support of this argument let's review the following accidents:

The first concerns a flight of three on a day intercept and instrument training mission. Shortly after takeoff the lead aircraft entered layered clouds on established climb speed. While in the clouds the pilot intuitively felt something was wrong with the aircraft; however, he failed to immediately detect the source of the problem. He did, however, notice a fifty knot decrease in airspeed as he concentrated on maintaining a normal pitch attitude on his ADI. As the airspeed was dropping through 300 kias the inertial navigation unit failure light illuminated and the ADI tumbled. Aircraft control was transferred to the rear seater, a non-pilot, who was unable to recover the aircraft. Both crewmembers ejected successfully.

In another accident the aircraft, shortly after lift-off, entered instrument flight conditions. Again the pitch attitude was established at ten degrees nose up as the aircraft accelerated to climb speed. At approximately 250 kias the pilot noted flashing wheel lights and checked the gear indicators to confirm the gear position. While transitioning back to the flight instruments, the pilot indicated the aircraft felt strange; however, the attitude indicator still indicated a ten degree climb. Suddenly the pilot got quite light in his seat and informed his back seater that something wasn't right. Crosschecking his altimeter and vertical velocity, the pilot noted the altitude to be decreasing through 2000 feet at between 500 and 1000 feet per minute. Back pressure was applied to establish a positive climb rate as the aircraft broke through the clouds in a five-to-ten degree nose-low, right wing-low attitude. Back pressure was increased and the nose rotated through the horizon just as the aircraft crossed a stand of trees. After tree impact, the aircraft was successfully flown above the cloud deck. With assistance from another member of the flight, a successful approach and landing was made.

Even more recently, one of our Air National Guard pilots experienced an attitude indicator failure during an annual instrument check. Whether the guy passed or failed the checkride is not important for this writing. But I feel the subsequent action taken by this wing is, perhaps some small part of the story should be told so everyone has a clear understanding as to why the local experiment was conducted..

The examinee, in the rear cockpit, briefed the flight examiner (FE) prior to takeoff that, after lift-off, he would be lowering the hood and that any departure instructions given were to be followed by the FE until he (the examinee) was ready to assume control of the aircraft. After lift-off, departure control cleared the aircraft. After life-off, departure control cleared the aircraft for a right turn of fifty degrees, on course.

The rear seat pilot secured the hood and assumed control of the aircraft, wondering why the FE had not initiated the right turn. Without crosschecking any other instrumentation, the rear seat pilot applied control pressures to establish the aircraft in a 30 degree right bank. At this time, he noticed the heading indicator turning while the attitude indicator was indicating a 15 degree nose up, wings level attitude. A partial panel unusual attitude recovery was attempted as he informed the FE of his attitude indicator loss. The FE recovered the aircraft from near 90 degrees of bank and aborted the flight without further incident. After this the simulator folks fixed their machine so they could duplicate the exact sequence, without, of course, telling the pilots. Within one week, four of nine pilots tested crashed within 10 seconds after the malfunction was introduced. We are not talking about low levels of flying experience in this wing. The lowest man had 988 hours in aircraft type, while the high timer had over 5500 total hours with 2377 in type.

In the majority of the attitude indicator failures presented here some significant points come to light. First, in all cases where the pilot was trapped and needed help, instrument flight conditions existed. Second, the transition to other flight instruments was slow or non-existent. Third, without visual reference to the horizon and/or a slow instrument crosscheck, an unusual attitude was encountered within seconds.

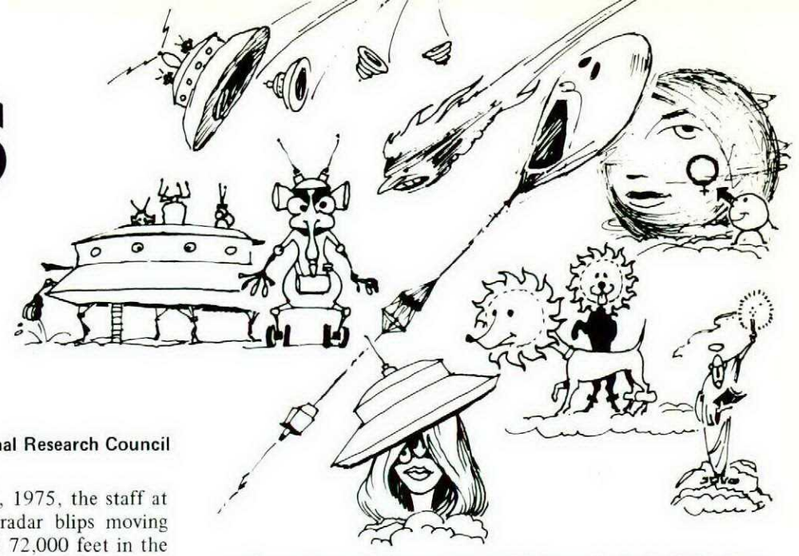
Well then, one might ask, where do we go from here? I wish I had an immediate answer, but I don't. Perhaps one suspect area is our training. In years gone by, we trained utilizing an instrument hood and at least occasionally on a partial panel; i.e., heading indicator, altimeter, airspeed indicator, turn and slip indicator and vertical velocity. Today this seems to be a lost art or, at least, has a minimum level of acceptance; however, the facilities are available for such training through simulation and at least one of our MAJCOMs has recently reinstituted just such training as an integral part of their flight simulation program. With regard to the instrument hood, I didn't like it when I was flying it and I think the decision by most MAJCOMs to do away with it was a valid one. However, in practicing instrument maneuvers without some restrictive device, one has a tendency to cheat, which I most sincerely discourage. The time to learn to fly good instruments is during VMC conditions. All it really takes is dedicated effort and practice. This also is the time to learn to cope with such emergencies as attitude indicator failure. I still have a one-quarter inch plywood cutout, specifically designed to cover an attitude indicator, which was presented to me years ago by my aircraft commander. Although I no longer use it, it's still a valid tool for teaching partial panel flying.

If your wing doesn't have a valid simulator instrument training program ask them to develop one. Hell, I've been out of control more than once in a simulator but, fortunately, never once in an airplane.

The ability to handle an attitude indicator failure depends uppermost on your own capabilities – with the key being the capability to recognize the malfunction. Sometimes it's easy in that the red off-flag is visible, sometimes it's not. Flight instruments are presented in a package and more cues are available than just those presented by the attitude indicator. However, those cues are not available without an instrument crosscheck, and, quite honestly, that's your best chance for survival. Work on it, practice every chance you get in both the simulator and in flight, and, perhaps, rather than becoming an Air Force statistic, you too will have a good bar story to tell.

Aerospace Safety

UFO's Fact or Figment?



by Robert Rickerd National Research Council

In the early morning of November 11, 1975, the staff at CFB Falconbridge tracked unidentified radar blips moving upwards at altitudes between 42,000 and 72,000 feet in the vicinity of Sudbury, Ontario. Visual sightings were also made by the military base personnel and members of Regional and Provincial Police Forces, but U.S. Air National Guard jets sent to investigate found nothing.

The event was described in newspapers the following day, adding to the thousands of worldwide reports recorded since 1947 when the current era of the UFO started. But like all solid sightings that went before, which could not be attributed to hoax or natural phenomena, the Falconbridge report had no bottom line–no answer to this intriguing riddle which had been taunting observers for 28 years.

The scientific community cannot be said to have conducted an all-out research program designed to get to the bottom of the UFO enigma, but there have been notable exceptions, and some of the aura which had been built up around it has as a result been stripped away. For example, a widely publicized piece of "evidence" held up by believers of extraterrestrial visitations by UFO's had been the discovery of doughnut-shaped "burns" in fertile soil which was thereafter unable to support any form of vegetation.

One of the earliest recorded examples of these rings in North America had been the source of no little awe and superstition for two centuries on Chatham County, North Carolina. Called the "Devil's Tramping Ground", legend had it that the devil himself had created the sterile 40-foot circle during nightly walks while plotting fresh troubles to plague humanity!

In recent years, additional rings were "found" in widely-separated parts of the world–Brazil, New Zealand and at several sites in Canada.

Two interested Canada Department of Agriculture scientists working in the Soil Research Institute at Ottawa, focussed their attention on one of these areas near Sterling, Ontario. Samples of soil were exposed to the full spectrum of analysis and it did not take too long to ascertain that the soil contained a sufficient amount of anhydrous uric acid to inhibit the growth of vegetation. From there, it was not too difficult to connect this substance and the ring shape to a quite common and down-to-earth cause–the "Fairy Ring" Mushroom. The "burned" rings were thus discredited once and for all as evidence of space-craft landings.

But not all vestiges of the UFO phenomena can be disposed of so easily–especially multiple sightings like the Falconbridge one made by responsible members of the community, and one type of observation which is particularly difficult to discount is the in-flight report by airline and military aircrew. There are no hoaxes thousands of feet in the air and crews are trained to recognize sun dogs, the planet Venus, meteors, lightning, St. Elmo's Fire, and Radiosonde balloons.

The American Institute of Astronautics and Aeronautics published some scientifically baffling cases based on aircrew and radar reports in its journal "Astronautics and Aeronautics" for study by its members. Although no conclusions were drawn it was evident that this august body felt that the UFO subject deserved further study.

The Condon Committee and the U.S. Academy of Sciences who endorsed their half-million dollar report agreed that 1) no important information was being held back from the public by the government; 2) the unidentifieds posed no threat to national security; 3) nothing of scientific value had been learned in the previous 21 years; 4) there appeared to be no reason to set up an investigative agency to study the phenomenon on an ongoing basis, but they also concurred that there were important areas of atmospheric optics, radio wave propagation and atmospheric electricity where science did not have all the answers.

Therein may lie the clue of clues to the identity of the UFO and in the interest of flight safety every effort should be made to legitimize the phenomena and bring it out from behind the "laughter curtain". For whether they are "real" or not, UFO's are visible, and as such could cause an involuntary reaction which could pose a potential danger to passengers, crew and aircraft, especially at night.

The airline crew and passengers in the following widely publicized UFO cases undoubtedly would have agreed with the last statement. The unidentifieds are good dinner conversation and may even serve as a diverting side show on a summer evening, but where aircraft occupants are actually shaken up or hurt that is a different matter.

2:45 a.m., July 23, 1948, at 5,000 feet between Houston and Atlanta, an Eastern Airlines DC-3, pilotted by C.S. Chiles and J.B. Whitted, had to take evasive action to avoid a "brilliant object" near Montgomery, Alabama.

9:35 p.m., December 5, 1948, Pioneer Airlines Flight 63 DC-3 service to Albuquerque was approached head-on by a "green fireball" and the captain was forced to pull the aircraft up into a tight turn to avoid it.

12:10 a.m., October 19, 1953, at 8,000 feet, an American Airlines DC-6, pilotted by Captain J.L. Kidd between Philadelphia and Washington, was forced into a dive to avoid a "gleaming light". First aid was required for several passengers who were not wearing their seat belts.

Just before midnight on April 14, 1954, at 5,000 feet, United Airlines flight 193 over Long Beach, California, captained by J.M. Schiedel, was forced into a sudden climbing turn by a bright red light, breaking a stewardess' ankle and the leg of one of the passengers.

3:30 a.m., March 9, 1957, a Pan American DC-6A flight 257 en route from New York to San Juan, Puerto Rico, 150 miles east of Jacksonville, Florida, was yanked into a sudden climb by Captain Matthew Van Winkle to avoid a collision with a beam of "brilliant light". Four other plane crews reported similar sightings in the area. A stewardess and several passengers were injured.

July 17, 1957, Flight 655 Dallas–Los Angeles, with 85 passengers on board, was thrown into a dive by its pilot Captain Ed Bachner to avoid a strange "object" 100 miles east of El Paso. Two passengers were hospitalized.

10:15 p.m., July 22, 1957, at 18,000 feet, TWA Constellation Flight 21 near Amarillo, Texas, was put into a dive by Captain G.M. Schemel to avoid a big red and green "light" which approached on a collision course. The plane was forced to return to Amarillo, where first aid was administered and one passenger was hospitalized.

It is unfortunate that corporate policy and ridicule has combined to shut off the sources of this type of report in recent years, for upon reading them, one must wonder, if in certain flight modes, such incidents might not contribute to, or actually cause, a fatal mishap. This consideration alone should be enough to warrant a broad ongoing government-funded scientific investigation of these occurrences. But as far as is publicly known it has not had this effect.

In Canada, the National Research Council serves as a repository for what are called "Non-Meteoritic Sightings". The Council inherited the Armed Forces' file when the military opted out of the UFO business. The file, which is open to the public, is expanded and maintained without special staff or funding. NRC, therefore, can only investigate reports that show promise of new or valuable scientific information.

In the United States, J. Allen Hynek, for 20 years UFO consultant to the U.S. Air Force, heads up the Centre for UFO Studies at Northfield, Illinois. Dr. Hynek is a noted astronomer and Chairman of the Lindheimer Astronomical Research Centre. He believes the solution to the UFO enigma is the responsibility of science and has gathered around him interested engineers and scientists who are prepared to give of their time to help solve the riddle. The Centre has no government affiliations; technical facilities are provided by private industry, and public donations provided its funding.

Commercial and military aircrew make the best non-scientific observers of aerial phenomena because of their training and professional competence. They literally live in the sky and the safety of their passengers and multi-million dollar aircraft depend on their knowledge, skill and judgment.

It is to be hoped that the UFO will somehow return to fashion, permitting these observers to once again report freely on their sightings without fear of ridicule. In the meantime, the occasional good solid human and electronic reports by earth bound witnesses like the Falconbridge sighting, will continue to taunt the believers.

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the altitude is high enough. As mentioned, the threshold is regarded as being as low as 18,000 feet but the real concern begins at altitudes above 25,000 feet. Remember though, if you have been scuba diving shortly before the flight the danger altitude is 5,000 feet (or even lower). There are, in addition, recognized predisposing factors once the threshold has been exceeded. In general, the higher the altitude, the longer the exposure, the colder the temperature, then the greater the risk. Exercise at altitude (as might occur in a transport aircraft with the flight engineer trying to rectify a snag, or the loadmaster working with cargo) greatly increases the risk of this phenonmenon occuring. Personal factors are known, statistically at least, to increase susceptibility to this illness, e.g. obesity, old age (over 30!), previous injury to a joint (for the bends) and inadequate fluid intake or dehydration.

Having described the potential consequences of high altitude decompression sickness in rather grim medical terms, we must now put things back in proper perspective. Most of us who fly as crew or passenger are not at any significant risk of suffering decompression sickness. Some of our CF personnel however, can be regularily exposed to this hazard, namely:

1. T-33 pilots, and
2. aeromedical training unit staff.

As well, circumstances may lead a Twin Otter or Buffalo (and a significant number of people) to hazardous altitudes. Of course, anyone flying in a pressurized aircraft could be exposed to this phenomenon if a cabin pressurization failure occurred and, for some reason, an adequate emergency descent was not possible.

What are the actions that should be remembered by those who are subjected to this hazard? Firstly, if you have been engaged in scuba or other diving activities don't do any sort of flying or otherwise ascend to high altitudes (e.g. high altitude chamber or mountain travel), until 24 hours have elapsed. Having mentioned chambers, we should add that the risk of decompression sickness in the high altitude chamber portion or aeromedical training is, for the student, low, and considered an acceptable necessity. Unlike other situations, this is a well controlled, brief and infrequent exposure, with the capability of rapid descent and immediate medical assistance.

If you have symptoms in flight which may be due to decompression sickness (most likely the bends), the following immediate action is recommended:

- get on 100% oxygen
- make an emergency descent as soon as possible to as low an altitude as is feasible
- advise someone on the ground
  request the flight surgeon meet you on landing
- land as soon as possible

You should proceed with this plan, even if your symptoms disappear completely during the descent. Get yourself safely

cont'd on page 23

The hot and cold affair between your aircraft and the nickel cadmium battery

Mr. J.H. Belanger
DAASE 6-3-2

INTRODUCTION

Using nickel-cadmium batteries in aircraft involves compromises.

Among other goodies, the early sixties brought on that new fangled, all singing, all dancing, power package offered as a panacea for power users called the nickel-cadmium battery. Some advertisers laid it on kind of thick too. "Why fly lead weight around?" was one question which stood out in bold print in the trade magazines, managing to suggest that 55 pounds of nickel was somehow lighter than 55 pounds of lead.

The nicad and its benefits were of course oversold, but there are nevertheless some advantages in the use of this battery, although these are more convincing when stated objectively, or when contrasted with correlated drawbacks as in CFTO C-93-155-000/MF-001, Figure 2-1-4 which is reproduced below for convenience. The cold weather superiority of nicads is of prime importance in Canada, and their flat voltage characteristic on discharge is another valuable asset since it can keep the electronics going longer when it serves as the emergency power source.

ADVANTAGES

Long Life – A long life can be expected, with numerous usage cycles. Individual cells are replaceable, enabling economical and convenient repairs in cases of failure of individual cells. Cells can be easily connected and disconnected, however connector maintenance is necessary to ensure connector cleanliness, security and lightness.

Stable Density of Electrolyte – The density of the electrolyte is stable under normal operating conditions, and does not require Specific Gravity readings to be taken.

Voltage/Charge Characteristics – The voltage level varies little except at extremes of full-charge and full-discharge, providing a stable voltage under varying state-of-charge conditions.

Temperature/Performance – The battery, with 30% KOH, can withstand without damage temperatures down to -54° C (-65° F). Since electrolyte concentration does not vary with state of charge, the freezing point stays at a fixed minimum. The battery voltage remains relatively steady under load even at temperatures down to -40° C (-40° F).

Voltage/Load Characteristics – The nickel-cadmium battery maintains a relatively stable voltage under varying load conditions, due to its very low internal resistance.

DISADVANTAGES

High Initial Cost – The cost of nickel-cadmium batteries is considerably higher than that of lead-acid batteries, and effective maintenance is required to enable its operational advantages to be realized. Also, cell interchangeability means numerous exposed, removable connections which have to be kept cleaned and tightened. Handling care is required to prevent intercell sparking.

Electrolyte Contamination – The KDH electrolyte contaminates easily, both in the cells and in containers, unless it is kept covered at all times. KDH electrolyte has an affinity for carbon dioxide ($C0_2$) in ambient air, causing a reaction which produces potassium carbonate (K_2CO_3) and derates battery capacity and performance. Due to high plate porosity, the cell electrolyte is not easily replaced.

NOTE: The stable density characteristic of the electrolyte means that the battery State-of-Charge cannot be ascertained by S.G. readings.

Voltage/Charge Relationship – The stable voltage/charge characteristic of the battery means that its state of charge cannot be easily determined from its voltage reading, unless sufficiently precise measuring instruments are available.

Temperature/Performance Characteristics – High ambient temperatures may induce thermal runaway under certain charge conditions. (See Theory of Operation).

Voltage/Load Characteristics – It is not easy to determine the state of charge by the battery voltage. Also, because of very low internal resistance, very high discharge currents can occur under short-circuit conditions, which can be hazardous to personnel and damaging to equipment. During maintenance, precautions have to be taken to prevent intercell shorting, which can ignite ambient combustible gases.

The susceptibility of nicads at high temperatures became known early when the term *thermal runaway* was coined, which phenomenon describes a hot battery that starts accepting more current at end of charge, instead of less as it normally should. Thermal runaway in turn sets the stage for cell shorting and complete battery failure.

Power demands, not required, escalated and the battery was tasked to start turbine engines, turbofan engines, and then to re-start them at short intervals on helicopters and on short-leg jets and turboprops. Since the battery heats up on discharge and is slow to dissipate heat, these demands when unchecked, can put the present generation of nicads through the thermal ceiling of cellophane, which is the membrane that North American nicad battery manufacturers use (between two layers of nylon) for plate separator.

This thermal ceiling is functionally taken as 130° F (55° C) although a new battery can exceed that temperature. When the cellophane separator has broken down, bridges build up through the nylon and the result is a cell short-circuit, causing self-discharge and overheating of the cell, which can then spread to contiguous cells one after the other. As a cell short circuits, the battery terminal voltage goes down by a 1.3 volt increment. Since cell-shorting can result from the last internal start, the battery will then demand more charging current from the constant voltage bus, leading to excessive overcharge when airborne, and to thermal runaway. Thus thermal runaway, and discharge overheating causing cell shorting, are two failure processes initially distinct, although the end results are frequently entwined. The thermal runaway of a battery can be brought under control by stopping battery charging, i.e., by turning the aircraft battery switch off. Thus isolating the battery from the charging bus will limit the energy dissipated to that of the battery itself. Turning the battery switch off at such a time will also prevent the generator being overloaded and subsequently failing as a result of the battery failure.

MANAGEMENT

The low thermal ceiling of the nicad battery, and its slow thermal dissipation, make the present generation of nicads touchy to use in summer. Since the batteries heat up on charge and on discharge, it is wise to economize on usage in hot weather. Saving on discharge automatically saves on charge. That which is not taken out does not have to be put back in. One good way to economize on discharge is to use external power, especially for starting the engine(s), wherever possible. For some helicopter hot weather field operations where the battery serves as an APU, it is desirable where practical that spare batteries be brought along and that arrangements be made to have the battery removed for cooling or for shop servicing when it has been unavoidably used to excess at close intervals.

It is highly desirable to avoid charging the battery when hot, say in excess of 55° C, or when too hot to touch by hand. If the battery is not depleted, or if the type of mission renders the battery role as an emergency power source secondary, the likelihood of airborne battery failure can be decreased by turning the battery switch off when the generator is turned on. The pilot has of course to remember that his battery switch is OFF, especially on single generator installations. In such instances, the battery switch can be turned back on at a later stage of the flight, such as on the before descent check, so that the generator can top up the battery charge.

In many small turbine applications, lead-acid (LA) batteries do a good job of internal starting in warm weather. But the cold weather limitations of LA batteries reappear with freezing weather. It is thus possible to get the best of both worlds by using LA batteries for summer operations, and nicads for winter operations, since present configuration of nicads is fortunately interchangeable with equivalent size lead-acids as regards form fit and function. Such recourse to lead-acids constitutes an interim solution for selected applications until research and design can resolve the present thermal shortcomings of the nickel-cadmium vented system in aircraft batteries. Commands are encouraged to develop such a dual capability for nicad applications such as the CUH-IN Helicopter where the optional use of an L.A. alternate has been approved.

MAINTENANCE MANAGEMENT

Proper shop maintenance, at frequent enough intervals, is also essential to the successful operations of nicad batteries. Maintainers and supervisors can also do much to foster reliability by ensuring that the aircraft service cycle is satisfactory for the battery, and by reading CFTO C-93-155-000/MF-000 and applying its instructions, especially as regards these highlights:

a. Balance of cells, inspection of cells, rejection of bad cells.
b. Setting the electrolyte level of cells.
c. Use of like cells (same type, vendor and rating) in one battery.
d. Proper torquing of cell terminal hardware.
e. Lower the voltage regulator (VR) setting in the spring (as per the aircraft instructions). For aircraft such as Sea King, CF5, CH147 which do not have an adjustable d.c. VR setting, the alternative is to shorten the aircraft service cycle of the battery, i.e., take it off the aircraft for shop reconditioning at 75 hours, or even 50 hrs, instead of 100 hrs.

FLIGHT SAFETY

An overcharging battery evolves combustible gases, which are normally contained by the airtight stainless steel battery case and are vented overboard. If an aircraft battery overheats and goes into thermal runaway, it is wise to turn the battery switch off, thus isolating the battery electrically. Otherwise the generator or other charging source keeps pouring energy into the battery, which accelerates the runaway and can cause the battery to break down internally, i.e., melting of cells, welding of plates and if the flight were prolonged enough, eventually burning holes in the battery case thus allowing oxygen and hydrogen gases inside some aircraft compartment. The loadmeter is an aid to the pilot in spotting battery thermal runaway at an early stage. The Battery Temperature Indicators being istalled in all aircraft with Nicads will ease this task in future. For more reading, see "Loadmeters advertise Battery Trouble" in Flight Comment Jul-Aug 1972, and "Battery Temperatures" in Flight Comment Mar-Apr 1974.

The *battery touch test* is a practical method of checking a hardworking nicad. If the battery is too hot to rest a hand on, cooling time should be allowed before another internal start is attempted. First give the Battery the finger test, the way a housewife finger tests her pressing iron. Such a battery touch test is safe and is recommended after each flight in warm weather. A battery which is too hot to touch will be in an advanced stage of runaway and there will be plenty of other signs of what is happening, i.e., violent gassing, overboard venting, hissing sounds, or swelling of the battery case.

The nicad batteries used in CF aircraft are in a stainless steel case with four strong clasps holding the cover in place. A battery undergoing runaway in an aircraft should be removed from the aircraft, with its cover in situ, taking all possible precautions. If too hot to handle in situ, the battery case can be temporarily cooled using CO_2 from a fire extinguisher, this being the only readily available means of cooling normally available around the aircraft, that does not leave moisture or residue and does not lead to other aircraft problems. Once it is out of the aircraft, the battery can be left to cool by itself with the cover in place; or if desired it can be cooled by water or by other convenient means.

SUGGESTED DOS AND DON'TS FOR FLIGHT CREWS

DO economize battery utilization in hot weather.
DO use external starting power where available.
DO space out battery engine starts as much as possible.
DO monitor the loadmeter reading, or the BTI when installed.
DO turn off the Battery Switch if the loadmeter reads higher than normal.
DO touch test the batteries before each start in hot weather.
DON'T crank the engine(s) on the battery.
DON'T make repeated engine start attempts on the battery.
DON'T repeat internal battery starts at excessively frequent intervals.
DON'T charge the battery when the battery is too hot.
DON'T recharge the aircraft battery in the aircraft using external ground power.

In view of their advantages, it is likely that nickel-cadmium batteries will be around for awhile. The CF is currently evaluating a new membrane suggested by DREO Shirley's Bay for use in cells in lieu of cellophane, and lab and field tests are under way. Other countries are investigating other approaches to the problem.

Until new-generation batteries become available, flight crews and ground crews can help enhance the reliability and safety of present equipment by observing applicable compromises as described above. The conjugated efforts of all concerned will in the future as it has in the past, alleviate problems and help maintain the relatively good CF record with nicad batteries.

A Blind Man's Look

So the second blind man said, "No, it feels like a wall," and the third said, "This elephant feels like a rope." Like the five blind men in the story describing the elephant, some of us see aviation safety through different eyes.

As a nonrated type, my views come from the back seat of the aircraft. It's enlightening to see what my presence back there generates. Did the pilot actually see that I was strapped in properly? Did he look to see if this ground-pounder left a strap hanging out of the back door? Did he look to see that the door was closed and latched securely? How about reminding me that the sleeves on my fatigues were rolled up? I have wondered on occasion why the copilot didn't think he needed gloves just because he was in the other seat.

I have watched two young men go through their preflight check of an aircraft, find a questionable area and apparently in the interest of mission completion, pursue it no further. They did not ask me if I was in a hurry, so I wondered why the crew chief was not consulted for his expertise. I have also watched other pilots go through that lengthy checklist, knowing how many times they must have done it before. I anticipated enjoying my ride much more as they meticulously covered each and every item, using the book.

I must admit to a degree of annoyance when a cloud shelf moved underneath us one day while we were in an OH-58. We were about 30 minutes out on a scheduled 2-hour flight, and the pilot did a 180-degree turn and returned to the airport. But I also had to recognize the professional attitude of the pilot concerning the safety of his passengers and aircraft.

I was curious on several occasions as to why pilots and copilots made a big deal about passing the controls to each other. Since my involvement in aviation I now get the AVIATION DIGEST and APPROACH. There was my answer. APPROACH told of a helicopter flying off a ship with each aviator thinking the other had the controls. They realized their error only as the aircraft began to settle slowly into the ocean.

My officer is not near a hangar or pilot readyroom. But when I'm at the airport, it's good to hear pilots discussing safety practices in their bull sessions, and to see posters displaying those lifesaving messages. I have even eavesdropped on a master aviator as he counseled two young warrant officers because their 20-minute fuel warning light came on and they made a precautionary landing in a farmer's field. First came praise for their airmanship, and then he questioned their judgement for allowing this fuel shortage situation to occur in the first place. I hope his unkind words made a lasting impression on those two lads.

My turn to counsel came one day in the hangar when I saw a soldier, with a cigarette in his hand, spray painting a sign with an aerosol container.

Well, there it is. I certainly have not described the whole elephant. I'm sure a tower operator can come up with his hair-raising tales, and the crew chiefs and pilots have their experiences. The one sure thing I have found is that this safety business is everyone's business and we all should stick our noses into it.

If one flys them, fuels them, maintains them, rides in them or just stands on the ground enviously as they roar off, safety has to be part of his life. There is no alternative.

Courtesy Colonel Roger J. Kesselring, USAR
United States Army
AVIATION DIGEST

Colonel Kesselring is a graduate of the Infantry Officer Career Course and the School for Inspectors General. He is a former inspector general with Headquarters, Fifth Army, and is now Inspector General, 416th Engineer Command (Construction), Chicago, IL

The Accident

by Maj Joe Tillman

The autopsy conducted by the Flight Surgeon listed under "injuries incurred during mishap:"

Body Part: Vertibral Column
Diagnosis: Multiple Fractures and Dislocations
Cause: Ground Impact

The AF Form 711 put it more simply: "Royal, James J., Jr., Captain, 920901171, FP, Pilot, F."

Captain Royall, for all practical purposes, was dead two days prior to the accident of 8 January, 1975.

Scene: Squadron commander's officer
Time: 0815, 6 January.

The squadron commander leaned back in his chair and balanced a pencil between his forefingers.

"Sam, the old man wants us to get some night missions on the board this week. The weather is killing us. . .we cancelled eight lines last week and we only got about half our missions off during our last night-flying phase."

"Sir, we're in a real bind." The scheduling officer leaned forward in his chair. "I don't think we can get three turnarounds a day. Maintenance is in a bind to give us two. This cold weather has put a bunch of the aircraft down with hydraulic leaks. One-three-six has been down for a week with a fuel leak. I don't know if maintenance can support us with another turnaround."

The colonel had turned away from his chief scheduler and pressed a key on the squawk box. "Mary, get me Colonel Birch." He swivelled back around and faced the major. "Sam, I'll talk to maintenance. You go schedule the missions. . .get those guys on the board for their night requirements! "

Scene: Maintenance line shack
Time: 1330, 6 January.

The NCOIC stood in front of six young sergeants.

"I can't help it, Willis. Colonel Birch called me and told me we'll turn four more birds for night missions on Wednesday and Thursday. I've cancelled Hooker's going away party until next week. Now, I know we're short-handed. It's going to take all of you haulin' together to get these birds off on time."

Sergeant Willis, rubbing his red eyes, spoke up, "Sarge, we can't turn those birds for an 1800 go! No way! "

The Senior master sergeant pointed at him, "Willis, I didn't ask you to do it. I told you to do it. That's all I have. . .let's go."

Scene: The scheduling counter
Time: 1245, 7 January.

"Dammit, Sam, you told me I had tomorrow off. I've already made plans! "

"Whoa, Slow down, Jim. I had to add some night missions. The old man told me to fly the guys who need the night requirements. Sorry."

"Sam, you know I've got some personal problems at home. Tomorrow I've gotta take the kids over to my sister's place. It's an eight-hour round trip. Can't you get someone else to take it? "

"Sorry, Jim. . ." The scheduler picked up the phone on the third ring. Captain Royall slammed his hand down on the plexiglas countertop, turned around and walked out.

Scene: Parking spot echo two
Time: 1715, 8 January.

"Hey, Chief, let's go! I'm gonna be late."

Sergeant Willis glared at Captain Royall and turned back to his problem – a hydraulic leak. His Tech Orders were laying at his feet, closed. His attempts to get a specialist to his aircraft had failed. . .Maintenance Control told him it would take at least thirty minutes to get a man out to the aircraft. Captain Royall walked over to his formations lead aircraft as the pilot was strapping in. Standing on the kick-step, he advised his leader he might be late, and since there were no spares, might cancel out altogether. He secretly hoped they would canx, since he had been on the road since six o'clock that morning – after a night with very little sleep and a lot of

soul-searching. Divorce seemed the only solution. "Damn! " he thought to himself, "I'm gonna miss those kids. . ."

He was shaken out of these thoughts by the chief, who was signalling him that his bird was ready. He made a quick walkaround and strapped in. By the time he got the engine cranked up, he heard lead call for taxi. Signalling the chief to pull chocks, he ran up to about eighty percent and turned out on the taxi lane. Sergeant Willis turned his back on the jet blast and held onto his cap. The searing blast engulfed him, then subsided. He threw his cap down on the ramp in disgust.

Scene: En route to the range
Time: 1835, 8 January.

"Tuck it in, two. . .you're too far back."

Captain Royall thought to himself, "In your ear, you SOB. . .I can fly rings around you and you know it. . .how the hell am I supposed to keep any kind of position with you bobbing around. . ."

About that time, he caught a flickering light in his peripheral vision. "Lead, two. . .I think I got a problem. I'm gonna move out and check it."

"Rog, two."

Captain Royall checked the warning panel, but there were no lights. Glancing at his engine instruments, he noticed the hydraulic pressure was right at the lower limits and fluctuating slightly.

"Lead, I think I've got a hydraulic problem. I'd better take this pig back."

"Jim, I had that bird a few days ago. It's OK, the pressure will stay at the lower limit all day long. But if you don't think you can hack it, I'll lead you home."

Captain Royall bristled a little at the last comment. "Press on," he said.

Scene: The range
Time: 1905, 8 January.

As he was pulling off from his first pass, Captain Royall thought to himself, "I knew as soon as I pickled, it was going to be a bad pass. I knew it."

His radio crackled.

"Vego two, I had your score. . .unbelievable at six."

Captain Royall suppressed an invective and rogered the range officer. He thought to himself, "C'mon, Jim, you can do better than that! " He was cleared in for his second pass and rolled in tight and steep. As he was about to pickle, he again caught a warning light out of the corner of his eye. He looked over to see which light it was. It was to be the last thing he ever did.

The accident report best described the impact. "The aircraft impacted the ground approximately four hundred feet from the target at the eleven o'clock position. The Range Control Officer stated it was traveling at a high rate of speed (approximately 300 to 350 KIAS), 20° nose low, 10° right bank on a heading of about 015° magnetic. The terrain was flat and the impact area was on a slight upslope. The aircraft was not in a yaw condition. The crater dimensions were approximately 20 to 50 feet and 10 feet deep at the lowest point."

Scene: The Base Ops Snack Bar
Time: 1155, 9 January.

Sergeant Willis was cupping a styrofoam container of coffee between his hands. The steam from the coffee did little to warm his numb fingers. His NCOIC sat across from him. It was evident he had not slept the night before.

"Willis, are you sure there was nothing seriously wrong with the hydraulics on your bird? You know, Captain Royall's leader said there might have been some kind of problem with his hydraulic system."

"Well, there was only that small leak I caught on preflight and I fixed that. If you ask me, that guy shouldn't have been flying at all yesterday."

The old senior master sergeant looked up from his clipboard, "How's that, Willis? "

"Well, hell, Sarge. . .the guy was all screwed up. He jumped all over me because the bird wasn't ready to go. He looked. . .you know. . .preoccupied with something. When he pulled out of the chocks, he damned near blew me over. . .he didn't seem to realize what was going on. . ."

The NCOIC rubbed his neck, "Well, after talkin' to the guys this morning, they said he was one of the best pilots in the squadron. . .I guess you never know. . ."

Scene: Officer's Club Casual Bar
Time: 2230, 9 January.

"You know, Fred, when I told Jim he had to fly that mission day before yesterday, he was pretty upset. Said he had to drive somewhere. . .I never thought he would go ahead and do it with a night flight scheduled. Jeez, he musta' really been beat. I should have scheduled someone else. . ."

"Hey, Sam, don't blame yourself. You and I both know Jim could fly that mission in his sleep. It was a damn maintenance malfunction! I should have led him back when he first told me he had a problem. I guess I would have, but I flew that same bird a couple of days ago and told Jim not to worry about the low pressure. I guess the damn hydraulic system just gave up. . ."

Scene: Wing Commander's Office
Time: 1600, 10 January.

The commander sat behind his desk, studying a message. He looked up at the Maintenance Officer, "Well, that's it. I'm sorry I can't tell you more, but there wasn't much left of the wreckage."

"Yes sir, I guess so. I'll pass on what we've got so far to the troops."

The squadron commander cleared his throat. "Damn shame. Captain Royall was one of our best pilots. I'm gonna have to bite a portion of the communal bullet too, I guess. I shouldn't have put him up for night range work without checking to see how long it had been since he last flew a night mission."

The wing commander looked over at the squadron CO, "Don't feel too badly, Robbie. It's out of our hands, now. . .You better get back to your squadron. Your boys are briefing for their 1800 go in 15 minutes. You might want to let them know what we've got so far."

The two men left the office. The colonel looked back down at the accident progress report message. He took a red pencil and very slowly underlined, "An exhaustive, but unsuccessful, effort has been made to find evidence of hydraulic failure, jammed flight controls, FOD, disconnected control linkage, malfunctioning trim controls, or materiel failure which would explain this accident. Capture marks indicate stabilator and rudder positioning were normal. The pilot made no attempt to eject."

He put the report back into a folder and left his office.

Tac Attack

On the Dials

In our travels we're often faced with "Hey you're an ICP, what about such-and-such?" "Usually, these questions cannot be answered out of hand; if it were that easy the question wouldn't have been asked in the first place. Questions, suggestions, or rebuttals will be happily entertained and if not answered in print we shall attempt to give a personal answer. Please direct any communication to: Commandant, CFB Winnipeg, Westwin, Man. Attn: ICPS.

Obstacle Clearance on Takeoff and Missed Approach

"The pilot of an aircraft on departure or missed approach shall not comply with any ATC instructions until he has assured himself of terrain clearance."

A pretty strong statement you may think. Well it has just been reconfirmed with MOT in Ottawa that controllers are providing "NO" obstacle clearence when they issue instructions to aircraft on departure or missed approach. Ref: NOTAM 1/76 Page 42.

Example # 1 – A departure situation. You have just got the wheels in the well and departure control says "CANFORCE 1234, you are radar indentified, turn left heading 220°, climb to 8,000 feet." That instruction sounds pretty commanding, and most of you "ace" pilots would probably follow the instruction if your aircraft was above 500 feet and at a safe manoeuvering speed. Before you make that turn, think about the first two statements. Have you achieved sufficient terrain clearance if you proceed in that direction? Remember, the responsibility for ensuring terrain clearance at this stage of flight lies entirely on your shoulders. The controller has no idea of your altitude or rate of climb so he has no way of knowing if you are able to clear the surrounding terrain. He only expects you to follow his instructions after you have provided yourself with obstacle clearance. The only exception would be if the controller stipulates a specific point at which to commence the turn. Only altitude will be considered as a specific point. i.e. "When out of 3,000 feet turn left."

Example # 2 – You are doing a NDB Rwy 22 approach to Sudbury on a Round Robin flight. The published missed approach is "immediate right turn climbing to 3,000". ATC gives you this clearance: "CANFORCE 1234 is cleared from Sudbury to destination, maintain 8,000. On missed approach turn left, climb on course."

Do you follow the controller's instructions or the published missed approach? From earlier statements, we know the controller is not providing you with obstacle clearance. We do know that if we follow the published missed approach we are assured of obstacle clearance. **NOTE**: There are numerous towers off the end of the runway to the left. In this situation the controller's instructions are to be followed only after you have followed the published missed approach and achieved sufficient terrain clearance.

Now that we have convinced the non believers that the pilot is responsible for obstacle clearance, the next question is – What is obstacle clearance and how do we achieve it?

There are several altitudes that provide obstacle clearance (1,000 feet above highest obstacle in the area being referred to):

1. Quadrantal (within 25 NM).
2. Emergency safe (within 100NM).
3. MEA for you route (if you are on track).
4. Missed approach altitude (if you are following the published missed approach profile).
5. A combination of all four.

Now let's look at how. On a missed approach, just follow the published missed approach until you reach an altitude that will provide obstacle clearance. From there you can normally proceed on course or follow ATC instructions.

In the case of take off, the answer is not so easy. On most take off's you provide yourself with terrain clearance visually. But how can we provide ourselves with obstacle clearance on take off when the weather is on limits?

If the airport has a departure or SID, follow the published procedure as you would for missed approach.

Before proceeding further, let's look at CF take off limits. We are authorized to use for take off, the minimum MDA and vis published for the runway in use.

Before we blindly take off under the above mentioned minimum weather conditions we should consider the following:

1. The rate of climb for your type of aircraft.
2. Are there any obstructions off the end of the runway that would prevent a straight ahead climb to an obstacle clearance altitude (You will need to be familiar with the airport or use a topographical map.)
3. If there are obstacles, you can intercept a published missed approach profile and fly it.
4. If you are unable to follow para 2 or 3, it may be wise to raise your take off limits so that you are able to. An example of a take off that could be disasterous under minimum weather conditions is, Rwy 26 at Victoria.

There are many problems associated with obstacle clearance on take off under minimum weather conditions and they will be dealt with more deeply at a future time when the answers are resolved. Meanwhile, it is hoped that awareness of the obstacle clearance problems associated with take off and missed approach will keep us from unscheduled contact with "terra firma".

Maj D.C. Deagnon

cont'd from page 17

on the ground and let the flight surgeon try to sort out the cause of your symptoms. The medical drill to expect, if you have had bends symptoms only and these have disappeared, is that you will be medically questioned and examined and temporarily restricted from high altitude re-exposure, probably for 24 hours. If you still have decompression sickness symptoms after landing, or did have symptoms potentially more serious than the bends (e.g. the chokes) you will require, in addition, medical observation for at least 24 hours. Rarely are more extensive medical measures required.

Remember that decompression sickness is a normal human response to low surrounding pressures and does not indicate you have some medical abnormality that might jeopardize your flying career. The worst that is likely to happen to you, if you respond correctly to this type of physiological incident, is that you get poked and prodded a bit and perhpas laid off flying for a couple of days. This is a good sight better than what can happen if you suffer decompression sickness and attempt to remain at altitude.!

Comments

None of us know as much as all of us — so pass the word.

WRITE

In previous editions we have published pleas for material for publication from field units, and in this issue we are going to have to repeat the request. This magazine exists for two basic purposes — to make available to field units information which originates from this and other headquarters, and to allow an interchange of information between field units.

If you as a pilot, mechanic, or administrator encounter a flight safety problem, it will probably eventually be encountered by someone else. Your solution, or at least your warning, may prevent loss of life or valuable equipment — but only if you spread the word around. That is what we produce the magazine for — but you're not using it as much as you could.

We want this magazine to present the thoughts of everyone in any way associated with air operations. It exists as much for the loadmasters and supply techs as for the pilots, and as much for the armourers and tow crews as for the navigators. We want to see this magazine in crew-rooms sure, but we also want to find it in the control tower, in transient servicing, and in the base transportation office. Too often five or six copies sit around unread in the aircrew briefing room while the groundcrew go without or have only months out of date editions to read.

If you have something to say about how the operation is being run or could be improved — please drop us a note. We want to hear from you — we'll even write your article for you — but first of all we want to talk about it.

Incidentally, this request does not stop at the military community. There are thousands of Canadians interested in the operation of aircraft (safely) and we are eager to hear from our civilian friends also. If we could, through our efforts, save just one life this year — or ever — it would be worth an awful lot of effort.

DO NOT WRITE

To us if you want to receive this magazine. We do not handle circulation and your request will only be delayed if routed through us.

Write instead to:

INFORMATION CANADA
Ottawa, Ontario, K1A 0S9

and send the cheque as indicated in the masthead.

PHOTOS

Flight Comment has a continuing requirement for interesting photographs related to aircraft operations. If you have any colour or black and white pictures that you would like to share with our readers — send them along. Even if your contribution doesn't make the front cover we still need lots of current photos for our articles. If you don't have any photos we're sure you have an interesting story or anecdote to tell. If you like — just send us an article and we'll supply the photos to go with it.

NATIONAL DEFENCE HEADQUARTERS
DIRECTORATE OF FLIGHT SAFETY

COL R. D. SCHULTZ
DIRECTOR OF FLIGHT SAFETY

MAJ D. R. WILLIAMS
Education and analysis

L.COL F. G. VILLENEUVE
Investigation and prevention

Editor Capt John D. Williams

Art & Layout J. A. Dubord
DDDS7 Graphic Arts

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FIRE?

1. MAINTAIN CONTROL OF THE AIRCRAFT

2. Assess the situation

3. Take CHECKLIST corrective action

Flight

In the sky suspended on wings of eagles
In flight above far-reaching cloud
Turned golden by the sunsets rays
Enclosed by the heavens peaceful shroud
There is a oneness in our being
With life, and love, and all below
A knowledge of what, and why, and wherefore
A wonderment only flyers can know.

There is a calm in these upper reaches
In this drawing room of the lesser gods
Untarnished by human fumbling fingers
Aloof from mans self-created fog.

For none can inhabit this flawless realm
We can but intrude with our thunderous sound
Then we who would walk in paths of angels
Must all too quickly return to ground.

We live to ride this cloud strewn trail
Wherever the driving wind may blow
And love to scale the billowing heights
That dwarf all those on the earth below

The anvil clouds and lightning flashes
The rainbow arcs of an autumn day
Are tapestries in our cathedral
Which raise our eyes and make us pray

That the line we etch across the sky
Be bold, and straight, and true
And that we never forget, in age
That such was the road we knew.

John D. Williams