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See Back Cover

MESS DRESS

Major General Perry B. Griffith, Deputy Inspector General for Safety, USAF

Sometimes we get so involved in the big problems that we ignore the small ones. It is often these small ones, going unattended, that lead directly to the major ones that turn into real headaches. This is often expressed in the reverse by the old axiom about not being able to see the forest for the trees. Either way, both kinds of problems need our attention: the big ones because unsolved they may cause disaster; the small ones to prevent them from becoming or contributing to the more serious ones.

A small problem that has been a matter of concern to me for a long time is that of dress requirements for rated personnel in Officers' Open Messes, particularly at breakfast. Recently a message from Hq USAF to all major commands stated the policy that, " . . . messing facilities, in which flying clothing may be worn, be readily and conveniently available to rated personnel preparing for morning flights." Whether this is an open mess or some other facility is a matter of command prerogative. Although the policy now has been clearly stated, some of the bases I have visited apparently didn't get the message, and the pilot on cross-country is lucky to be conveniently able to get himself a meal.

It is my opinion that rated officers should be allowed to eat breakfast in all Air Force messes in their flight clothing, and there are a couple of good reasons for this opinion:

• First, prohibiting flight clothing in the messes often results in rated personel not eating breakfast. Rather than eat in one uniform and switch to another for work, many of us grab a cup of coffee and maybe a doughnut at the most convenient snack bar and call it a meal. Sometimes there isn't even a snack bar. It has been well established that breakfast is our most important meal. The body has had no refueling for many hours and is soon fatigued without proper nourishment. If the conditions are right, long flight, bad weather, prolonged high altitude, then fatigue can easily cause a serious, perhaps fatal accident.

• Then there is the aircrew that has to get off early. Time is short and dressing for breakfast, going back to their rooms to change, checking out of the VOQ, can lead to a harrassed, even vexed state of mind. This is no condition to be in for planning a flight, much less making it. The one or two small things that can be overlooked in the rush could turn out to be fatal.

There is precedent for a policy of permitting flying clothing at breakfast. Battle dress has always been allowed to be worn in Army messes when officers are engaged in duties taking them to the drill ground or field. A flying suit is the working uniform of the professional airman as much as battle dress for the soldier. Such clothing must be clean, of course, and the officer should present a neat appearance.

It may be that some bases, for various reasons, may wish to set off a special area, possibly a screened part of the dining room, for those officers wearing flight clothing. The airman at least can get a good breakfast without having to change his clothes a couple of times. But the present situation, with different criteria throughout the Air Force, is past due for a change.

It would be difficult to pin the cause of an accident on the pilot's not having eaten breakfast. But I strongly feel that the policy I am suggesting would add that little ounce of prevention that would give us one more tool with which to save lives and aircraft. ★★

T-BIRD TIPS

• It takes 1,200,000 cubic feet of concrete to make an 8000-foot runway 150 feet wide. Then to add 500 feet of overrun at each end, one needs an additional 150,000 cubic feet of black top.

• It takes a tad of tamping, a bit of stabilizing and lots of stirring before the yearning tread of a T-Bird tire can caress gently this inviting surface.

Too frequently though, after being provided with an excellent landing surface of great length, the pilot errs and for some moments the T-Bird tire tread is filled with dirt. Subsequently the pilot's plaintive lamenting beats irritatingly upon unreceptive eardrums. The mal-manipulation of controls which causes a satisfactorily operating aircraft to land on an unprepared surface short of a nice long runway justly causes grief to the operator. There can hardly be mitigating circumstances.

Each runway has a landing threshold which is normally briefed to be an imaginary point 500 feet down the runway from the approach end. Runways marked in accordance with AFR 91-17, All Weather Runways, serve the pilot a distinct aiming point 500 feet down the runway—hereon is where tire/surface contact should be made. Nine T-Birds were fractured during the first quarter of '61, or one bent T-Bird every ten days, because tire/surface contact was made short of the runway. Correction of this situation doesn't seem to be much of a hill for a stepper!

R&A Division, DFSR

BIRD VS BIRD

In North Dakota they hunt pheasants with a .22 rifle—not so in Pennsylvania. Pictured here are the remains of one that a Guard pilot bagged with an F-89J engine screen. After traveling 2000 feet on takeoff roll, the pilot noticed momentary power surge, then a sudden loss of power on left engine. Takeoff was aborted without incident.

Investigation revealed a large pheasant had been ingested into the engine. Fortunately, FOD damage to the engine was practically nil and a possible aircraft accident was prevented by the pilot's decision to abort the mission, not to mention the proper use of screens during ground operation and takeoff. ★

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LIGHTS FOR LANDING

The next time you prepare to land, take a look at the tire marks on the underrun and at the very edge of the runway threshold. They will give you some idea how many aircraft barely made it to the concrete. Then add these to the known number of aircraft that hit in the dirt and you will come up with some figures that can give you the shakes if you are a flying safety officer or a base commander.

Research by the Air Force, FAA and the airlines has shown that jet aircraft are many times more susceptible to undershooting than reciprocating aircraft, and that a device is needed to provide glideslope information to pilots by visual means.

Such devices are available and one, after exhaustive tests, has been accepted for Air Force-wide usage. It is a British product, the Visual Glide Slope Indicator System, developed by the Royal Aircraft Establishment (RAE). At least three of the VGSI systems have been installed in the U. S.—at the FAA National Aviation Facilities Experimental Center, (NAFEC), Atlantic City, Westover AFB, Mass., and at New York's LaGuardia Field.

Years of research and development by many agencies were culminated in the summer of 1959 when the FAA decided to test five systems at its Bureau of Research and Development test facility at Atlantic City. The objective was to recommend the selection of the best system for adoption as a U. S. national standard.

A comprehensive test program was begun in February 1960. More than 100 pilots participated, including a group from MATS at McGuire AFB and SAC pilots in KC-135s from Westover AFB. Twenty-six aircraft types participated, ranging from a Piper Tri-Pacer to a B-52. Data collected by phototheodolite tracking equipment and pilot questionnaires were considered in addition to cost and maintenance factors in making the selection of the best system.

As a result of the evaluation, the Bureau of Research and Development recommended to the FAA that the VGSI system be adopted as a national standard.

The Air Force then conducted a concentrated operational suitability test, using current representative aircraft. During a one-week period, 16 pilots flew 180 approaches in the following aircraft: T-37, F-100, F-101, F-104, F-105, F-106, B-47 and B-52. The participating pilots were enthusiastic about the system and strongly agreed that a definite USAF requirement exists.

The VGSI system has since been adopted as a U. S. standard and accepted by ICAO and NATO as standard.

The VGSI system has a wide application as a visual aid to reduce probability of undershoot or overshoot landing accidents. Application includes: high volume day and night approaches, approach zones with featureless terrain (ground or water), brightly lighted areas, locations where noise abatement is desired or where precise approaches are necessary because of marginal length or braking conditions.

Because of inherent visual range limitations, the VGSI system is not a substitute for standard high intensity approach lighting; however, on an instrument approach, the system is very useful as a transition aid, during the change from instrument to visual flight. Since it is essentially designed as a VFR aid, the requirement for guidance at long range in daylight was given great consideration. The RAE system is capable of giving accurate guidance in sunlight at ranges of 4-5 nautical miles, and 7-8 nautical miles at night.

Since the RAE VGSI system has been adopted nationally and internationally, pilots can expect to see these systems being installed commencing this fall.

The RAE device makes use of color indications of lights alongside the runway to define the glideslope. It consists of 12 light source units, arranged in two bars transverse to the runway, with three units on each side of the runway opposite a point 750 feet from the threshold, and three units on each side 500 feet farther down, opposite a point 1250 feet from the threshold. (These dimensions apply to NAFEC. They will be varied somewhat to meet local siting and operational conditions.) Each unit is a box about 4½ feet square, containing three high intensity sealed beam lamps. Immediately in front of each lamp is a filter, the upper half of which is red and the lower half clear. A horizontal slit, two inches wide, across the front of the box

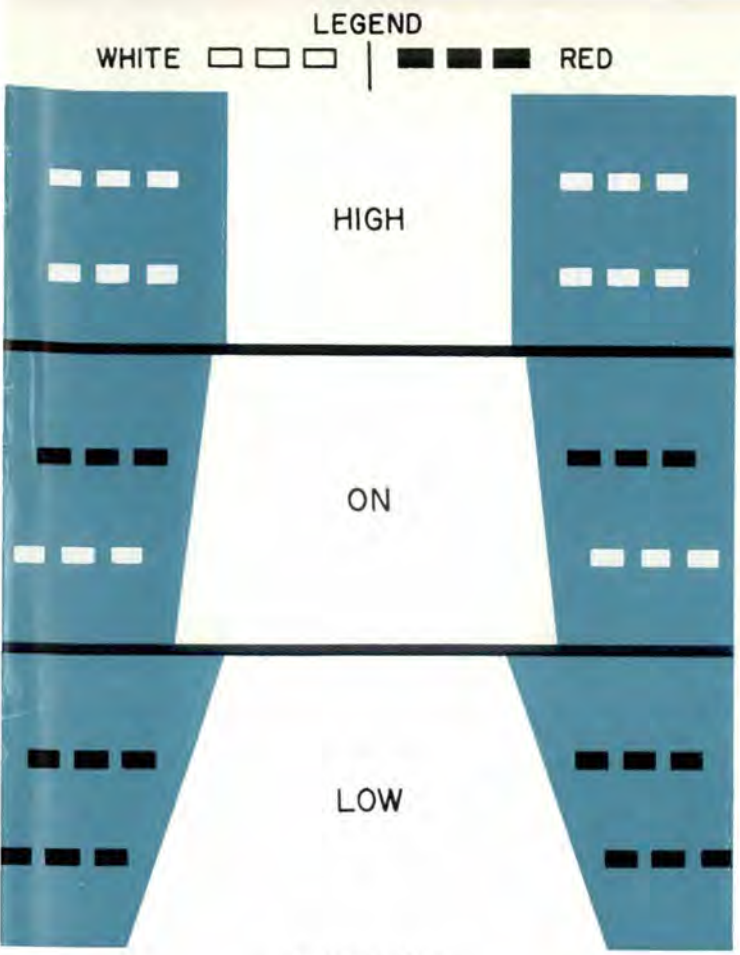


FIGURE ONE

causes the light to be white when viewed from a high angle and red from a low angle. A narrow band of pink, the transition zone, separates the red and white portions of the beams.

The units within each row can be adjusted to the desired glideslope by raising the front of the box so that the bottom of the white beam is at the proper angle.

In operational use, the objective of the pilot is to overshoot the row of lights nearer the threshold, so they will show white, and undershoot the row of lights farther down, so they will appear red. Thus, if the pilot maintains a position so that both red and white colors are visible, the aircraft will fly down a glideslope to a touchdown zone 500 feet long which begins 750 feet from the threshold. (In the NAFEC installation the ILS glideslope angle and the ILS reference point are almost identical with the VGSI system. Touchdown point and glideslope angle will be varied to suit local siting and operational conditions. The VGSI will normally use the same approach angle used by the electronic approach system.)

If the aircraft begins to deviate from the glideslope, it is indicated by a change in color of one or the other bars. If the deviation is toward the high side, the further lights will change from red, through pink, to white. If low, the nearer lights will change from white, through pink to red. Therefore, a high indication will be all lights white, and if below the glideslope, all lights will be red. The pink zone is a warning to the pilot that a deviation is occurring.

The various indications as seen by the pilot are shown in the sketch in Figure One.

At first glance, some pilots have expressed doubt as to their ability to remember which row of lights will appear red and which white. All that must be remembered is that both colors must be seen to be on the glideslope, and from the glideslope they can be seen in only one configuration. Another point sometimes raised is that red is not a good color to indicate correct procedure. Any two colors can be used, but red and white were chosen after much research because of their ability to retain their distinctiveness under low visibility conditions such as haze or precipitation. If it is remembered that all red lights indicate a low position, the common understanding of red as a danger signal is not compromised.

One attractive feature of the RAE system is its versatility. At NAFEC, for example, it was tested briefly in several configurations using a smaller number of light units. It was determined that guidance was available from as few as two boxes: one at the downwind position (750 feet from the threshold), and one at the upwind position (1250 feet from threshold) on the left side of the runway. Range is sacrificed in this configuration, but the lights were usable at two nautical miles in daylight with only two light boxes. TAC has expressed an interest in such a system, which might be easily air transported, powered with a small portable generator, and easily and quickly installed or moved to another runway. A more comprehensive evaluation of a reduced RAE system began at NAFEC in April of this year.

The RAE Visual Glide Slope Indicator has a major potential for preventing landing accidents. It should also increase pilot confidence, for example, when he is making a difficult night approach, over inky black terrain, to a runway that looks shorter the closer he gets. One pilot, flying an F-100, stated that in 700 hours in that aircraft he had not made a night landing completely free from anxiety until he flew in the project at NAFEC. Said he, "We can't afford not to buy that system." We think other pilots will agree with him.

Several training aids are being provided, according to an article in the 9 June 1961 TIG Brief. An FAA familiarization film should be ready for distribution soon; a brief description will be included in section II of FLIP, and a revision of chapter 16, AFM 51-37, will explain the principle of the system. ★

Lt. Col. R. S. Griffith, USAF, National Aviation Facilities Experimental Center, Atlantic City, N. J.

Arrows indicate VGSI lights bracketing runway at RAF Station, Cranwell, England. To pilot on glideslope, first row of lights should be white (indicating high), second row red (indicating low).

Gruesome, yes. We used this picture to illustrate what liquid oxygen can do to a man's hand. And it takes only a short exposure.

LIVING *with*

It has become increasingly evident that the medical problems arising from missile operations must be put into proper perspective for many reasons. As this is a relatively new field of endeavor, the Air Force Medical Service is necessarily short of experience in the purely operational situation. The spectacular event of a launching of an intercontinental ballistic missile with its attendant fire and thunder from our missile test centers created so much justly deserved enthusiasm for the medical problems that it has tended to obscure the true picture of living with these birds every day at an operational site.

This is not meant to imply that our mission has changed, nor that our role in the overall support has become any less important—less spectacular maybe, but more important now than ever before. Brigadier General Theodore C. Bedwell, Jr., Commander, USAF Aerospace Medical Center, recently said in an address at the School of Aerospace Medicine, "The nature of missile weapon systems has made the majority of Commanders and their staff agencies more acutely aware of the need for consideration of health protection and human economy as they apply to the Command missile mission."

Any operational unit deserves the best medical support available. The penalties arising from weak medical support are not equally serious in all cases, but missile weapon systems are very sensitive to loss of manpower, impaired efficiency and human error, and a consequent loss of operational effectiveness as grossly wasteful in terms of the amount of money invested in them, no less than in the terms of peril to the national security.

In the Fall of 1958 a survey was made of all missile accidents and incidents which covered periods 1956 through 1958 in one of our major commands. This survey disclosed that missile accidents and incidents were increasing at an alarming rate. The cause factors, when analyzed, reflected that 65 per cent were the direct result of human error. Figures such as these are of great concern to those of us in the Medical Service and should stimulate our greater participation in the safety programs, in an attempt to reduce the number of accidents attributed to human error. Most of the effort expended in the Flight Surgeon's office that appears to be routine medical care is actually aimed in this direction. In the selection of crews, the pre-assignment physical examination done by your Flight Surgeon is designed to detect such things as diminished visual acuity, color vision defects and impaired hearing to prevent the utilization of a worker in a position where he might cause a disastrous accident through no fault of his own. These conditions have been found in personnel actually assigned and functioning as missile crewmen.

Frequent periodic examinations and interviews with personnel at the launch complex help to detect crewmen exposed to toxic materials or anxiety producing situations that could dictate treatment or rest to prevent accidents. Protective clothing and equipment have been devised and are prescribed for wear in all areas where a hazardous situation exists. This clothing and equipment is designed and provided to protect the individual from accidental injury or exposure to toxic fuels and must be maintained with meticulous care, inspected prior to use and used properly to provide adequate protection.

The dissemination of information is one of the most important functions of the Flight Surgeon's office, and has assumed a major role in the missile safety program. General Bedwell further stated, "It is essential that all personnel in the propellant storage and handling areas be indoctrinated in the nature and characteristics of the materials they use and in the safety precautions to be observed. Observance of safe handling practices will do much to eliminate the possibility of injury. It is essential that such personnel be informed regarding first-aid and emergency procedures to be followed pending the arrival of medical help."

First aid training and re-training for all missile crews is mandatory, and as always, time available for this training will be short. At the present time the daily visit of the Flight Surgeon to the Alert Complex is well established, but with the dispersion of launch facilities and the relatively small number of people at each site this is becoming an impossibility. Personal contact with question and answer discussions has long been recognized as the best method of keeping personnel informed; however, in view of the above we are going to have to use other means of communication. This diminished frequency of personal contact will impose a greater responsibility on missile crew members to

the Birds!

Capt. Samuel J. Brewer, School of Aerospace Medicine, Brooks AFB, Texas

report promptly all illnesses however minor they might be. It is the Flight Surgeon's responsibility to determine the potential effect of illness and this dual channel of communication will keep him an active team member.

Recent excellent articles in these pages concerning the problems of handling liquid oxygen and liquid nitrogen have prompted this discussion on some of the health hazards of a few more of our propellants in use and contemplated for use in the near future.

Since the days when we worked for the Signal Corps, the Air Force has used hydro-carbon fuels in enormous quantities with surprisingly little difficulty. Lest this give us a false sense of security, remember that these hydrocarbon type fuels can cause trouble in confined or poorly ventilated areas. In high concentration the fumes produce a narcotic effect that progresses to coma and death if the worker is not removed to fresh air. This then is the emergency treatment—remove the victim to an uncontaminated atmosphere as quickly as possible and use artificial respiration if needed. Oxygen should be given as soon as possible and medical aid summoned.

During the troop movement to Lebanon a pilot was directing the parking of his aircraft at night and backed into an open fuel pit. The quick thinking co-pilot donned an oxygen mask and with a walk-around bottle went in after the pilot and probably saved his life. Practically all of our missiles will be inclosed in semi-hard or silo type launch complexes, and a spill of large quantities of RP[1] in this situation could create a hazardous condition. The amine fuels, hydrazine and unsymmetrical dimethylhydrazine (UDMH) already used in some of our missiles, are programmed for much more extensive use in the very near future. Both of these are toxic to personnel in relatively small quantity. They can cause significant effect on the body, by absorption through the skin, inhalation of vapors or by ingestion. In addition, hydrazine will cause a severe burn of the skin. UDMH does not harm the skin but it is readily absorbed into the body by this route. The vapors from these compounds are irritating to the eyes and lungs and this can lead to development of pulmonary edema, a filling of air spaces with fluid with the resulting inability of the lungs to transport oxygen to the blood stream. As this can be a delayed reaction any exposure to high concentrations can affect the central nervous system with resulting convulsions and possibly death. In the event of leaks in lines or spills of hydrazine fuels the first aid rendered on the site is a most important part of the medical care. Safety showers are available and should be used immediately by all contaminated workers. Do not attempt to remove safety clothing until under the shower, then remove it quickly and wash all splashed areas with copious amounts of water. Always notify the Flight Surgeon's office of any contamination with these compounds as quickly as possible.

Nitrogen Tetroxide (Nitrogen Peroxide, Liquid Nitrogen Dioxide) is an excellent oxidizer that can be stored in missile tanks for long periods of time without deterioration and for this reason will probably be used in large quantities as part of our storable propellant systems. Liquid Nitrogen Tetroxide is corrosive to our body tissues and severe burns of the skin and eyes result from contact. A most serious toxic hazard from this oxidizer results from inhalation of the vapors causing irritation of the lungs and development of pulmonary edema. The vapors or fumes vary from light yellow to dark brown in color, but this is no indication of their relative toxicity. The initial symptoms of exposure are irritation of eyes, nose and throat, cough, tightness of chest and nausea. These may be slight and not noticed, then hours later severe shortness of breath may develop rapidly. Marked difficulty in breathing usually follows this and anyone so affected is in grave danger and needs medical care immediately.

First aid for anyone exposed to these fumes is rapid removal to an uncontaminated atmosphere and copious flushing of the skin and eyes with water. One point here—*water in copious amounts is at present the best emergency decontaminant we have for all propellants in use.* In the event any chemical is splashed into the eye, flushing with water must be accomplished as rapidly as possible. If you have a choice of going for medical help or washing out the eye, *let the medical aid wait and hold the victim's eyes open while washing them out with water for fifteen minutes by the clock.* These people must be carried and not allowed to walk to the medical facility for observation and treatment. Exertion frequently causes severe symptoms to develop.

The best treatment for any toxic fuel hazard is prevention of exposure. All missile systems have been conceived, designed and produced with safety of operating personnel in mind and any exposure will result from a breakdown in either the mechanical system or the recommended operating procedure. This discussion is not intended to create fear or anxiety, but to develop a healthy respect for these propellants. Remember that any exposure is usually an emergency situation and Air Force crews have been training for and handling emergencies for many years in this manner. The more you know about any situation, the better you will be able to cope with it and prevent injury to personnel or to our missiles, neither of which we can afford to lose. ★

1 If there is foreign matter visible in the mouth, wipe it out quickly with your fingers or a cloth wrapped around your fingers.

2 Tilt the head back so the chin is pointing upward.

3 Pull or push the jaw into a jutting-out position.

4 Open your mouth wide and place it tightly over victim's mouth. At same time pinch victim's nostrils shut.

THE KISS

Alfred W. Cantwell, National Director, Safety Services,

Mouth-to-mouth resuscitation, probably the oldest and simplest technique for saving life when breathing has stopped — from drowning, electrical shock, smothering or other breath-stopping accidents—is now recommended by the American Red Cross as the fastest, most effective method. Reference is made to this method in the Bible in the story of the revival of the Shunammite woman's child by Elisha as he "lay upon the child and put his mouth upon his mouth."

So simple is this technique that people who have only seen it mentioned in magazines or in newspapers, or on television have saved lives which might otherwise have been lost.

In 1957 the American Red Cross adopted this method as the most effective for resuscitating infants and small children. In 1959 the method was approved for adults. It is by far the best procedure for the *lone rescuer* in the absence of resuscitation equipment, and it can be sustained by the rescuer for a much longer period of time without fatigue than other methods. However, since certain conditions, such as a severe facial injury, may prohibit mouth-to-mouth contact and since some people may dislike such physical contact, the Red Cross has not discarded the Silvester chest pressure-arm lift method, nor the Holger Nielsen back pressure-arm lift technique. Both of these manual methods are still included in Red Cross textbooks.

Regardless of which method of artificial respiration is used, successful resuscitation rests on two factors: getting an open air passageway as quickly as possible, and stimulating the expansion and contraction of the chest, either externally or internally. One of the main advantages of mouth-to-mouth breathing is that the rescuer, by his close contact with the victim, knows an airway has been opened when he feels he is getting an air exchange from the victim.

A timetable on the speed factor in artificial respiration, computed by the American Medical Association, shows how chances for reviving a victim dwindle as the minutes pass:

- Within 1 minute, a 98 per cent chance of revival.
- 3 minutes, 72 per cent.
- 5 minutes, 25 per cent.
- 10 minutes, 1 per cent.
- 12 minutes, 1/1000 per cent.

Thus, speed is vital in getting an airway opened and the chest moving again in the breathing rhythm.

On a February day in upper New York State, a man parked his car in front of the local grocery store and left his four children in the automobile. He rolled the car window partially down and left the engine running while he went in to purchase groceries. Several minutes later, a store employee came out to put gasoline in the car and saw that the children in the car were apparently unconscious. He pulled them out of the car and, with help, got them into the store. One of the children had stopped breathing. A neighbor, who had rushed over to see if he could be of assistance and who had had some first aid training, knew he had to act, and act fast. He tried to open the child's mouth

(5) Or close the nostrils with your cheek.

(6) Or close the victim's mouth and place your mouth over the nose.

Blow into the victim's mouth or nose. If you are not getting air exchange, recheck the head and jaw position.

(7) If you still do not get air exchange, quickly turn the victim on his side and administer several sharp blows between the shoulder blades in the hope of dislodging foreign matter.

American Red Cross, Washington, D.C.

but her jaws were tightly closed. He immediately placed his mouth over her mouth and nose and began breathing into her lungs. After several moments had elapsed, she responded and began to breathe. Then she stopped breathing again. Now the rescuer was able to open her mouth and hold it open. He resumed mouth-to-mouth resuscitation and she started to breathe again. An ambulance arrived shortly thereafter and oxygen was administered, and the children were taken to the hospital. Later that evening they were released. Without the mouth-to-mouth artificial respiration one of these lives would certainly have been lost.

Children can use this lifesaving technique to save lives. In Minnesota a 10-year-old girl helped revive her 2-year-old sister by forcing her breath into the baby's mouth. The fast-thinking youngster had read about the breathing method in a newspaper.

Although mouth-to-mouth (mouth-to-nose) resuscitation is a comparatively simple technique, proficiency can best be gained by developing speed in getting the victim ready for breathing into his mouth, making certain that the head is tilted back and the jaw is placed in a jutting out position.

Waste no time beginning this lifesaving procedure. When a person has been submerged in water, for example, begin the process the moment the victim has been pulled into shallow water. Do not wait until you have the victim on land, for every moment is precious.

Resuscitation of a child requires the rescuer to take relatively shallow breaths geared to the child's size. These should be taken at the rate of about 20 per minute. With an adult the rescuer should blow vigorously about 12 times a minute.

When there is initial failure to obtain an air exchange, the head and jaw position of either child or adult should be rechecked. Then, in the case of the child, the victim should be held up by the ankles and several sharp slaps administered between the shoulder blades. The adult victim should be turned on his side to make possible the blows on the back. Once this is done, breathing into the victim should be resumed.

Normally, recovery should be rapid, except in electric shock, drug poisoning, or carbon monoxide poisoning cases. In these instances nerves and muscles controlling the breathing system are paralyzed or deeply depressed, or the carbon monoxide has displaced oxygen in the blood stream over a period of time. When these cases are encountered, artificial respiration must often be carried on for long periods of time.

Artificial respiration should be continued until the victim begins to breathe for himself, or until a physician pronounces the victim dead, or until the person appears to be dead beyond any doubt. A doctor's care is necessary during the recovery period, as respiratory and other disturbances may develop as an aftermath. ★

The lifesaving method described here will save the lives of some swimmers this season. But remember, it can be used after any mishap which causes breathing to stop. Ed.

OF LIFE

When the Light Fails

Three major F-104 accidents have occurred in recent months when pilots continued full throttle (Max A/B) takeoff attempts after failing to obtain an afterburner (A/B) light. These pilots undoubtedly realized the decreased thrust available with the throttle in Max A/B without A/B operation, and yet these simple abort situations deteriorated into three accidents and two fatalities.

Let's review what happens when the pilot advances the throttle into afterburner. The solid line, labelled Nozzle Position, indicates the nozzle area selected by the mechanical schedule in the nozzle area control in response to throttle position. The dotted line indicates the area established by the temperature modulating system to hold Military EGT in response to thermocouple signals. The "ramp cam" schedule in A/B was incorporated to establish a greater minimum nozzle area as A/B throttle position is increased so that if a nozzle closure due to amplifier failure occurred no severe overtemp or engine stall would occur.

The "ramp cam" not only provides this emergency protection, but also shows itself under normal operation. Note in Figure 1 that as throttle is advanced above approximately 85° (Min. Sector) the Ramp Cam schedules nozzle above military position, causing EGT to drop prior to A/B light. Note specifically that if the throttle is advanced to full A/B (approximately 113°), the nozzle will open to "5" regardless of whether the afterburner lights or not. If it does not light, the engine thrust on a J79-7 under these conditions is about 6565 pounds, as opposed to 9935 pounds at military power and 15,600 pounds in full afterburner. The J79-3A suffers a similar marked decrease in thrust under the same conditions. Whether you're flying an F-104A, B, C. D. F. or G, you have insufficient thrust to push your bird to flying speed on any existing length of concrete, except possibly the Pennsylvania Turnpike.

The problem is: How do we keep from attempting the impossible—take off in afterburner throttle with no A/B light? If we follow the normal procedure in the Pilot's Handbook, we release the brakes (I'll say more about this later), select minimum A/B (to keep the nozzle area near military and make lighting conditions better for the engine), and advance to full afterburner only after light-off. This means that in approximately 2½ seconds, normal light-off time on the ground, we should know if we're going to have afterburner for takeoff. If the A/B doesn't light in that time, chop to Idle and clear the runway.

How do we recognize an A/B light? The most obvious clue is the familiar "kick-in-the-pants" thrust increase; the most important instrument is the EGT gauge which rises to 640-660° and then drops as the nozzle moves open to hold Mil EGT. When this happens, we can push the throttle to max, make one last check of EGT and nozzle, and continue the takeoff. With all of these symptoms to note, there should never be any reason to roll down the runway at reduced thrust because it was not known that the afterburner was out.

If the afterburner fails to light, or blows out during takeoff roll, the pilot has two choices:

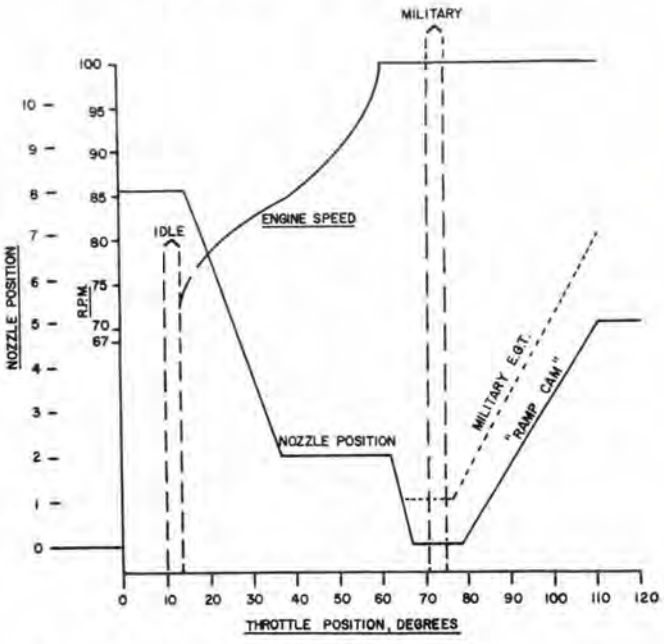


Figure One

- He should chop to idle and abort if speed and runway permit; or
- He should retard to military to close the nozzle and make a military takeoff if committed.

Condition number two above, in which the aircraft is some distance down the runway when the A/B blows out (an extremely rare occurrence), is the only time the pilot should consider an unplanned military takeoff. The pilot's decision in the case of A/B blowout must be positive and permanent; if the decision to abort is made, follow the abort procedures completely. Don't start an abort procedure, then change your mind and decide to try a military takeoff after all. On the other hand, if you elect to continue your takeoff in military following an A/B blowout, then press on and ease the bird off when the airspeed needle says you are at the magic number. Don't roll for a few more thousand feet in military and then try to abort; if you were committed to takeoff when the A/B blew out, then you're asking for trouble if you try to abort a few thousand feet later. If you always abort if the A/B fails to light, and if you stick with your original "go-no-go" decision if the A/B fails during takeoff roll, you will never be caught short.

We have discussed two alternatives if the afterburner fails to light or blows out during takeoff roll. Now let's talk about what must never be done. Never leave the throttle in A/B and continue the takeoff with reduced thrust due to the greater nozzle area and lower EGT. This will result only in eating up valuable runway and never attaining flying speed. In doing this you are betting your life on an afterburner light. With each thousand-foot marker that goes by, the odds are increasing that you'll lose!

You are probably familiar with an A/B light-off technique which we might call "spontaneous ignition." In this procedure, after failing to get a normal sector

A/B light, the pilot advances to full afterburner, then retards to minimum A/B, where, as the nozzle closes on mechanical schedule the afterburner will often light-off, even though the pilot burner system is inoperative. Although this method will often produce an afterburner light, I strongly recommend not using this technique for two reasons:

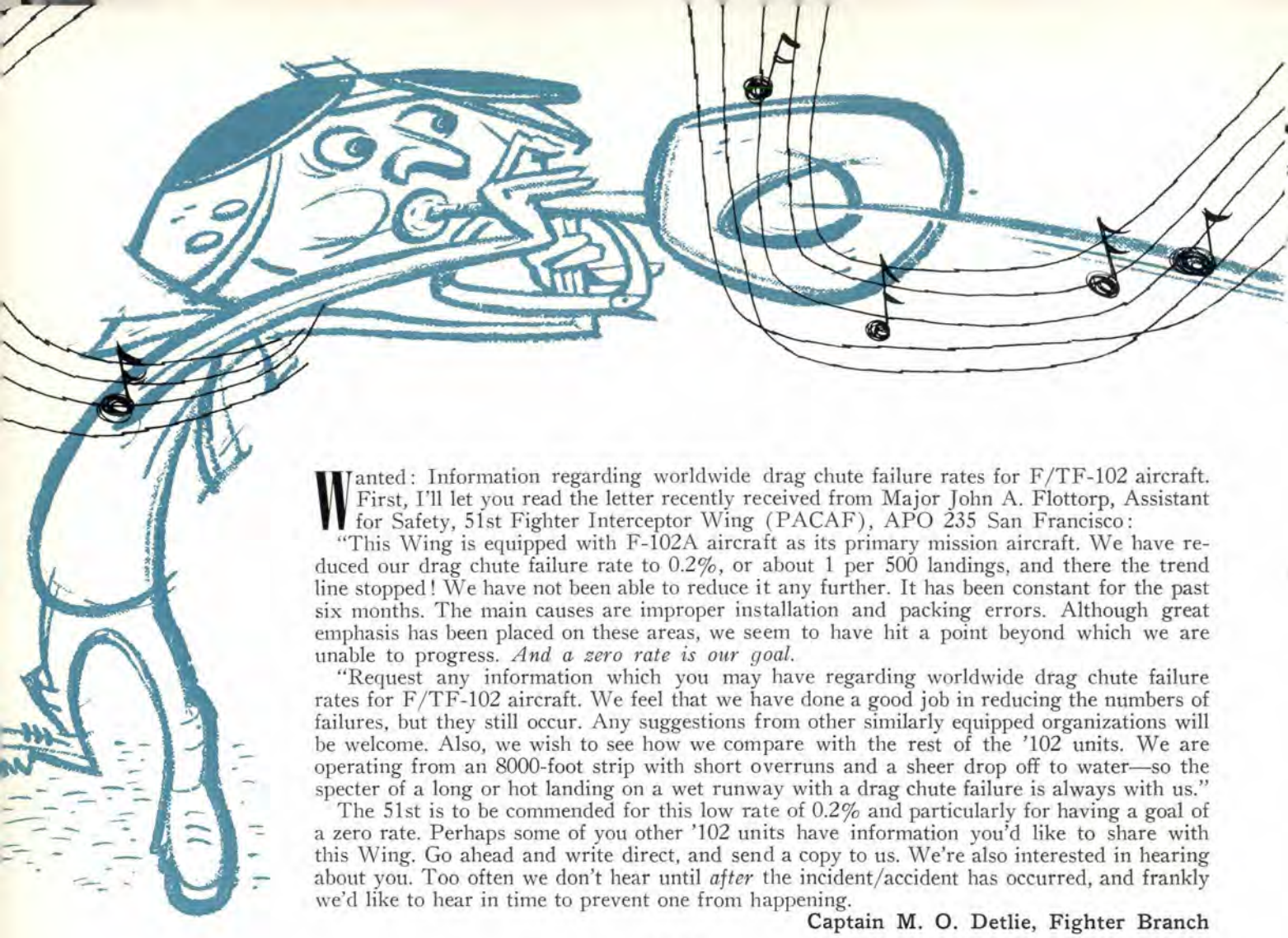
- It compromises the foolproof takeoff situation we are trying to create. It requires some very concentrated monitoring of the nozzle and EGT gauge in order to properly position the throttle. This leads to a kind of cockpit hypnosis which may cause the pilot to work himself into the "coffin corner" where he figures he's too slow to fly but too late to abort. In a final effort he stuffs the throttle to full A/B, opens the nozzle, and races off the runway in a fast taxi. I consider this procedure as real "sucker bait," and one which is potentially very dangerous.
- An afterburner which was lit-off spontaneously may not even switch over and provide full A/B thrust. By the time the pilot knows this he's just that much farther down the runway. Furthermore, it is very unlikely that an afterburner which wouldn't light on the ground would work properly in flight. Your squadron would be farther ahead if the aircraft is returned to the line to be brought up to combat ready status—you'll never make ace in military, anyway!

Let's wrap up this difficult business of takeoff in three simple steps:

- **Have a Plan.** Know each time you take the runway for a briefed A/B takeoff, that you are going to abort if the A/B does not light normally. Make a military takeoff only if the mission briefing calls for it, and only after you have planned it from the Pilot's Handbook Takeoff Chart.
- **Know what to look for.** When you put the throttle into afterburner, don't merely look for some gauges winking and blinking at you from the right side of the panel. Look specifically at the EGT and nozzle gauges. Know that when you go into sector A/B, the nozzle should open to about "2" and EGT drop to around 525° C. before the afterburner lights. Know that if you push the throttle to max A/B and the nozzle opens to "5" and EGT drops to 450° or so, and stays there, you have neither afterburner nor sufficient thrust to do anything but taxi back to the line. Know that the properly operating A/B should light-off in sector in about 2½ seconds. Every second's delay after that should be telling you to abort.
- **Hold the brakes until afterburner lights.** Since you can hold the aircraft at military, you can hold it as the throttle is advanced into A/B, since thrust is actually going down as the nozzle opens. When the afterburner lights, release the brakes and leap off! In this way you eliminate any possibility of using up valuable runway while waiting for an A/B light and trying to figure out what to do if it doesn't. This technique should be limited only by wet runways, spongy brakes or "weak knees." I realize this could create problems in formation takeoffs, but at this point I'll retreat to my ivory tower with the familiar cry, "That's an operational problem!" The obvious solution would be to let the first man to light-off lead! Scientists have told the bumblebee he couldn't fly, but he proved them wrong. The technical types have told us the F-104 can't take off with full A/B throttle and no afterburner fire, and three pilots have proved they were right. Let's not try for four! ★

Following USAF flight training and duty assignment as an F-86D pilot, 1952-1956, Fritz was production test pilot for Douglas Aircraft, flying its A4D and F4D (Navy) airplanes. From 1957 to the present he has been engineering test pilot for General Electric Co., at Edwards AFB, and has 1100 hours flight test time on all versions of J79 military and commercial engines. He has flown the following J79 test aircraft: XF4D, F-104, F-101, F11F-1F, F4H, and RB-66, and has 445 hours of F-104 flight time. In March 1960 Fritz received the Edwards AFB Flying Safety Award for "successful deadstick of the '104 on a 4750-foot runway.

John M. Fritz, Engineering Test Pilot, General Electric Co., Edwards AFB, California



Wanted: Information regarding worldwide drag chute failure rates for F/TF-102 aircraft. First, I'll let you read the letter recently received from Major John A. Flottorp, Assistant for Safety, 51st Fighter Interceptor Wing (PACAF), APO 235 San Francisco:

"This Wing is equipped with F-102A aircraft as its primary mission aircraft. We have reduced our drag chute failure rate to 0.2%, or about 1 per 500 landings, and there the trend line stopped! We have not been able to reduce it any further. It has been constant for the past six months. The main causes are improper installation and packing errors. Although great emphasis has been placed on these areas, we seem to have hit a point beyond which we are unable to progress. *And a zero rate is our goal.*

"Request any information which you may have regarding worldwide drag chute failure rates for F/TF-102 aircraft. We feel that we have done a good job in reducing the numbers of failures, but they still occur. Any suggestions from other similarly equipped organizations will be welcome. Also, we wish to see how we compare with the rest of the '102 units. We are operating from an 8000-foot strip with short overruns and a sheer drop off to water—so the specter of a long or hot landing on a wet runway with a drag chute failure is always with us."

The 51st is to be commended for this low rate of 0.2% and particularly for having a goal of a zero rate. Perhaps some of you other '102 units have information you'd like to share with this Wing. Go ahead and write direct, and send a copy to us. We're also interested in hearing about you. Too often we don't hear until *after* the incident/accident has occurred, and frankly we'd like to hear in time to prevent one from happening.

Captain M. O. Detlie, Fighter Branch

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Since accidents seem to run in cycles, some people don't like to hear them discussed when they aren't having any. This may be a good idea but I've never gone along with it. An accident usually occurs because someone makes a mistake and that mistake may have been caused by ignorance. My theory on accident cycles is that certain types of accidents alert everyone to the danger and this extra alertness stops the cycle. After a period of having no accidents from a particular cause, everyone loses the extra alertness and another cycle begins. This month I want to write about some of the things that *haven't* caused F-100 accidents for quite a while, but which are always lurking in the background waiting for another cycle to begin.

• **The drag chute.** It has been six months or more since a drag chute came out on takeoff. This one can be real hairy, too, and it usually results in an accident. The first indication to the pilot is a reduction in acceleration which is almost synonymous with the reduction felt when the afterburner goes out. The pilot's first reaction usually is to move the throttle inboard. At this time a loss of thrust occurs and the pilot interprets it as engine failure. A late abort is then effected, and the aircraft goes through the barrier like a bat out of hell and ends up burning somewhere in the tulies. All this talk is great, but how do you prevent such a thing from happening? First of all, make certain that a qualified person has installed the drag chute. Judging from the accidents reported, I'd be inclined to say that some pilots are not qualified to install a drag chute. Nearly every accident which has occurred because the drag chute came out was preceded by a landing at a strange base where the pilot either supervised a crew that was unfamiliar with drag chute installation, or installed it himself.

There is one way you can tell if the afterburner went out or the drag chute deployed, but it requires some preplanning. This is done by adjusting the mirror prior to takeoff so that the area where the drag chute deploys is in sight. If this is done, a glance in the mirror will tell you if the drag chute is out or in. It's common "knowledge" that the afterburner will burn the drag chute off. This is sometimes true but not always. If the aircraft has been rotated to takeoff attitude and the drag chute is deployed on the ground, the 'burner will not burn it off until the aircraft is airborne and the chute has streamed back down into the AB axis. If the mirror is not in position for you to see the chute, and it comes out on takeoff and you come out of AB, I think it's safe to say you'll never make it. I'm not going to try to tell you how to solve this one but I think it could be given some serious thought.

C-NOTES

• **Tire failure on takeoff.** A few tires are still failing on takeoff but pilots are doing an excellent job of coping with this problem. Those who have been successful in continuing takeoff have punched off the stores first, and then flown on off without too much difficulty in maintaining directional control. If speed is below 150 knots when the tire blows, an abort *is definitely advisable.*

• **Spins.** Everyone must have quit pressing too hard because a spin has not been reported for months. Most of those in the past have involved external stores, or some pilot just checking out in the airplane. Staying out of a spin is easier than getting out of one *after* it starts. My advice remains the same and that is: Keep the airspeed up, and don't try to fight when you are carrying stores.

Oops! Correction! Between the time I wrote this and the proofreading, someone got in a spin. He was on an air tactics mission involving adverse yaw, hard turns, rudder reversal and high G over-the-top maneuvers. On one of the over-the-top maneuvers the speed got too low and the aircraft yawed off and entered a spin. The pilot could not recover and ejected. His chute streamed and he was killed.

• **Landing Short.** This is usually preceded by a high approach where power was reduced to or near idle; then a high sink rate set in and before the pilot could correct, the aircraft had touched down short. If it is necessary to get the power to idle before the overrun is under your wheels the best cure is to go around.

These are the things you pilots have been doing right for the past few months. Keep it up for a few more and maybe the effort being made to cure some of the more serious problems will start to pay dividends.The rate for 1961 at the end of May is below 20 per hundred thousand—lowest in the history of the F-100.

Lt. Col. W. W. Wilson, Fighter Br.

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Being uncomfortably seated in an automobile while doing nothing more than sightseeing can be tiring, to say the least, but consider a fighter pilot uncomfortably seated while flying an F-106 aircraft, even on a short flight. If everything's right for it, this situation could lead to trouble. Some reports indicate that pilots flying F-106s equipped with supersonic seats have used, and perhaps some are still using, a pneumatic pad support lumbar type MXU-22P (USAF 58F3580) for more comfortable sitting during flight. However, this bit of added comfort may not be the answer.

Since experimenting with this type of lumbar cushion, CONVAIR has determined that the cushion could be subjected to excessive expansion during climbout as cabin altitude increases, or rapid expansion when the canopy is jettisoned during ejection at altitude. In either case, expansion of the pneumatic lumbar support cushion could put the pilot in an incorrect position for ejection which could result in a back injury. Also, it is possible that the fully inflated cushion—under the foregoing circumstances—could force the pilot forward to such a degree as to hinder operation of foot retraction and seat man positioning of pilot for ejection.

In view of these findings, it is recommended that F-106 pilots be cautioned against using the pneumatic type lumbar support cushion in supersonic seats. Meantime, CONVAIR is also experimenting with a foam plastic type lumbar support cushion. Objective: comfortable, supersonic seating.

Fighter Branch

Double Trouble

I would like to relate this RF-84F incident with the intention of your formulating a plan of action should you happen to be subjected to a similar experience. As you read on, quarterback the heck out of my action (or inaction). Let's face it, the best way to cope with an emergency is to be prepared for it. The other character (and sometimes that's what he is) making the scene is Lt. Bill Nielson, a member of my flight. This is how it sounds.

Being "weekend warriors," we were making like same on the usual routine navigational training mission. We had planned on completing two high and two low navigation requirements. Bill was leading the first high leg to Tinker. All was normal until about ten minutes out. We were working RAPCON for our penetration when I smelled smoke. Okay, quarterbacks, call the play and then check the book. I turned on 100% oxygen and checked loadmeters, inverters, circuit breakers, and generators. All readings were normal. There seemed to be a bluish haze which did not persist and disappeared in three to four minutes. The cockpit temperature began to increase at this time and, as we were being vectored on final, I didn't have time to do any trouble shooting other than to turn the cockpit temperature control to cold. It was dark by the time we had eaten and been refueled (flying machines, that is), so we decided to RON. I made no mention of the hot cockpit to local maintenance, nor did I write it up. My reasoning being that if the condition still existed on the next flight, I would simply go to RAM and eliminate the heat and vent system.

It was decided that Bill would lead again and a 500 foot, low-level (pilotage) navigation mission was planned to Alvin Callender Field, New Orleans. The weather was forecast VFR with 3500′ scattered at MSY. The flight was briefed thoroughly, covering check points, fuel, emergency landing fields, hand signals and Callender Field. Neither of us had been in there before. The flight plan figured 1+10.

We made a formation takeoff and it became apparent soon thereafter that the heat problem still existed. Bill set course and I moved out to a more comfortable position for some experimentation. Going to the RAM position had no effect on the temperature. I must have tried it four or five times to no avail. I took one of my gloves off to accurately determine where the heat was coming from. I closed a grille or vent above the right console which really didn't help, as all heat now came out the toe vents. These I couldn't even see, let alone reach.

This flight was being conducted in November, therefore I was wearing the light summer jacket. I recall before entering the cockpit at Tinker trying to make up my mind whether or not to wear it or stow it in the camera compartment. I decided to wear it. This may or may not have been a wise decision, read on and judge for yourself.

We crossed our first check point on time and on fuel. Bill asked me how it was going and I replied with something like, "mighty warm." I told him I was going off the air "for one." It was more like fifteen before I was back on again. First of all it was hot, damn hot, but I thought I could handle it. It was uncomfortable but not unbearable. I decided the jacket had to come off and took my helmet off in preparation. I unbuckled my parachute and almost decided I could stand the heat when I came to the Mae West. (This is a real struggle for me to remove while standing up in an empty room.) I sat pondering this for some time and decided the jacket had to come off. I finally succeeded in removing the Mae West (needless to say, I didn't put it back on) and the jacket, which I stuffed between the right arm rest and console. I rehooked the parachute and then sat there some more dreading having to put my helmet back on. I figured if Bill called and didn't get an answer he would join on me to see what's what. I fell some distance behind and didn't really care if I ever moved up in proper position.

The sun shining through the canopy didn't help matters any and I was experiencing difficulty seeing with perspiration running into my eyes. If I rubbed them it became worse. I was thankful there was no cockpit temperature gauge to have to look at. The most discomfort was from my left boot becoming hot. Also the buckles on my parachute and the handle on the left arm rest were very hot. I stuffed some maps between the handle and my leg. I wrapped my left boot and leg with my jacket which helped considerably. I suppose you quarterbacks are all wondering why I didn't blow the canopy. I didn't because of possible damage to the tail section, dirt and debris from cockpit floor getting into my eyes, noise and subsequent loss of radio communication. (I've experienced two canopies coming open or partially open in flight.) I knew my judgment was becoming impaired because I had to make a concerted effort as to what to do next. Our course should have taken us within sight of England AFB, but you don't see far at 500 feet and we passed west of it. I had forgotten England even existed by that time. I was determined to get the machine on the ground safely at Callender. In my mind that was the only place left to go.

I finally got my helmet back on and experienced difficulty in donning the oxygen mask because the rubber was hot. I had to place it on my face and then quickly remove it several times. I went on 100% oxygen which was cooler to breathe. My pulse rate had increased considerably but breathing was normal. I

Capt. Louis H. Lovelette, 384 19th Street, San Pedro, Calif.

would like to say that at no time did I feel I was not in command of the situation. In attempting radio contact I discovered my UHF was inoperative. Bill said later he had no indication of my predicament as my flying was not erratic. I did signal him to land as soon as possible, however.

I had been making a reasonable attempt at navigating, but now wasn't too sure of our position. I knew we were roughly right of course. I recall thinking "enough is enough," so in attempting to get a wingtip on Shreveport I discovered the radio compass was inoperative, although it had checked okay on the preflight at Tinker. About this time I also noticed the EGT was fluctuating between 400° and zero. Engine operation was normal so I disregarded the fluctuation.

It would have been impossible to fly the bird without gloves. I could only touch the throttle long enough to move it as required. We finally arrived at Callender Field and landed. After I had opened the canopy, I noticed the EGT was back to normal. After parking the bird I collapsed and went into a semi-shock. What happened to me subsequently is a story in itself which I won't relate at this time. Suffice to say, my condition was diagnosed as "severe heat exhaustion, mental anxiety, hyperventilation and shock."

Investigation revealed the cooling turbine had failed which accounted for the smoke in the cockpit. It was also discovered that the linkage had failed internally on the valve that shuts off hot air and dumps pressurization. The fluctuating EGT, radio compass and inoperative UHF were attributed directly to heat since all functioned normally on the subsequent test hop. (Engine had to be removed to change the turbine.) The aircraft manufacturer says climbing to a higher altitude and/or reducing RPM would have alleviated the situation somewhat. These measures are only temporary, of course, and the aircraft should be landed as soon as possible. I do not advocate my decisions as being ideal or even desired, but under the circumstances they seemed to be the only alternative. The point is, I let this situation progress too far without taking more positive action. I want to stress that if this happens to you, you are in real trouble, and if you happen to be alone, especially at night it only compounds your problem. Hope you found this interesting and enlightening. ★

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The U. S. Air Force has received its 11th consecutive "Award of Honor," the highest recognition by the National Safety Council for outstanding achievement in accident prevention. The Honorable Eugene M. Zuckert, Secretary of the Air Force, received the award for 1960 in a presentation ceremony from George C. Stewart, (Maj Gen, USAF, Ret) Executive Vice President, National Safety Council, on 24 May. Since the last quarter of 1961 is a high accident exposure period, these particular months may be the deciding point for winning again. Pictured here, L-R: Will L. Tubbs (Col, USAF Ret), Director Ground Safety, Deputy Inspector General/Safety; Secretary Zuckert; General Stewart; Brig Gen John M. Breit, USAF, Deputy Inspector General for Security. In separate ceremonies, "Awards of Honor" were received by ATC and PACAF. The second highest award, "Awards of Merit," were received by MATS, USAFE, and ADC.

CROSS COUNTRY NOTES

ON his last trip Rex was getting a weather briefing for the next leg when one of our fearless aviators made a transmission over channel 13. It went like, "Hey there, Mr. Weatherman, down at Pyote. I'm a headin' for Donaldson. What have they got in the way of weather?" Now, I'm sure this questioning pilot thought he was the only and best comic of the skies and that the weather troops would hold their sides from the guffaws. Don't believe it. They've been the route before and are fairly immune to cheap comedy. Anyway the forecaster picked up the last Donaldson weather sequence and read it; with a tip of his hat and a "Rog" our comic sped off. Now here's the gripe. This lad wasn't due at Donaldson for over 2½ hours and the weather sequence he was given was 45 minutes old, so by the time he got to Donaldson the weather picture could have changed from good to bad or bad to good. What he wanted was a *forecast* for his arrival time.

This isn't a new subject; we've talked about this several times, but for some reason an awful lot of pilots haven't gotten the word. If you want to know if your grass is getting watered by natural rainfall then go ahead and ask for "the latest sequence." If you want to know what the weather will be at the time of your arrival then ask for a *forecast*.

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AS long as the T-33 has been around you would think that we would have learned all her little tricks and idiosyncrasies. Obviously, we haven't, and to show an example here is an OHR sent to Rex by Captain Roy C. Ihde, Director of Safety, 3970th CSG, APO 283:

"On a pre-landing check in the GCA pattern, the right gear indicator continued to read UP after the gear was lowered. Recycling failed to correct this condition. Tower reported that gear appeared down. The pilot flew formation with a C-54 and its crew stated that the gear appeared to be down and locked. The warning horn would not sound, and the gear-unsafe light was out. The pilots activated the gear emergency system from front and rear cockpit and landed safely with right gear Selsyn indicating UP. After the battery switch was placed OFF and then returned to ON the Selsyn indicator indicated GEAR DOWN. A heavy rain had occurred prior to this first flight of the day."

An investigation showed that the right gear uplock limit switch malfunctioned presumably due to moisture from recent rains. This malfunction in flight caused the right gear Selsyn indicator in both cockpits to indicate gear up. During ground check it was noted that placing battery-generator switch to OFF position momentarily and then back to "battery-generator" corrected the erroneous gear indication. A test conducted during OHR investigation revealed that pulling the landing gear warning IND (indicator) circuit breaker momentarily and then resetting it would also correct the erroneous gear indication.

While this procedure isn't approved nor in the Dash One it seems pretty certain that it could turn an emergency into a normal landing. There's a caution note, however. It's this: Prior to resetting the indicator circuit breaker be sure that the landing gear position indicator movement has stopped.

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Here's one that's best left in the words of the KC-135 Aircraft Commander. He was to ferry the '135 back to his home base after some maintenance had been performed. He was aboard the aircraft when the civilian crew attempted to start the engines to check on the maintenance that had been accomplished.

"An air cart was connected to the aircraft with the air conditioning system ON resulting in hot fumes filling the cockpit and cabin. I advised them that the air conditioning was *on* and that I was turning it *off*. Then they attempted to start #4 engine without success and followed with attempts to start #3, #2 and #1. All were unsuccessful. While they were attempting to start the engines, they were turning on and off the starter switches, bleed switches, alternate pressurization switch and the air conditioning switch and finally discovered that they had not turned on the battery switch. The battery switch was turned on and #4 engine was started but they were unable to start engines 1, 2, or 3. They decided that the air cart was faulty and sent for an-

FROM REX RILEY

other. As the tug backed up to the "faulty" air cart, the tug caught fire. The driver stopped the tug (instead of getting it away from the airplane), got off and ran around to the side of the tug that was burning and attempted to beat out the fire (burning fuel) with some sort of a cloth object. Fortunately, the fire guard on #2 engine came running up with a CO_2 bottle and extinguished the flames. Then the driver re-started the tug (why it didn't catch fire again I'll never know) and hooked on to the "faulty" air cart and drove away with it.

The new air cart was connected to the aircraft but attempts to start engines 1, 2, and 3 were still unsuccessful. Power was advanced on #4 engine in an attempt to start the other engines and as the RPM approached 90%, I discovered that they had turned the air conditioning switch on again during their initial attempt to start the engines, before the battery switch was turned on. I advised them that the air conditioning switch was on, and I turned it off again. Engines 1, 2, and 3 were then started without further incident.

The aircraft was towed from a position near the hangar and the engine run was accomplished with the nose gear down lock pin removed. At no time during engine start or run-up was the radio turned on so that fire equipment could have been called. The engine run was accomplished at the edge of the ramp with the tail turned toward and very near to the active runway and the tower was not advised.

I left the aircraft after the engines were started (for personal safety consideration) and went into the maintenance office to ask why maintenance personnel did not use checklists for engine start and run-up. I was advised that they were "so well experienced" that they did not need checklists.

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In going through the many OHRs (Operational Hazard Reports) lo and behold what showed up but a dyed-in-the-wool "buzzing" report. I thought buzzing had gone out with the days of the white silk scarf and the pitch into the traffic off the deck. Another thing the buzz job wasn't a fighter jock, but a C-47 pilot. Seems like this intrepid Gooney driver was on a four-hour local when he got the urge to show his daring to some radar site folks. He did pretty good—3 low passes down to 40 feet or so—with steep pullups and steep banks (C-47 chandelles). On one pass he came pretty close to the radar "bubble." Too bad for the C-47 pilot that the base commander didn't think more of his skill than his judgment because at last reports he isn't flying at all these days—seems he's trying to figure out what to do about the court-martial charges.

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There is an "Ode to Blindness." It was written by Milton. In this ode is a phrase "They also serve who only stand and wait." Well, we haven't been standing nor waiting, but we might as well have. We stood up and shouted "Pave the overrun, stabilize the overrun." We persuaded the engineers to patch up the runway lips by improving the overrun. This should prevent accidents involving lips. No more problem. Well, you'll never guess it. Now that we have paved overruns, we have no more runway lips! But guess what we have? Overrun lips. We now have those characters who try to land at the very beginning of any paved surface. This is usually now the overrun beginning. We now have accidents involving the overrun lip. This is progress?

Well, look below. Isn't that a pretty picture! Now, I ask you—don't use the overrun for a landing touchdown zone. Aim and squat at least on the runway threshold. ★

The Price is Right

CWO-3 Stuart L. Lamotte, 1502d Air Transport Wing,
APO 953 San Francisco, Calif.

Faithful airplanes, like old soldiers, never die, and in this case they don't even fade away. In this day of rocket propulsion, nuclear warheads, solid fuels and space capsules, we are prone to forget some old and true friends: the prop-driven aircraft and the people who maintain them. As a gentle reminder it might be well for us to take a long look at one Air Force organization whose heart and soul is wrapped up in the old flying machines.

This organization is the 1502d Air Transport Wing of the Military Air Transport Service, and its flying machines are C-124s and C-118s. Although ideally assigned at Hickam AFB, Hawaii, this unit has a king-size mission in the immediate worldwide airlift support of both men and materiels for the Department of Defense. As of 30 April the latest fly-safe mark for the 1502d is 295,333 hours without an accident.

Col. David E. Daniel, 1502d Wing Commander, is quick to acknowledge all efforts toward flying safety.

"This outstanding achievement wasn't accomplished by any individual," said Col. Daniel, "but is the result of professional teamwork by all 1502d members."

Normally you will find planes with the 1502d insignia on their silver sides at such places as Tachikawa, the Philippines, Guam, Wake, or Travis; but it would not be unnatural to see the same planes at Christchurch, New Zealand, or San Juan, Puerto Rico. It's around the clock, around the world for the 1502d!

Professional maintenance and dedicated aircrews have provided the 1502d with an exceptionally good safety record of a quarter of a million flying hours without a single accident.

Let's stop right here and investigate this term "professional maintenance" as it applies to the 1502d. To begin with, the top drawer maintenance the Wing gets "didn't just happen." It is a very carefully planned day to week to month project, and it all starts with AFM 66-1. Maintenance personnel, from the chief on down the line, are firm believers in this document. There is a noticeable spirit of "can do" in this organization, easily traced to having the rules, knowing and following them.

Another solid asset the 1502d ATW has is the marriage between maintenance and operations. Operations knows what it wants for its planes and crews, and maintenance does the providing; it's that simple. A shining example is the refurbishing program. You know an old lady with more than 10,000 hours on her airframe needs an occasional face-lifting, and this is exactly what she gets. We stand her down on an AR work order and then go to it. Cockpits are painted, seats reupholstered, stenciling done over, and up-to-date modifications added. Actually, the old gal is better than new and is rarin' to go after all this work is completed. Naturally this and all other maintenance is controlled by the place of the same name: maintenance control, a maintenance staff agency on the same level with quality, training, and materiel control; analysis, records and reports, plus the stand team, but with more responsibility perhaps. This activity is an around-the-clock, seven-days-a-week deal which, in this time, cranks out a lot of maintenance know-how.

All of you who're familiar with 66-1 know just how complicated this operation can get. Take from 400 to 600 transient aircraft per month plus 33 base-assigned aircraft, add commercial flights including pure jets, stir well, and you get the picture. Nothing this big and unwieldy could possibly work without teamwork.

The 1502d has it. You must have a Periodic Maintenance Squadron producing good, on-time aircraft; Field Maintenance supporting the line; Periodic with the right skill levels when and where they are needed, and, of course, a Flightline Maintenance Squadron that is on the ball. In each of these units the Commander runs his own show, but he does have a strong coordinating line with the Chief of Maintenance.

As for the squadrons themselves, each has a special talent or two over and above that which we normally would expect. Periodic personnel, for example, are trained to perform an inspection on either a C-124 or a C-118—without so much as a blink of an eye. Flightline is a going concern with the rotating, on call, crew chief crew system; our reliability rate proves this is a good thing. Field Maintenance is blessed with a wealth of talent in key places where it counts the most. Many of these people watched the Air Force grow from the rock bottom of Pearl Harbor days. The 1502d ATW is all this; records don't lie. The proof of the pudding is projects like "Big SLAM" and "Long Pass." You can and do accelerate from a five-hour-a-day utilization to over eight-hours-a-day without stubbing a toe. Lest we forget, this is achieved with aircraft built before most of the world ever heard of Korea!

Everybody gets into the act in our show. Training control, the stand team, and the management engineers all have a definite part to play in the maintenance performance. We depend a great deal on accurate, up-to-the-minute job standards, properly trained personnel

Col. David E. Daniel
Commander, 1502d Air Transport Wing

Maintenance Control personnel of 1502d ATW plot (left) an inbound transient aircraft. Control room is heart of maintenance activities shown at right.

to perform the jobs, and a definite standard to guide each performance. We make progress in unity and, as GE puts it, "It's our most important product."

Maintenance provided by the 1502d is not all birds and flowers. We have our share of problems just as any airplane-owning organization has. Right now we are faced with a pretty serious corrosion situation. It appears that aluminum airplanes based on a tropical island and constantly exposed to salt air will corrode; ours are doing just that.

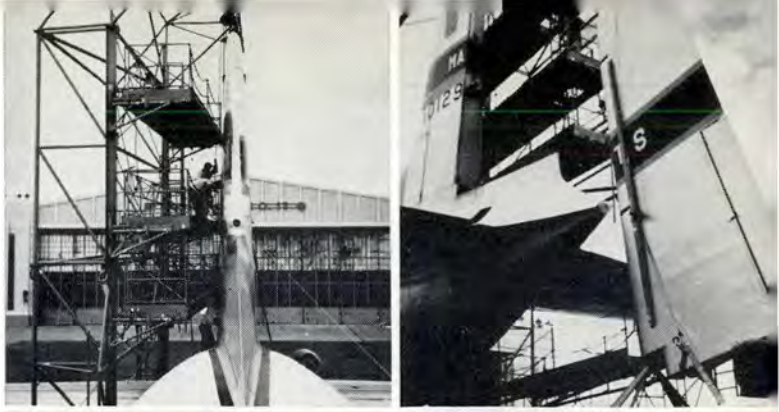
Fortunately—as part of the team—we have a very fine Quality Control Section whose personnel inspect, analyze, record, and then have these troublesome corrosion areas treated. We believe we have this one licked. At this point, let me re-emphasize: Know the rules and follow them.

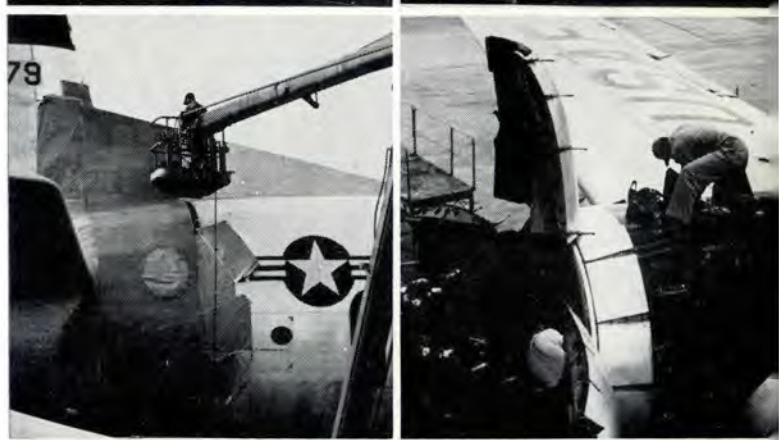
A lot of money and many manhours were spent in putting AFM 66-1 together. It may not have all the answers, but it has most of them.

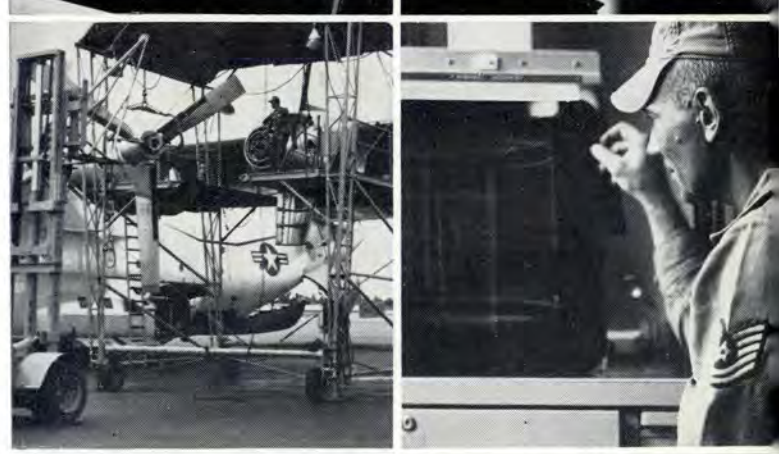
While we're on 66-1, let's drop a hint or two about maintenance data collection and exception time reporting. The uses of both of these accounting systems are unlimited. The Chief of Maintenance and his staff recognize the true value of proper on-time collection of maintenance data. Records, reports, and analysis is our "Scotland Yard" in this area of maintenance business. When we get out of line in reporting data or are reporting it incorrectly, they let us know in a hurry. This is as it should be. It can be safely stated that the complete use of the above-mentioned accounting systems, as directed by 66-1, has made the 1502d ATW a better place to live in and work for.

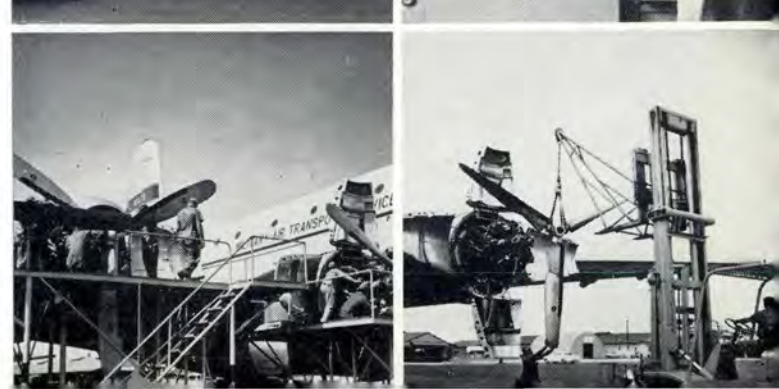
Linked with the maintenance effort is materiel control. Maintenance begins with Supply. It can all end there too if you don't have a smooth-running, efficient unit as we have. Low cannibalization and AOCP (aircraft out-of-commission for parts) rates put a gleam in the boss' eye, just as your child's good report cards puts the gleam in your eye.

The 1502d has broken and will continue to break airlift records. This is not a band playing, flag-waving rally. It is a lot of real good airplane pilots and mechanics working hard for the boss, the wing, and for the United States Air Force. In passenger and cargo miles flown, in training received, in providing quick and efficient airlift to keep the cold war cold, in all the accomplishments of the flying and maintenance crews, in all of these things and more—for the 1502d Air Transport Wing—the price is right! ★









SILENCE! F. E. B. WORKING

Capt. James B. Knighten, 6139th Support Sq, APO 919 San Francisco, Calif.

When my neighbors complain about my son being such a big loud mouth, I tell them, "It's all right. One of these days he's going to be an Air Force pilot, and as a pilot, he's expected to be heard when he speaks." Anyway, I have loved noises ever since the year A.D. (after the disaster). However, during those B.C. (before the crash) years, I was known as Gentle Jimmie, flying the left seat with Soft Talking Sam and we were called the "Super Silent Flying Team." Both of us were ten-year captains, IPs, flight exasperators and aircraft commanders, par excellent.

Those who observed us in the cockpit witnessed a beautiful ballet of precision maneuverings, minute adjustments and perfect coordination, all without a single word being spoken. It was truly magnificent. He read the space between my ears and I read the void between his. We were like two pantomimists, working quietly as a team, unhampered by a lot of yakkity yak and Dash One responses to checklists. We knew exactly what to do and we did it, on cue. Talk was superfluous. Using a checklist was criminal. The Elites of the Ozone were at the helm.

When I smiled, Sam raised the gear; a nod and the power was reduced; a shrug and the flaps came up. No chit-chat, like a well oiled machine with everything done beautifully and silently—until that day.

That day involved a routine eight-hour flight of four cigars, the customary nods and smiles. The Silent Ones were on stage and the audience was spellbound. Even the snow outside was quiet. Only those noisy C-47 engines ruined the astral serenity. When over the high station at destination, we received the weather . . . one hundred and a half. I smiled and Sam dropped the gear silently. The cockpit was quieter than the chapel on payday. On entering the glideslope, Sam silently advanced the power and lit a cigar. Then GCA said, "You're passing through minimums." I smiled.

Just as I expected, Sam gently tapped my hand, advanced the power and silently took the yoke, meaning the field was not in sight. Perfect coordination. I nodded and looked up just as the field came in sight, so I gently tapped Sam's hand, cut the power and quietly took the yoke back again, meaning I had it. However, before I could level off, Sam gently tapped my hand, advanced the power and silently *re-retook* the yoke, meaning we were in a fog bank and he was going around. I smiled understandingly, but that instant I saw the runway and, as you might expect from such professionals, I gently tapped Sam's hand, *re-retook* the yoke, cut the power and landed.

Now that I look back, this precise interplay of shifting responsibility, taking and retaking the yoke, all without a word being said was marvelous. It was a degree of coordination that even a Notre Dame backfield would be proud of.

Unfortunately, however, Sam raised the gear on the first attempted go-around and the gear was still in that very silent UP position when the props started digging up the runway noisily.

At that point I broke the silence and asked Sam what happened but Sam didn't answer. He was busy filling out the Form One and his application for retirement. Meanwhile the prop noise was music compared to the racket the base commander was making as he jumped up and down like a maniac on the corrugated L-shaped wing.

I do feel, now that it is all over, that Sam should have broken his silence at my F.E.B., but he didn't. I also feel that the verdict, "Grounded until death do us part," is legally insufficient and I shall appeal all the way up to the U.N. Meanwhile my son can yell all he wants to and if I ever see him without a checklist in his hand, reading each item one by one, even if he's riding his scooter, I shall kick him all the way from the top of his Exterior Inspection to the bottom of his Before Leaving the Aircraft and he won't be able to sit on his Post Flight for a week. Yell, boy, yell! ★

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CAUTION! HOT BRAKES!

Reprinted from B-58 Hustler News, CONVAIR, Fort Worth, Texas

Aircraft brakes withstand a great amount of heat and give off little odor or smoke. However, braking actions sometimes cause brakes to overheat. This overheating extends through wheels and tires and creates serious explosion hazards which can cause personnel injuries and aircraft damage.

Hot brakes result from high-energy braking. Just how hot depends on airplane gross weight, speed at which brakes are applied, whether a deceleration parachute is used, and other factors. A brake application at a gross weight of 82,000 pounds and indicated air speed of 155 knots results in a brake energy of 8 million foot-pounds, if a deceleration parachute is used. Without the parachute, this same brake application develops a brake energy of 11½ million foot-pounds.

When considering precautionary measures for handling an emergency hot brakes situation, remember that tire pressures increase for a period up to 75 minutes after the airplane has been braked. Extreme caution must be taken before nearing hot wheels. Safety practices should provide that all personnel, except those who need to be nearby, maintain a safe distance—a 25-foot minimum is recommended. Also, approaches to main landing gears should be made only from front or aft. Tire fragments and debris scatter laterally in an explosion.

Fire-fighting equipment should be as near as possible to an airplane's anticipated stopping position. As soon as the airplane slows to a stop, the equipment should be moved to its actual location. After the airplane has stopped and the engines are shut off, the main landing gears should be approached from front or aft. No one should stand directly between the main gears or outboard of either gear because of the dangers of explosion.

If a fire is evident in a brake or wheel and tire pressures have been relieved (flat tires), any agent can be safely employed to extinguish the blaze unless it is a magnesium fire. (A dry chemical extinguisher should then be used.) If the tires have not been deflated, an explosion is possible and bromochloromethane (CB) should be sprayed on the fire, using short intermittent bursts. Apply only the minimum quantity necessary for complete extinguishment. A one-or two-gallon extinguisher should be adequate, but a 20-GPM handline from a fire truck is more effective. If CB is not available, use short applications of water in a fog pattern. Again, use only the minimum amount necessary to extinguish the fire. If the fire is limited to the brake, a straight stream can be discharged onto it, but no additional agent should be used for cooling the entire wheel assembly.

When a fire is not evident following a high-energy braking action, allow the brakes to cool by themselves, but with fire-fighting equipment held in readiness and personnel maintaining safe distances.

Improper use and application of fire extinguishing agents can also create a rather dangerous situation. This can cause far more damaging results than extreme temperatures from over-heating. CO_2, dry chemical, or foam should never be used solely for cooling hot brakes. CO_2 can induce thermal shock in the wheel by its sub-zero discharge temperature. Dry chemical will not cool brakes and foam does not have as good a cooling effect as CB or water. However, if for some unforeseen reason a magnesium fire develops, as evidenced by an extremely white, bright flame (parts of the wheel are magnesium), a dry chemical should be used to extinguish this fire—liquid-type extinguishers spread the fire.

Accelerated or uneven spot cooling by improper application of cooling agents induces thermal shock, causing a wheel to fracture. This wheel fracture, coupled with high pressure from inflated tires, forms a combination sufficiently critical to explode and scatter metal fragments and other debris.

Another point is smoke does not always mean a fire. It can be due to excessive grease and leaking hydraulic fluid. In any case, no airplane involved in a high-energy brake stop should ever be left unattended until sufficient time has elapsed for the brakes to completely cool.

Common sense is as important as accident prevention measures in fire-fighting. The ability to cope with dangerous situations and to know exactly what to do instantly during an emergency can mean the difference between saving and losing a crew and airplane. This can be achieved only by thorough training and frequent fire drills designed to familiarize personnel concerned with safe fire-fighting procedures and equipment. ★

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WRITE IT UP...OR DOWN

Any information you put in writing will help the maintenance people when they're trying to find what's wrong with your airplane. Here is a letter from Joe Maintenance to a Pilot, reprinted from Hill AFB's Aerospace Safety Bulletin.

Dear Pilot:

It may be presumptuous of me to write this letter, but I know of an easy way for you to help me to help you, and I can't keep quiet any longer. When I start to fix an aircraft I'm sort of like Jack Webb, "I need the facts," and more often than not, you don't give 'em to me—in writing, that is. The proper reporting of your inflight troubles will not only cut down my work, it'll give you a safer aircraft the next time you fly.

Some pilots figure, perhaps, that a mechanic is a worthless sort who spends his time drinking coffee, changing spark plugs, and writing "Ground Checked Okay" on the forms, but this is not always true. Quite often, in fact, your grumbling about your aircraft condition should be aimed at yourself. In some instances brevity is appropriate, but the lack of details in many write-ups is absurd.

Like most mechanics I want to do a good job and maintain a good aircraft, but without your help I don't have a chance. Without a few clues I'm lost, and I get real frustrated going around in circles trying to figure out where to start.

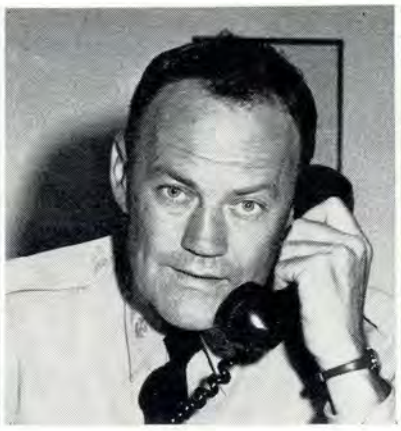
Perhaps a few simple rules will help to straighten things out. How about these?

- Write it up! Your talking about it with the Flight Engineer or the Follow Me driver is fine, but sometimes they don't tell me about it.
- Write in *all* the details. If it's about an engine, tell me the altitude, power settings, instrument readings, temperature, and anything else you think of. If it's about a radio, tell me which channel, and whether it's the receiver or the transmitter, and what kind of noise it makes. Be specific. And don't be afraid to use more than one block for the write-up if you need more space. Tell me everything.
- Tell me what checks you have made and what the results were. You seldom ever quit using a piece of equipment without some effort to make it work or to find out what's wrong, and I may not be able to to duplicate your tests on the ground.
- The last rule is to keep the Form 781 handy, and write everything down as it happens. You'd be amazed at the items people forget after they are on the ground and in a hurry to get home.

I hope I've made my point, sir. With your help maybe I can get the Maintenance Officer off my back, give my ulcers a rest, and even quit beating my wife.

Thanks,
Joe Maintenance.






L to R: Lt Cols. Wilson, Hilmo, Brosnan, Price

"Rō-tā'-shun"

Colonels Smith (above) and Bishop

"Rotation" this year has taken several of our "contributing editors." These are the persons who, even though their names haven't appeared on the masthead of AEROSPACE SAFETY, have contributed regularly to such features as the "C-Notes," "Cross-Country Notes by Rex Riley," "Checklist," and miscellaneous fly-safe items, as well as full length articles.

Comments referring to their contributions are indicative of reader interest, therefore I am using this space to give you their new addresses, should you wish to swap notes with them or to write them about their specific bylined articles. The pilot-authors (we call 'em project officers) who have transferred or are scheduled to leave DIG/Safety are:

• Lt. Col. W. W. "Woody" Wilson, F-100 project officer. Readers are still writing about his article, "Living a Century with the Hundred" (April 1960). Col. Wilson has transferred to Hq USAFE, DCS/Ops, APO 633 New York, as has Major Glenn Crum, '105 project officer and soon to be a light colonel. Major Robert M. Scott, project officer and accident investigator of the F-104, is returning to "Frozen Chosen" (Korea). For you pilots who want to swap '104 notes with him, he can be contacted at the 6146th AF Advisory Group, APO 76 San Francisco. Col. Ed Bishop, F-100 and '102 pilot, is now with the 32d Air Division, Tinker AFB, Okla. Lt. Col. Cornelius G. Brosnan, B-52 project officer, has a new assignment with Det 1, 315th Air Div, APO 235 San Francisco. Lt. Col. Arthur B. Hilmo, authority on Facilities, has orders for Fairchild AFB (Weather Det Co), Washington. Lt. Col. Robert D. "Jim" Price, T-33 project officer, has an assignment with Hq 12th Air Force, DCS/Ops, APO 12, New York. Major Samuel E. Neely, Asst. Chief of the Life Sciences Dept., is now assigned to the USAF Medical School, Gunter AFB, Ala. Much of the material written by these project officers has been reprinted in For-

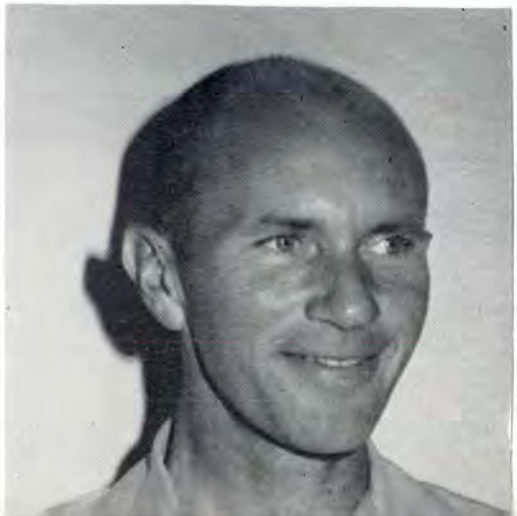
L to R: Lt Col Ward, and Majors Crum, Scott, Neely

"...the act of turning round on an axis like a wheel; regular succession." WEBSTER'S DICTIONARY

eign Air Force publications, as well as in aviation safety magazines here in the ZI.

• And from the department specifically charged with the job of gathering fly-safe material for and preparing publications for the printer, three officers—including the head man of this office—have transferred: Colonel Herman F. Smith, Assistant for Education & Training, has gone to the Air Force Academy as Professor of Psychology. Lt. Col. Francis D. Hessey, formerly Editor and the first officer to head up the new department called "The Literature Branch," has an assignment with the 6143 Ops Sq, APO 929, San Francisco. During his assignment as Editor, Col. Hessey flew to a crash scene in the Rocky Mountains Area, obtained material for and wrote a survival article entitled "Horror in Hell's Canyon," which the Air Force Academy has included in its course of instruction on survival procedures. In another story, Col. Hessey told how a Calif. ANG Unit did things to bring its safety record from the low-man place to the top of the totem pole. This story was sufficiently informative and newsworthy to be reprinted in the Congressional Record. Lt. Col. John Landry, the film expert, has contributed and monitored a lot of safety-of-flight material emanating from the Chart & Photographic Service, USAF. Col. Landry's new address is 10th Tac Recon Wing, APO 238 New York. Major Joseph G. Ross, Editor of the Aerospace Accident & Maintenance Review for the past three years, has worked closely with our staff in lining up material for fly safe publications. Major Ross is going to Command & Staff School for a student tour of nine months. We fully realize that there are many other persons who have furnished story material; however, these project officers have been called upon almost constantly, and have responded regularly with advice and assistance. The staff appreciates every bit of the help it has received from them. We'll be on the lookout for future contributions! ★ JLT

Above, Maj. Ross and Lt Col Landry. Below, Lt Col Hessey



IRON MAN OF THE SKIES...

The Air Force's iron man of the skies, Captain C. Z. Chumley, slowly extricated himself from his beetle-shaped import, deposited his hat on the seat and sunglasses over the rear view mirror. Momentarily he considered the garage door, then deciding that this would be one night when he wasn't about to leave the sanctum of his home, wearily closed it with a wall-rattling bang.

His spouse, eager for reinforcements after a trying day with Sioux warriors and peanut butter and jelly sandwiches, greeted him at the door. Chumley accepted the wifely peck and made for his chair. "Six inches of gin and a ha' drop of vermouth on the rocks will do just fine, my sweet."

While his wife dutifully repaired to the kitchen to prepare the potion for her tired warrior, Chumley examined the mail man's daily offering. There were the usual bills and hard sell ad letters, the new Playboy, and a dainty smelling envelope from Aunt Sophie. There was one piece that caught his eye. Opening it he read:

Dear Captain Chumley:

Perhaps you are a familiar with the American Foundation for Promotion of Safety of Flight. We are a national organization dedicated to promoting safety in the skies. Our activities include research into factors adverse to flying safety, new products, dissemination of the findings of our research by means of our magazine and special bulletins, posters and articles in the various communication media.

One of our most widely publicized activities is our annual award to a pilot who has, in the opinion of our judges, contributed the most to flying safety during the past year. In the past we have confined our effort to civilian aviation. However, the Foundation has decided to present an additional award, beginning this year, to a military pilot. The award will consist of a beautiful trophy 36 inches tall, and a monetary award of $2500.

Unfortunately the number of military pilots precludes our considering every one, at least this first year. We have, therefore, used a rather complicated selection process to reduce this number to manageable size. We now have a considerable list of names from which the final winner will be chosen. You are one of this group.

We would appreciate your completing the attached questionnaire and returning it to us within ten days. If you need additional space feel free to add as many additional pages as you wish.

Congratulations, and may we hear from you soon.

Sincerely,
A. A. Shafor

Chumley studied the paper the letter was written on. It was grade A bond, watermarked; the letterhead was in fine raised printing, the typing was letter perfect and done on an electric machine. By the time the six inches of gin and ha' drop of vermouth were gone he had decided that the American Foundation was a quality outfit and worthy of his attention. Especially the bit about a $2500 award. He would give it a go. After all, who was better qualified than he for such recognition?

Dear Mr. Shafor:

Attached is the questionnaire you recently sent to me in regard to your award for military pilots. You will note that I have attached several pages of additional information. The questionnaire was a little skimpy for details, and hereabouts I am known as a stickler for details. Yessir, ol' C. Z. never overlooks a thing when it comes to safety. The proof is that I am still living after many thousands of hours behind a whirling prop and riding a stovepipe 'way up in the thin blue yonder.

Just one question: When can I expect to receive the award? With summer coming on I could use the money to build a swimming pool.

Sincerely,
Capt. C. Z. Chumley

Several days later the following reply arrived at the Wherry habitat of the Chumleys:

Dear Capt. Chumley:

I appreciate your interest as evidenced by your rather lengthy reply to our questionnaire. I also noted your comments in the accompanying letter.

Before there is a misunderstanding of any kind, I should make it clear that you have not been selected for the award. The selection is now being made and the winner will be notified within the next 30 days.

In reviewing your qualifications for the award I was dismayed that the Air Force has such atrocious maintenance. I have always had an impression quite to the contrary. All those accidents and incidents you have been involved in. My, you must be a very durable person to have survived. Apparently supervision, training and facilities are no better than the maintenance. I thought you would like to know that we are instigating a study to bring this deplorable situation to the attention of the proper people. We can't have our boys flying around under such dangerous conditions.

Yours for Safe Flying,
A. A. Shafor

Dear Mr. Shafor:

I'm sorry that I gave you the impression that the Air Force is lacking in good maintenance, supervision, training and facilities. On the whole they are excellent, but you know . . . you can't have perfection. It is just that in my long career and many, many hours of flying that I naturally have encountered deficiencies which when related at one time—as in your questionnaire—makes things seem worse than they really are.

Part of our problem is the equipment we get. So blame the manufacturers, not the Air Force.

I'm looking forward to receiving the award as it is getting hotter here every day.

Sincerely,
C. Z. Chumley

Dear Capt. Chumley:

I think it is a positive crime that you boys must fly in unsafe equipment. I appreciate your attempt to defend the Air Force. Such loyalty is very commendable. It is obvious, however, that serious safety deficiencies exist and we intend to continue our study and at the proper time present it to the appropriate Congressional Committee.

We have you to thank also for bringing to our attention the inadequate equipment supplied to you by the aircraft manufacturers. We intend to do something about that too. Chumley, I don't know whether you will win the award, but I admire your honesty, loyalty and courage in revealing serious deficiencies that otherwise might have remained hidden. When we get the publicity going the taxpayers will be up in arms. And I will personally see to it that you get full credit for exposing this disgusting situation.

Devotedly,
A. A. Shafor

Dear A. A.:

As you no doubt have perceived by now, I am a modest man. So please leave my name out of any publicity, except, of course, in regard to the award. What I really mean is, just don't get the papers and the teevee people all stirred up.

What I said to you was meant to be confidential—just between us, ha, ha. Actually the planes and gear we got are first class. We all complain about various things, you know—the way the cockpits are laid out, performance of some of the radio gear, and so on. It's just that some of the gadgets are a little hard to get to in a crowded cockpit and radios will fail.

About the Air Force, please forget about the study and the Congressional Committee. I was really a little

tired when I filled it out and naturally pessimistic. I had just returned from a very tough refueling mission and nothing seemed to have gone right. The tanker crew was new at the business and wouldn't hold still so I could get a hookup. I nearly ran out of fuel, then in backing off with a full load I got into a spin. Naturally, I was a little shook.

Anyway, thanks for everything. And if you'll just consider the questionnaire and the award and forget about the investigations and publicity I would appreciate it.

Yours,
C. Z. Chumley

Dear Capt. Chumley:

Such modesty. Such loyalty. You dauntless flyers are indeed the strong right arm of the nation. But we can't hide the fact that that strong right arm is weakened by all the bumbling and inefficiency that has remained a dark secret for so long. I know how a modest man like you must feel, but we will very soon expose these terrible conditions.

I thought that might be interested in knowing that our weeding out is moving right along and we should have a winner in another week. I think you have a good chance. Meanwhile, I have a surprise for you. Just be sure to read your newspaper 10 days from the date of this letter. Heads will roll, my boy, and it will all be the result of your courageous exposure.

To a Real Hero,
A. A. Shafor

WU TO A. A. SHAFOR

PLEASE, PLEASE FORGET THE AWARD STOP A COLD FRONT MOVED IN AND IT'S A LITTLE CHILLY FOR SWIMMING STOP ALSO, FOR CRYING OUT LOUD, FORGET THE PUBLICITY, THE CONGRESS AND THE TAXPAYERS STOP I CAN'T TAKE ON THE WHOLE BUNCH AT THE SAME TIME STOP ALSO, WHEN YOU SPEAK OF HEADS ROLLING I KNOW EXACTLY WHICH HEAD YOU MEAN STOP PLEASE RETURN MY QUESTIONNAIRE AND FORGET THE WHOLE THING OR I WILL BE EX CAPTAIN STOP

C. Z. CHUMLEY

Dear Capt. Chumley:

I regret to tell you that you did not win the annual Safety Award. However, it is my great pleasure to inform you that the Board of Directors of the Foundation was very favorably impressed with your bravery, courage and modesty. Therefore, a special award has been arranged and it will be presented to you with appropriate ceremony in the very near future. I can't tell you more now.

Sincerely,
A. A. Shafor

Dear Capt. Chumley:

I am writing in place of Mr. Shafor, who is no longer with us. As for the award he mentioned in his last letter to you, we have found it necessary to cancel it. However, if for any reason you should wish to resign from the Air Force, we have a position which I believe would be very suitable for a man of your talents. Quite often we bash up an airplane for research purposes. If you would be interested in doing the bashing, please contact us.

Sincerely,
J. J. Crawford
Chairman of the Board

Colonel Mosely looked up from the newspapers spread around his desk.

"Chumley, I've got a job for you. Get busy and find out who this 'unnamed Air Force Captain' is who's about to expose serious deficiencies in Air Force flying operations and whose testimony may involve the entire aviation industry. This is serious, man, and you must get to the bottom of it at once." ★

You can never tell when a habit, established over the years, will finally bear fruit. There are some, of course, that don't bear good fruit, but it's a good feeling when one good one helps you "over the hump."

My harvest was reaped on a night that was meant for flying perfect "Field Grade Weather." The only thing missing was a big moon to make it more like day. There wasn't a cloud in the sky, the stars were bright, and the wind was light.

It was a Friday night in November, the night preceding our regular monthly drill week-end. My squadron was scheduled for some night formation flying but I was due at the Wing Commander's Staff Meeting and could not join the flight. The Wing Air Operations Officer and I decided to do some proficiency flying prior to the meeting. We had flown for a short while and I had just completed a practice instrument approach and landing and was taxiing around for a second takeoff.

A C-47 landed before we had once again reached the active runway and about four or five minutes after he landed we were ready for our second takeoff of the night.

The tower cleared us for takeoff so I put the landing lights on and taxied on to the runway, being sure as usual to use all the runway. I turned slowly into position and came to a full stop. I ran the engines up to 30 Hg and made my usual check of all instruments prior to releasing the brakes.

During our initial takeoff we had noted that we weren't getting quite the manifold pressure we should on the right engine. On this second takeoff both the copilot and the engineer were concentrating on the instrument readings so that we could give an accurate report of the slight malfunction to the maintenance people. The airplane accelerated rapidly and I had just taken a quick check on my airspeed and noticed it was passing 90 knots, when I saw a shadowy mass loom up in my landing lights. In the next split instant I saw that it was a disabled light aircraft on the runway. I horsed back on the stick and it flashed beneath my left engine and out of sight.

Neither the copilot nor the engineer saw the aircraft, and they were startled by the "G" force exerted in clearing the aircraft. When notified, the control tower turned the runway lights up full but could not see anything on the runway. They closed the runway and dispatched a vehicle to check, and found a single engine Beech Bonanza with a collapsed gear.

The light aircraft had lost its engine and electrical power and had landed on the runway between the time the C-47 landed and we took off. No one in the tower or on the ground had seen it land.

How many times have instructors said to students: "What would you do if a car or airplane pulled into your path on takeoff?" We had no time to put into effect any of the words of wisdom that have been expounded in answer to that question. We were committed and our ability to clear the aircraft was decided before starting our takeoff roll.

Which good habit paid off? Was it the habit of always using the landing lights for night takeoffs? I couldn't have seen the aircraft otherwise. Was it the habit of always using the last inch of runway available? Would we have cleared the aircraft if we started even fifty feet farther down? I think not. Was it the habit of always coming to a complete stop and running the engines up to at least 30 Hg before rolling? How many pilots remember that their performance data for a runway is figured on full power from a dead stop at the end of the runway? Was it in this case, perhaps all three good habits that paid off in uncountable dividends?

There may never be another time that these habits will earn another dividend, but I'm satisfied now with the investment that was made all these past years.

Incidentally, aside from the fact that I was satisfied with the results, the very next day our Wing was to be presented with the Air Force Flying Safety Award. Without these good habits, think of what the next day would have been like. Think of the embarrassment, the chagrin, the sadness, and the paper work. Above all—THINK of me with no head—maybe! ★

Maj. John E. Carroll, 514th Troop Carrier Wing (M), Mitchel AFB, New York

Fatigue | IT CAN KILL YOU

Major Donald J. Forsythe, Bomber Branch, DFSR

AT approximately 0500Z one steaming hot summer night, the dense jungle was ripped and shattered by a large four-engine USAF transport. The crash occurred during a night weather VOR approach terminating a long overwater flight.

The aircraft was destroyed and three of its seven occupants were killed.

The cause of this accident was attributed to the pilot's making a descent below minimums during an unauthorized approach. Investigation, however, revealed that the crew had been actively on duty for more than 18 hours, and that the last 5½ hours of flight was accomplished in this noisy vibrating monster at an altitude of 9500 feet, with apparently little or no oxygen utilization.

A person in the tower during the approach and crash stated that transmissions from the aircraft sounded extremely tired, and he particularly noticed the aircraft did not acknowledge transmissions until asked to do so. The entire pattern of events revealed by investigation strongly suggests that the pilot was influenced by fatigue.

What is fatigue? What causes it? What are the results, and how do we prevent or minimize the effects? The situation described above is one which invariably produces fatigue. The long crew duty time, the noise, the vibration, the altitude and lack of oxygen, the critical work task requirements at the end of a long flight, are all conducive to fatigue. The hypoxia which results from over five hours flight at 9500 feet is mild but significant. The classic picture of hypoxia is not necessarily a subjective feeling of weariness but rather a decreased ability to form sound judgment and a decreased motivation to do well.

Fatigue was known in industry long before aviation became aware of its implications. One of the first recorded recognitions of fatigue in industry occurred in England with the passing of an Act of Parliament in 1802, restricting the hours of employment of children and requiring certain standards of working conditions. Industry has since approached the problem in several ways. It has recognized that conditions and hours of work relate directly to onset of fatigue, and fatigue results in decreased output, lowered efficiency and more accidents.

But fatigue is relatively new in the realm of flight. It is reasonably simple to define physical fatigue resulting from overexertion, but fatigue in a pilot or aircrew can less easily be considered to result solely from prolonged sustained activity.

Fatigue can perhaps be defined as a physiological state of tiredness, exhaustion or lassitude resulting from changes in body chemistry and physiology as a result of exertion which tends to inhibit further activity. The victim may or may not be aware of its presence which is manifested in a steady deterioration of skill and efficiency that cannot be dissipated by stimuli. Aircrew fatigue may be divided into two stages:

- Transient or normal fatigue. It follows a period of exertion or excitement and does respond to normal sleep and rest.
- Accumulative fatigue, which does not so respond but may occur after transient fatigue reaches such magnitude to be beyond normal recuperation. It may even result in a change of personality.

Numerous experiments and studies have been accomplished in the realm of aircrew fatigue. A series of experiments referred to as the Cambridge Cockpit Studies promulgated the idea that a pilot anticipates the risks of flying and reacts to "anticipating tensions" with responses intended to remove the danger and thus relax the tension. However, pronounced anticipation can be the same as anxiety. Flying requires highly organized skills which, when disrupted, can produce errors. Anxiety under certain conditions leads to a disorganization of skill.

These tests revealed that as the subjects became fatigued they accepted lower standards of accuracy and the range of their attention diminished with a marked forgetfulness of peripheral instruments and switches. Also, there was a sudden increase of errors near the end of the flight, indicating a tendency to relax when nearing destination.

Many things cause fatigue during flight: the size, weight and type of the aircraft, the location of instruments and the effort required to move controls. Noise, vibration, variation of pressure, temperature, oxygen, and noxious gases all influence fatigue. Duration of the flight, including preparation time, frequency of takeoffs and landings, number and type of work tasks dealt with, anxiety as result of a prolonged instrument flight or air refueling all tend to deplete a reserve of energy. Changes in regions, climate, time zones and variations in diet all affect the store of energy. The time spent on preflight and delays in planned or intended flight result in anxieties. Personal problems, economic and domestic, also are factors predisposing to fatigue. It is generally accepted that anxiety and emotions interfere with the judgment needed to accomplsih accurately timed and coordinated movements. This leads to preoccupation and forgetfulness.

What are the results of fatigue in a pilot or aircrew? Pilots must operate with maximum efficiency during certain peaks of activity. It is significant that the effect of fatigue is greatest at the end of flight where demands for performance are at their height. It is often necessary for the pilot to produce a reserve of energy and capability at the end of a long flight in order to make an instrument approach.

As in the case of the transport accident previously mentioned, the requirement may exceed the energy/skill level held in reserve. The deterioration of skill and acceptance of lower standards of performance are important in relation to misreading published letdown procedures, improper interpretation of visual cues and the misuse of equipment. All of these are common causes of accidents.

It is noteworthy also that in several recent accidents where fatigue has been a factor, visual errors occurred under conditions of darkness during final approach, landing, formation and air refueling.

What can you do to prevent or minimize fatigue?

You must maintain good physical and mental health. You should exercise adequately, get proper rest, eat a balanced diet and abstain from excessive consumption of tobacco and alcohol. In fact, you must do all you can to approach a flight in the best of health.

The commander must play his part by providing all possible support for the pilot/aircrew in the form of an aircraft well maintained and serviced, adequate procedures and regulations, plus an effective follow-up on deficiences in all areas affecting crew support. Where regulations governing crew rest are in effect, commanders should ascertain that not only are the spirit and intent of the regulation understood, but that mission requirements are not allowed to nullify the intent of the regulation.

Aircraft designers and others responsible for cockpit and flight deck details must consider the best possible arrangement of instruments, vision, lighting and comfort devices. Present human design appears fairly static with little evidence of a new improved model in the near future. Aircraft design and cockpit layouts must therefore bear the brunt of any change. The simpler the task required by the aircrew, the less fatigued they become during performance.

Support and traffic control facilities must streamline procedures where possible to minimize fatigue side effects in all areas of operation. As has been said in previous studies of pilot error behavior patterns, it is reasonable to expect that if pilots regard flying as safe, from confidence in the conditions in which they fly, the accident rate will decline. On these grounds alone, everything possible should be done to relieve pilots of anxiety about the outcome of their flights. Arrangements should be such that not only are the risks reduced, but pilots and aircrews should come to regard them as being reduced.★

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JOB CONTROL

Col. Wallace L. Anken, Director of Materiel, 108th Tac Ftr Wg, ANG, McGuire AFB, N.J.

"Camron, this is Job Control."

"Go ahead, Job Control."

"Camron, we have a bird with a blown tire on the end of runway 34. Get to it in a hurry, the tower is holding a half-dozen birds in the air and one of them is low on petrol."

"O.K. Job Control, we'll handle it."

Ten minutes elapse.

"Camron, this is Job Control—I haven't seen anyone head for the runway yet and the tower is screaming, what gives?"

"Sorry Job Control, we're rounding up a jack, emergency wheel, tow bar, etc., we'll be ready in a couple of minutes—"

Ten more minutes elapse.

"Camron, this is Job Control. The 'Old Man' just called and if we don't get that bird moved pronto, somebody is going to be picking threads off their sleeves."

"O.K. Job Control, we're moving out right now!"

Thirty minutes after the first call and many harsh words later, the sick bird was towed off the active runway.

If you maintenance types have ever been in this spot, take a look at the Coleman the 141st Tactical Fighter Squadron has parked in front of the hangar ready to go, with everything needed to get a flat-footed or otherwise sick bird off the active runway.

Mounted tires, an emergency wheel designed to slide into the wheel axle for towing, cockpit ladder, tow bar, tow cable slings, etc., are some of the equipment kept permanently on the Coleman. The Coleman also has a radio for working with job control and an ARC-33 for working with the control tower. It can still be utilized for towing and if need be, the racks holding the equipment can be removed in approximately half an hour.

The last time the 141st Tactical Fighter Squadron received a call to retrieve a bird with a flat tire on the active, it took exactly seven minutes from the time of the call to the time the aircraft was towed off the runway with two round tires.

The Control Tower will appreciate this speed, the airplane chauffeurs waiting to land and the Base Commander will surely like it, and it could prevent an accident! ★

Dear Fellow Airmen:

One of my first steps in taking office as Administrator of the Federal Aviation Agency was to write to all civilian airmen to express my interest in each of them and the common role which we share in the future of aviation. I am pleased with the invitation to express similar thoughts, in an informal way, to Air Force pilots through the pages of AEROSPACE SAFETY.

The airspace we share makes no distinction between the civil and military. Consequently, many of the problems facing civilian pilots also confront you.

Because of this close relationship, we might consider two ideas together: first, the FAA is an organization dedicated to serving the aviation needs of the entire Nation and all its citizens; second, the responsibilities inherent in aviation fall not only on those in civilian areas of government but the military also. We must all work together toward order and progress in the air as well as toward carrying out our individual functions.

I want to assure you that I will do my best to see that FAA fulfills its obligations to the Nation as a whole, to those who fly for enjoyment or profit as well as those who guard our skies and borders. FAA stands ready to assist the military in carrying out its vital responsibilities.

To the ends that we seek to serve, I earnestly solicit your support and your ideas. Every thoughtful suggestion will get thorough consideration, although it will not be possible to acknowledge each one.

In the past few weeks we have started studies to formulate a blueprint for the nation's aviation developments in the 1960s and to examine our rule-making and enforcement procedures.

As productive knowledge is gained, I shall do my best to keep all airmen fully informed with a view to finding ways, to paraphrase President Kennedy, in which we can all serve aviation rather than having aviation serve us. With such an attitude, I am hopeful that aviation progress in our Nation will be assured.

Sincerely,

N. E. HALABY

Administrator

Federal Aviation Agency

FALLOUT

LETTERS TO THE EDITOR

Deadsticking a Flamed-out Century

I am not trying to detract one iota from the recognition given Lt. Carl Wood for his performance in the face of an inflight emergency. (Page 27, February issue.) However, I am questioning the judgment of the editors of *Aerospace Safety*. Lt. Wood handled himself admirably but nonetheless, due to circumstances beyond his control, he did bend his aircraft.

I was recommended for the "Well Done" Award approximately one year ago for deadsticking a flamed-out F-100 all the way down from 30,000 feet to a safe landing on an airstrip that has tall palm trees on both ends, and when it was all over, the ground crew didn't even have to change the tires. All I got from *Aerospace Safety* was a smug reply telling me that the way I handled my emergency was not good enough in comparison to others that had been recommended. If you think that deadsticking a flamed-out Century isn't hairy, then I advise you to try it sometime.

Perhaps this letter will explain to you why I very seldom even glance at your magazine.

1/Lt. R. A. Young
53d Tactical Fighter Sq
APO 12 New York, N.Y.

P.S. I sure hope you have the guts to print this.

Welcome back to the reader-fold. Sorry that we lost you for a while especially because you thought our letter returning your nomination for the WELL DONE award was "smug." It was not so intended. Changes in the procedure for making the selection and the limited space allotted for this feature make it necessary for the loser list to be longer than that of the winners. Hope you'll give us another chance if only long enough to read your letter in this issue. Thank you for writing.

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The Exposure Suit

The "models" you see at lower right aren't from outer space and they aren't OJT Astronauts. They're fighter pilots of VF 151 testing the water-tight integrity of the Mark 4 Exposure Suit. This test was held in the NAS Atsugi Supply sump where the water temperature was a chilly 38°F. Each pilot was buckled into a parachute harness so that while he was testing the suit for leaks he could also refresh his emergency procedures of shedding the harness and climbing into a one-man raft.

The Mark 4 Exposure Suit, or "Poopy-suit" as it is known throughout the Navy, is a rubber suit covering almost the whole body, leaving only the hands and head uncovered. It was designed to improve a pilot's chance of survival in case he is forced to eject into very cold water. At 28°F., which is the temperature at which sea water begins to freeze, the average pilot has about 10 minutes before he will die of exposure. Wearing the "poopy-suit," however—liner, hood and gloves—his time in the water before exposure finally gets him, can be multiplied 12 times or more. The tests are held for every pilot in the squadron, particularly since reports have been received about pilots who ejected successfully into the ocean, only to be found frozen because of a faulty exposure suit.

Tests such as these are just one more step a professional pilot takes to make sure his safety gear is in tiptop shape.

Cdr M. S. Alexatos, USN
Fighter Sq 151, FPO San Francisco

Thanks, Commander. Along this same line, you might like to note the article "Cool, Cold Water" on page 24 of the July issue. Major Glen Crum has given us a bit about proper overwater survival equipment.

To Rex Riley

I've read through your cross-country notes in the May issue and noted how you commended one Luke troop for really using his head in saving another F-100. His thinking, judgment and action in getting the aircraft clear of the ground, in my opinion, was timely and under the circumstances outstanding. However, from here on, I think he boo-boo'ed. It is hard to argue with success, but success based on ⅛ of an inch between two lives plus an airplane on one hand and just the airplane on the other is a poor bet.

You yourself state that had the attaching bolt backed out ⅛ inch more, it would have been disastrous. It wasn't anyone's skill and cunning that kept that bolt in—it was just luck and time.

In my opinion, and I realize that it is easier for me to use hindsight, the best course of action after he got altitude and thought over the possibilities, was to make a nylon letdown. The F-100 cannot be second-guessed maintenance wise from the cockpit. It is too complicated.

In complimenting this pilot's sharpness in saving an F-100, I think you are setting a poor example. Remember, but for luck and ⅛ inch, we would have read a TWX about the landing and then a follow-up accident report.

1st Lt Walter M. Burkett
4526 CCTS, Nellis AFB, Nev.

Thanks for your comments, Lt., however, I feel sure that had the F-100 pilot realized that one-eighth of an inch could make the difference between life and death he would have shot himself out. In the airplane he wasn't aware of this. To him it could have been one of a few dozen other types of control problems. We still think his cool appraisal of the control remaining and subsequent techniuqe applied in using it deserved commendation.

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Who Needs Pressure?

I have read your most interesting article entitled "Who Needs Pressure?" in the June issue, and you are to be complimented on a real fine article. The message is clear and to the point. I think that the Aerospace Safety Magazine is a fine publication, and I look forward each month to its arrival. This is an excellent media for rapid dissemination of ideas relating to safety and related areas.

In reading your excellent article, I am afraid that the implication is that in this instance we had a defective pressurization system in the F-104 involved in this incident. True, no direct statement to this effect is made; however, the implication is there. I believe if you will review the record you will find that this loss of pressure was due to the failure of a crewmember to close the fresh air inlet duct. We here at the Air Force Flight Test Center pride ourselves in our ability to properly maintain our aircraft and equipment. This is a most difficult task due to the diversity of inventory and the fact that the majority of our aircraft are pre-production models for which there is relatively little logistic support. In particular, we have the only cabin pressurization systems tester of its kind in the Air Force.

Col. William E. McCullough
6515 Maintenance Group, ASC
Edwards AFB, California

Fore and aft of latest in B-52 series. Front cover shows Boeing B-52H equipped with deadly skybolt missiles designed to blast target more than a thousand miles away. New turbofan engines give big bomber greater range and performance. Above, business end of 20 mm. cannon capable of firing four thousand rounds per minute.

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