

TAC ATTACK

FLY/OS

FEBRUARY 1969

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NIGHT GUNNERY....Page 8

Night Gunnery Page 8

for efficient tactical air power

TAC ATTACK

FEBRUARY 1969

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TACTICAL AIR COMMAND

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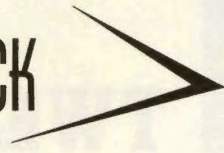
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Angle of ATTACK



a hardening process

When an accident occurs within TAC, the wing commander involved expends considerable effort gathering facts, assessing his operations and maintenance procedures, looking again at his overall safety program, and then attempts to analyze why this particular accident occurred. Too frequently, statistics show that the pilot is at fault.

A look at training records usually discloses a "better than average" pilot with a sound knowledge of his aircraft. However, in many instances, indicators were present which should have served as a warning.

The key person in the supervisory chain who can prevent or forecast a potential accident is the flight commander. It is from this level that the teamwork, so necessary for combat and peacetime tactical operations, begins.

The flight commander is the man who must insist on: radio discipline, correct join-up and rejoin procedures, flawless tactical and close formation, and see that a man doesn't fly when physically impaired, or under-trained for prevailing circumstances. It is the flight commander who analyzes each of his charges to ascertain whether an undesirable trend is developing; for example, involvement in a number of seemingly minor incidents, or acute apprehension during an inflight emergency. Or, he may detect that most hazardous of traits, the hyper-ego. This is the man who, with minimum experience, is trying to prove his masculinity by ignoring altitude minimums during weapons delivery, flying the tightest traffic pattern, or moving in too close during formation flight. And it is the flight commander who knows when a man has personal problems that preclude a safely conducted mission.

The flight commander does no one a favor by overlooking these obvious indicators. He has a hard job and toughness of character is required to do it properly. He must be prompt and direct in correcting mistakes of technique or lapses in air discipline. Usually, additional training or a first class "chewing out" will produce the required improvement. Occasionally, however, a complete job change may be necessary. He has to be tough enough to make the decision. Like all commanders, his flight's safety record usually reflects his efficiency.

Perhaps the evolution of a good flight commander can be likened to the manufacture of fine steel - which requires a hardening process.

R. L. LILES, Colonel, USAF

Chief of Safety



IS TWELVE HOURS ENOUGH ?

**.... between bottle
and throttle.**

**by Capt E. R. Anderson, Jr.
Flight Surgeon
33rd TFW**

Twelve hours between boozing and briefing is a code many flyers hold to. But validity of this cliché is questionable . . . is it really enough? Air Force regulations make no mention of time between last round and lift-off.

The relationship between alcohol ingestion and aircraft accidents has been very carefully studied in recent years by FAA. In 1963 they found that approximately one-third of all civil aircraft accidents involved pilots with detectable amounts of alcohol. In 1964 this number reached almost fifty percent.

As a result in 1965 FAA tried to establish a minimum time between drinking and flying. The proposed amendment (FAR 91:11) read, "No person may act as a crew member of a civil aircraft within eight hours after consumption of any alcoholic beverage."

At that time it was considered adequate for deterrence and enforcement purposes, as a rock bottom minimum beyond which safety would be jeopardized. Although never made official, it was a dangerously liberal understatement.

The FAA's Aeromedical Laboratory in Oklahoma City proved conclusively that small

amounts of alcohol decrease one's ability to perform complicated tasks, and can affect judgment and attitude to such a degree as to render even the most able pilot unsafe. Further, it has been shown that alcohol in amounts considered tolerable for driving is hazardous to safe operation in the air.

Rapid deterioration of neuromotor performance when the combination of alcohol and hypoxia are present has been demonstrated time and time again. This reduction in performance is such that at ten thousand feet cabin altitude disability is roughly squared.

Also theorized is that the body is capable of manufacturing alcohol under the effects of hypoxia and increased adrenalin secretion. However, this has not been adequately proven. But what food for thought it is!

The problem in airline transportation is far less apparent. The rules are distinct in that "... no pilot shall partake of alcohol within twenty-four hours prior to scheduled departure." And there is no faster way to be permanently grounded than by breaking this law.

What then should be the rule for the

Force. First, let's accept the fact that the body metabolizes alcohol at a fairly constant rate of 15 mgm percent (milligrams alcohol per 100 milliliters blood) per hour. (There is certainly variation between individuals, but this is a rather well established rate.) Second, let's accept that a blood-alcohol level of 150 mgm percent represents a marked degree of intoxication. This is the Air Force's definition of drunkenness and a fairly liberal one at that.

It would appear therefore that the blood-alcohol level should be nil in approximately ten hours. Add two for good measure and then . . . are you ready to fly? YOU BET YOUR SWEET LIFE YOU'RE NOT!

Recent studies show that in spite of a negative blood-alcohol level, concentration of alcohol in the cerebrospinal fluid is still quite high. And since the brain is bathed in this spinal fluid, with its elevated alcohol content, we see good reason not to fly despite a normal blood level.

We have here a semi-scientific explanation of the familiar hangover which is obviously not due solely to "impurities in the liquor." This also demonstrates the invalidity of a blood-alcohol level taken ten or more hours after drinking.

Captain E. R. Anderson, Jr., graduated from Louisiana State University School of Medicine in 1964, interned at Philadelphia General Hospital, did one year of general surgery residency at The Boston City Hospital and is now Flight Surgeon for the 16th and 40th Tac Ftr Sqdns of the 33rd TFW, Eglin AFB, Fla. An avid pilot, Capt Anderson hopes to make a career in Aerospace Medicine Research as a pilot-physician.

In conclusion it seems reasonable to suggest something in the area of eighteen to twenty-four hours between drinking and flying. Certainly bottle to throttle in just twelve hours is inadequate. More investigation in this area will undoubtedly follow. But I quote the October 1964 issue of AEROSPACE MEDICINE which stated, "It is not unreasonable to expect pilots to avoid the influence of alcohol for at least twenty-four hours before piloting. We strongly urge all pilots to exercise such restraint." ➤

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by Lt Col W. A. Rosenow
HQ TAC (OSMEN)

A hundred herder taxied back to the dearm area after a ground attack mission. In their rush to finish, the dearming crew failed to remove two ARD 446-1 cartridges from a pair of Type 1 pylons hanging from inboard stations. With a thumbs up signal, they cleared the pilot to return to the parking ramp.

Later that day a second load crew arrived and began preparing the same F-100 for ordnance loading. Starting with a functional check they applied electrical power and depressed the "Jettison All" button. It did exactly what it's supposed to do. Two Type 1 pylons blew clear of the wings as advertised.

Both load crews share the blame for this one. Both neglected to follow and complete their checklists. The first crew should have removed cartridges in the course of dearming; the second should have checked for cartridge removal before beginning a power-on functional check. A case of short-cut, followed by assumption.

Why do back-to-back checklist omissions happen in some organizations and not in others? Perhaps it's discipline and a thing called "Safety Program." Through the years units with effective programs establish good safety records... and somehow avoid back-to-back procedural errors.

You don't have to be an "old-timer" to realize that some outfits operate more efficiently

than others. And this simple fact registers more quickly if a good part of your career is spent traveling the safety survey trail, visiting Air Force bases worldwide. After just a few years of experience, it doesn't take many hours on station to forecast satisfactory results or long hours of difficult work, with accompanying midnights spent documenting findings and recommendations.

What are the ingredients of a successful safety program? It's not a standard assortment of component parts assembled in a stylized, set-in-concrete form, stamped "safety program" and distributed mechanically for all to admire. Instead, it's a highly individualized collection of attitudes, ideas, procedures, and requirements integrated into a coordinated, programmed operation directed toward fulfillment of the unit's mission. Repeating for emphasis: Directed toward mission accomplishment, not against.

So what adds up to a better-than-average safety program? Recently two TAC units scored unprecedented "Outstanding" ratings during safety surveys. One a tactical recon wing; the other a tactical airlift wing. As expected, both units have excellent safety records. Let's examine some extra ingredients in their programs... they may offer some clues to units wanting to join them and needing ideas.

Fundamental, first, essential, plus other adjectives describing vital to success, is a commander's concern for and direct support.

safety program. His genuine interest in accident prevention must be known, and impressed on his staff and supervisors... and fully recognized at the working troop level. Without active commander participation, effective safety program direction isn't possible. Too often, it slowly spirals downward into a transparent attitude known as safety lip service. When this negative approach is diffused throughout an operation, productive safety effort can't survive.

After the unit commander sets the organizational safety standard through his announced principles, policies, and directed actions, some program specifics are needed. In addition to exceptional commander concern, here are a few added items found in "outstanding" units surveyed:

One squadron commander assigned additional duty safety responsibilities to eleven individuals. This assured him widespread safety representation at all times. Probably of equal importance, his additional duty safety people were required to interrupt their primary duties at intervals and "bunk safety." He increased his safety coverage and idea production with his "two-heads-are-better-than-one" approach.

Flying safety meetings are planned for an entire year and coordinated with all sections to avoid conflict, clearly establishing flight safety's priority among participants. Thereby, safety education is recognized as a permanent part of the team effort and not labeled with an "as able" status.

Additional duty safety personnel are scheduled for safety training and school assignments, enlarging their capabilities and contributions.

Locally published directives and OIs covering all functional areas are current and well defined, containing specific guidelines and requirements. More important, individuals throughout the unit comply with both unit and higher headquarters' directives. No short-cuts permitted!

Maintenance facilities are clean and orderly, indicating both supervisor and operator pride in job performance and working conditions. Also, reflecting that work accomplished isn't careless or subject to contamination, creating later inflight

problems for aircrews. Personnel contacted in work centers are alert, knowledgeable, and demonstrate active interest in their jobs. All necessary repair equipment is available and in good working order. It's apparent that the unit's mission can be met with a minimum of wasted manhours and material.

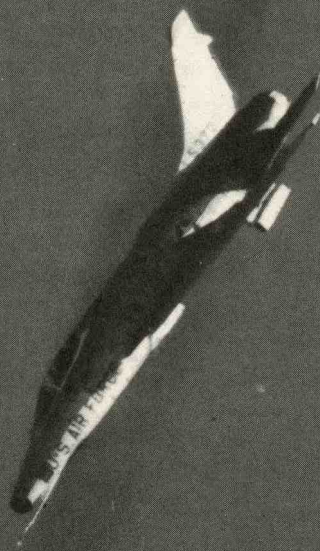
Contrasting sharply with these outstanding units are those apparently lacking firm commander support. In a matter of hours, it's obvious that safe operation as the only acceptable route to mission achievement hasn't been established as a way of life. Directives are outdated. New ones are "being prepared." Tech orders aren't available, but "on order." Poorly-managed maintenance work areas and out of commission equipment suggest less-than-the-best in repair work. Support types contacted offer responses such as, "I'm not the regular crew chief," or, "You'll have to ask Lt Jones or Sgt Smith." Lack of organizational pride and safety interest is evidenced by failure to follow manuals and directives.

Years of operational experience and know-how, plus some blood, sweat, and tears, are condensed into tech orders, flight manuals, and checklists. That old, untrue complaint about "the right way, wrong way, and Air Force way" ignores the years of progress represented in published directives. They do, in fact, constitute the most efficient and safest way to get the job done.

Unfortunately, some short-sighted individuals use a heavy operational requirement as an excuse for short-cuts. They can't see that a few minutes saved by not following checklist procedures eventually leads to malfunctioning missiles, downloading and reloading ordnance, aborting valuable missions, or worse, loss of an aircraft and irreplaceable crew. That's why supervisors, maintenance men, support specialists, and aircrew types have to follow proven, published directives.

Want to improve your unit's safety program? Start practicing the best short cut yet devised: Follow The Book. You'll avoid those embarrassing back-to-back omissions. And in time be telling the 516th TAW and 75th TRW to move over and make room for an "outstanding" newcomer.

the BLACK HOLE



of NIGHT GUNNERY

by Capt David T. Clark
113th TFW

Night gunnery at first thought may seem a frightening thing, whether on a controlled, lighted range, or in the hills of South Vietnam. Most fighter pilots have traditionally felt that night time is for . . . more natural pursuits. Certainly not flying. This misconception can be overcome to some extent with a thorough understanding of procedures and safety practices. All the students I have encountered confess after a couple of flights that it "wasn't as bad as I had expected."

As with any night flying, night gunnery does have some inherent hazards. One of the most pronounced is vertigo. Let's look at some vertigo inducers and see what we can do to reduce the

probability of becoming disoriented. Loss of the earth's horizon is probably the most common cause. However, this can be overcome by constantly cross-checking the attitude indicator.

Constantly turning your head causes the inner ear to present incorrect attitude information to the brain. Bending over, especially with head turned, can really put you on tilt. At night it's absolutely necessary to keep head movement to a minimum. Use your eyeballs to look around and remember, you're trying to prevent spilling some very personal gyros.

Working with flares causes shadows that distort the ground as a reference. Therefore

Do not rely on any single ground reference. When you should continually check your attitude against the attitude indicator.

During recovery, the shadow of your aircraft against a haze or smoke condition — possibly from previous flares — can appear as another aircraft flying a head-on collision course. Therefore, you should be aware of these conditions and anticipate them. Otherwise, you may end up taking unnecessary evasive action, creating more undesirable attitudes near the ground.

Here are some procedures that a pilot should follow prior to reaching the range:

- Make certain the windshield is clean to prevent restrictions to visibility. If necessary have the crew chief run a cloth between the wind screen and sight reflector glass — a hard spot to clean, but an important area to the pilot.

- Check attitude indicators for proper operation and adjustment. Your instruments are every bit as important here as they are in weather.

- Reestablish in your own mind exactly where light switches are located, and the desired settings during range work.

- Establish reticle brilliance. Keep brilliance low enroute to the range. Then if more brilliance is needed during deliveries, make adjustments downwind, while straight and level.

- On some aircraft (F-100) the radar lock-on light may illuminate, causing distraction during deliveries. Check this light during ground operations. If necessary, tape it or remove the bulb.

When arriving at the range, check orbit of the flare ship. To provide maximum safety, the flare ship should circle in a direction opposite the fighters.

The flare ship will adjust his orbit for wind conditions. This adjustment is normally 100 feet per knot of wind at release altitude. If wind direction is from the fighter's orbit, the flare ship must drop inside the fighter's pattern. Therefore, it is imperative that the flare ship be in sight prior to roll-in for a delivery pass. If the flare ship is not sighted, the fighter should go through dry without penetrating the flare ship's altitude.

It is just as important that you maintain visual contact with the other flight members. As soon as

pitch-out is accomplished and the aircraft is straight and level, turn position lights to bright flash. In addition to visual contact, radio calls must be made at key points in the pattern. Calls should be made on down wind opposite the target, turning base, turning final with flare ship in sight, and "off" when recovery is established.

The flight leader must coordinate with the flare ship as to altitudes, orbit points and number of flares to be dropped on each pass. He should then give special emphasis to these items during preflight briefing. A flare ship normally will drop three flares on each pass. Each pilot should watch for three flares at the same altitude, although lighted flares may remain at a lower altitude from a preceding pass.

If one or more flares fail to ignite, the pass should be aborted without penetrating the drop altitude. This procedure was shored up recently by an F-100 hitting an unlighted flare. The flare ignited and burned through the wing section resulting in loss of the aircraft. Other reasons for aborting a pass should include: flare ship not in sight; a flare between you and the target; flare ship between you and the target; or, any unusual circumstances that could be a safety hazard.

Night weapon deliveries like all weapon deliveries can be very accurate and accomplished safely if correct procedures are established and followed. This is thanks primarily to the extreme brilliance of the MK-24 Mod No 3 flare presently being used. This flare's output exceeds two million candlepower for 180 seconds. Flare lighting source is a combination of magnesium and sodium nitrate. It burns at a temperature capable of melting steel.

Flares are normally dropped at 3000 to 4000 feet above the ground. Ejection and ignition timers are preset to give full illumination between 1100 and 1500 feet AGL. This allows sufficient burn time so that the target is illuminated continuously. The flare normally burns out at approximately 500 feet AGL. A pilot must be extremely cautious during low altitude deliveries since these expended flares are not readily discernable.

After all deliveries are completed, the flight must rejoin for the trip home. It is extremely difficult to safely execute a normal turning rejoin.

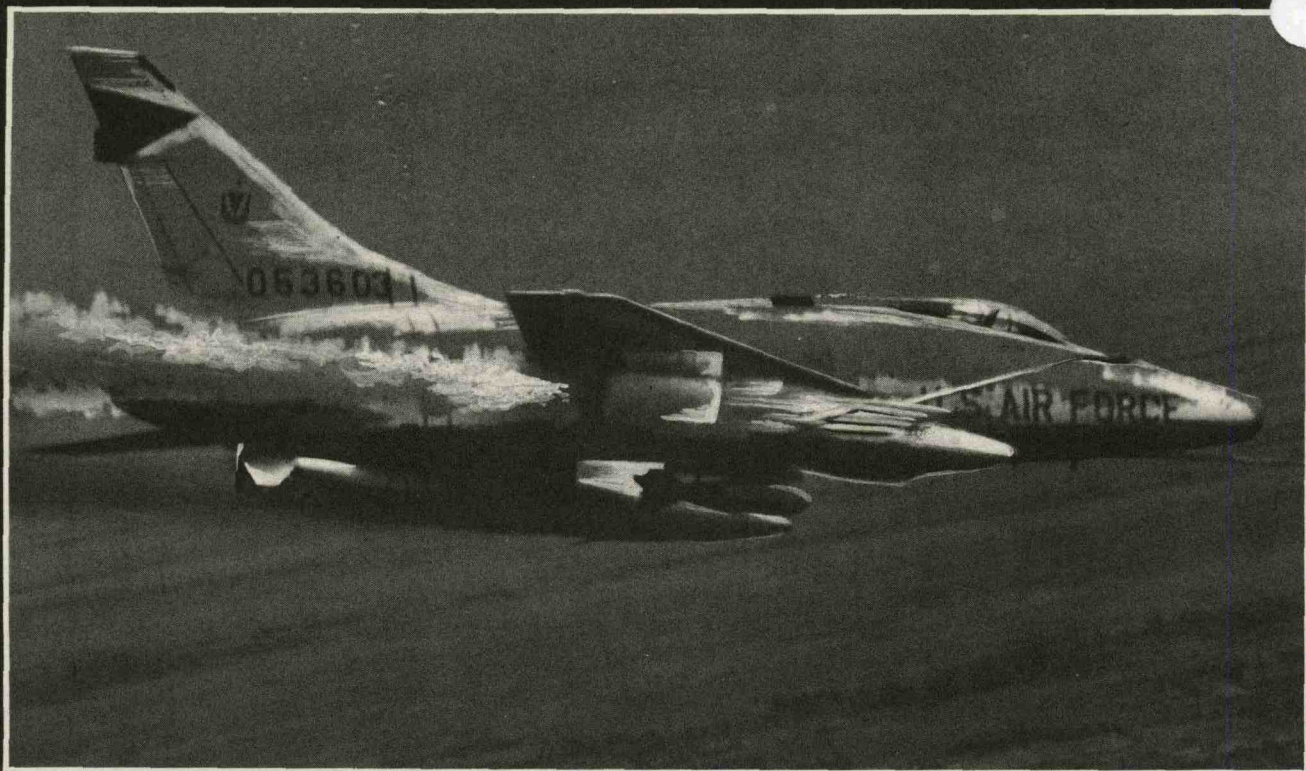
night gunnery

Therefore, we recommend that join-up off the range be made straight ahead. Be sure to keep horizontal separation until even with your leader. Then move in slowly after you have reached co-airspeed. Other than keeping good horizontal separation, airspeed is the most helpful tool to assist in a good safe rejoin. Use a maximum of 50 knots overtake — bleeding it off as you reach line abreast, because you cannot see your rate of overtake from directly behind until too late.

Southeast Asia has proven that the enemy moves at night. Therefore, night gunnery for fighter pilots is here to stay. It requires that a pilot be extremely alert and aware of what's going on. Consequently, it is essential that all pilots establish good sound procedures and operating techniques during "Night Owl" training. That way you can move freely and safely at night . . . but Charlie won't. ➤

Captain Clark graduated from Kansas State University in 1959 and entered pilot training the same year at Malden, Mo. In July of 1960, he graduated with Class 61-A at Webb AFB, Texas. After receiving his pilot rating he attended combat crew training in the KC-135 at Castle AFB, Calif. Until being released from active duty 4 years later, he served as a C-135 co-pilot at Turner AFB, Ga. After release from active duty in 1964, he joined United Air Lines and in May of 1965 the Air National Guard at Atlantic City, N.J. There he became qualified as an F-100 pilot. He remained with both the airlines and the Guard until his unit was activated in January 1968.

The 119th TFS of Atlantic City is stationed at Myrtle Beach AFB, S. C. A senior pilot with over 700 hours in the Super Sabre, Capt Clark completed his F-100 IP checkout in September 1968. He is presently providing both ground and inflight training to students assigned to the 113th TFW at Myrtle Beach AFB.



A 2nd Look at

PEACOCK PILOTAGE

and a

"CHLOROFORMED" CREW

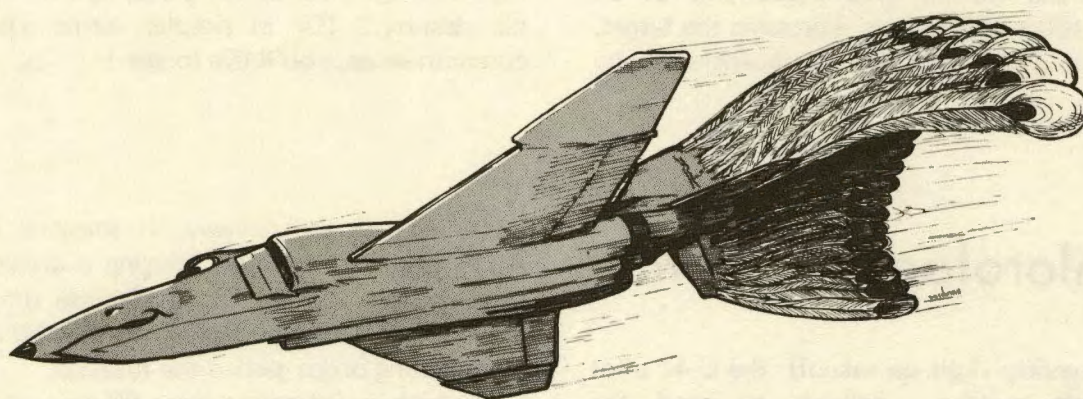
by Don Reynolds

peacock pilotage

Flying under FAC control, a recce type made his final pass over a ground forces CP at a CONUS training area. A few seconds later the RF-4C clipped through tall tree tops... a fireball scorching and gouging a path in the earth.

Was it mechanical failure? Negative, according

to eyewitnesses and Phantom technical specialists. Did the pilot lack knowledge of his aircraft's airborne limitations? It's doubtful, considering IP reports of his recent upgrading to AC, and his record as a PSO in SEA where he flew a full tour including several volunteer "no-holds-barred" combat missions, one of which won the Silver Star for his AC. Was it stupidity? Of course not. There isn't a man flying in today's Air Force that didn't meet special qualifications which exclude



PEACOCK PILOTAGE

feeble-mindedness. Was it something unknown — or unmentionable — something not noted in the regulations or Dash One . . . something that can kill?

The frag order called for day reconnaissance in support of a ground force training exercise. It requested photographic imagery, of Army tracked vehicles, of the best possible scale consistent with altitude requirements outlined in AFM 60-16, including a 500 AGL minimum because there were structures, vehicles, and personnel in the area.

On arrival at the target area, the Phantom pilot contacted FACs working from both a ground station and an O-1. He was given coordinates for several photo runs, and accomplished each one at minimum altitude, or above, at an estimated 360 to 420 KIAS.

Runs completed, he advised the FAC that he had 30-minutes fuel remaining and was holding high awaiting further instructions. FAC advised him to stand by while checking with the CP for further photo requirements.

While waiting, the recce pilot positioned himself behind and to the left of the O-1, contacted the airborne FAC and asked his speed. FAC replied, "105 mph." The Phantom said his low airspeed was 140 mph with gear and flaps down, as he came into the FAC's view at seven o'clock . . . with his gear and flaps down!

After completing two 360s with the FAC, the Phantom was cleared to leave the target area after a final run over the CP. He made a descending turn lining up with the CP, passing 150 to 300 feet over the waving ground-pounders at an estimated 160 to 180 knots. Egressing the target, witnesses said he selected afterburners as he

started a slow climbing roll with "everything still hanging." The roll was nearly complete when ground observers lost sight of the Phantom behind a tree line, which seconds later erupted in a ball of fire. The airborne FAC said the RF-4C appeared at a high angle of attack and seemed to mush or shake prior to contact.

What led this young phantom pilot to violate AFM 60-16 for no apparent reason, except to demonstrate his aircraft's capability to an audience, maneuvering the plane to an attitude and altitude from which there could be no recovery?

Two probable reasons were uncovered by the accident board's investigation. Both are related in this case, but worse, either one will take the lives of more aircrews because their prevention is not in the Dash One, and it's doubtful that it ever will be.

First, the board found evidence that the pilot, while a PSO lived through a similar maneuver, flown apparently for the same reason, by his former AC. The board summed up the second reason, which undoubtedly stimulated the fire when it stated, "a somewhat immature and ego-oriented personality structure of the pilot influenced him to violate a pre-briefed, well known regulation in order to demonstrate the aircraft's capability to a large audience."

Those pilots destined for an ego-oriented crash are offered absolutely no protection by regulations, and certainly cannot be saved by an ego-oriented supervisor. Their only hope lies within themselves. A solution dictated more than a century ago fits today's problem. "For as every man's reason must be his guide, so will it provide his destiny." (Or in simpler terms: Use your common sense, you'll live longer.) ➤

"chloroformed" crew

Easing gently right on takeoff, the C-47 pilot pushed left rudder . . . enough to send the Gooney into an out-of-control left swerve,

careening off the runway. It smashed into an Army jeep and wrecker, injuring a driver in the process, left its gear in a drainage ditch, and stopped with engines sagging from their mounts after flailing props gashed the fuselage.

Though investigators were 99 percent sure of the cause, they routinely inspected



mechanical systems, which checked OK. An A-20 fire extinguisher, the kind mounted on bulkheads in most of TAC's multi-engine aircraft, caused the crash. And it did its dirty work while secured in bracket, mounted firmly on the cockpit wall.

During takeoff checklist procedures, before taking the active, aircrew members detected fumes similar to alcohol. The flight mechanic checked deicer lines, switches, valves, and tank. But during the search and wait for clearance, the fumes dissipated. Moisture in padding covering the right bulkhead was noted by the FM, but because fumes were gone and the deicer system checked OK, the pilot accepted clearance and moved to the active.

Both side cockpit windows were opened about three-quarters of an inch as the Gooney picked up speed. Intense fumes suddenly filled the cockpit and the pilot's eyes burned and filled with tears. That's when the right drift was overcorrected.

Accident investigators found the extinguisher pressure gauge at 50 PSI instead of the normal 160 PSI. The safety was broken and the discharge lever was in released position. The valve was faulty allowing steady drainage. They found the moist bulkhead padding soaked with bromochloromethane, straight from the leaky bottle.

Bromochloromethane extinguishers, sometimes called chlorobromomethane (CB), is a

much safer agent than carbon tetrachloride or methylbromide. But it is still a potent chemical. The effects of CB on man's nerves and senses has been compared to chloroform. Within minutes, similar concentrations of either of these chemicals can cause staggering, dizziness, uncoordination, stupor, confusion, headache, nausea or unconsciousness.

The board included a medical opinion in its statement of cause. "The concentration in the small cockpit reached a level which seriously impaired the pilot's ability to react and apply proper coordinated action. Being under toxic effects of CB fumes, he failed to detect his initial right drift and over corrected with left rudder. With his reflexes impaired, he probably kicked in hard left rudder causing the aircraft to slew off the run way."

The pilot erred when he chose to takeoff without determining the cause of fumes. Sure, he checked the system which most probably could have been faulty, but when it checked out, he assumed nothing was wrong.

Checking the fire extinguisher condition is on checklists of at least three men: the crew chief, flight mechanic, and/or loadmaster in most multi-engine aircraft. Passing up "superfluous" checklist items may catch a guy half asleep. Ask the men who busted the Gooney! ➤

TAC TIPS

...interest items, mishaps with morals, for the TAC aircrewman.

confused crewman

The C-119 pilot started his power check before takeoff. When he pushed number two's throttle up to barometric, the engine quit. He tried a restart, but it refused to fire. That's when a posted fireguard saw white fluid running from an av gas drain. The pilot shutdown his good engine and deplaned his troops.

Maintenance types discovered an unusual type of fuel contamination. A confused crewmember not checked out on fuel servicing, pumped eight gallons of ADI fluid into the right engine's fuel tank. Evidently, he knew that ADI fluid was used, but wasn't sure where the tank was located. He took the direct route.

Don't hear about self-inflicted fuel contamination too often. This one brings up serious questions about supervision and training of crewmembers. Luckily, the engine quit running in time to avoid a pretty sporty takeoff. Flying and servicing airplanes is too demanding a business to let crewmembers check themselves out.

the "gambler"

A person would have to be deaf, blind, and stupid not to have been exposed to the word that has been getting around SEA about shipment of explosive souvenirs to the "world" — or in other words, the Land of the Big BX. We know you are aware of the consequences involved if any type munition went off in your living quarters. Yet some personnel attempt to carry explosive items home or send the BOOM-BOOM through the mail. The worst type is the one who carries an item to the port, turns chicken about getting caught and hides the explosive somewhere. Or he might even hide it on his "going home aircraft." We wonder if these individuals have any conception of the

degree of danger to which they expose other people.

But the highest gamble of all is with your conscience. Let's assume you were lucky, or so you thought, and got this little item by all those snoopy people. You dig your little gem out and place it on the mantle, or better yet on the television set... where everyone can get a real good look. After all, you are a hero. You succeeded in getting this thing through.

While you are off some place along comes one of your friends or one of your children. And he or she decides to look over this prize. The safety device is accidentally removed and suddenly everything is all over. (Or maybe you have a son who needs a new hit for "show and tell?") Are you really willing to take any of the chances... or even one of them, for a souvenir?

From 7th AF Safety Gram

chaff for aero clubs

Aero Clubbers and other private flyers can alert FAA radar controllers of an inflight emergency by signaling with a code 7700 emergency radar blip... without a transponder aboard. For a lost pilot with radio failure, FAA says the procedure, which uses aluminum chaff, is more quickly recognized by traffic controllers than the emergency triangular pattern procedure (though it is still recommended).

The technique is based on a WW II operation. Then, chaff was used to create spoofing target blips on enemy radar scopes. Today's emergency chaff is dropped from distressed aircraft in the same way.

Here's how it works. Drop a packet of chaff every two miles, while flying a straight line, until four drops have been made. Go another two m

and make a 360 degree turn to the left at three degrees per second (standard rate). Repeat the 360 degree turns at two mile intervals until four turns have been completed. The chaff pattern (which simulates the code 7700 blip) and 360 turns improve the possibility of detection by radar controllers. If your receiver is working, monitor frequency 121.50.

Chaff kits are sold by several manufacturers. Each have four packets of foil in two lengths: two inch for airport surveillance radar (ASR) and four and a half-inch for air route surveillance radar (ARSR).

The small kits are easily stowable and sound like real lifesavers.

red light district

Many of our busier commercial airfields are equipped with an illuminated runway centerline.

is, centerline lights run the full length of the way to aid pilots in directional control during conditions of low visibility.

Now comes something new. Those of you who may land on one of these fields will start to see red centerline lights on the last 3000 feet of runway. Two thousand feet of alternate red and white lights will mark the way to the last thousand feet. From there to the end you'll see red.

easy way out

A student and his IP were doing instrument training for about 30 minutes at FL 120 to 180 before starting an IFR recovery. Beginning the penetration descent, the student questioned his IP, "Sir, do you think we should tell them that I was hypoxic?"

The startled IP declared an emergency, made a rapid descent, landing without incident. On the ground, they found a leak in the student's oxygen mask hose. They also found the regulation/inhalation valve blocked with plastic shavings, traceable to holes drilled during a recent

helmet visor modification. In all, three human errors were committed.

The life support equipment specialist failed to complete the job by removing FOD. The pilot failed to properly inspect his personal gear, and did not report or take action on an unsafe flight condition. A painless way to become a statistic!

sea sun

Do you think you look and feel better with a good, healthy tan? Do you like to sun bathe? Do you like to roam on the beach? The answer to these questions for most of us is yes. Here are more questions. Are you flying tonight? Are you flying any night this week? Do you wear dark glasses during the day?

What do these two sets of questions have in common? They are both related to your night vision. At night, bad weather, poor ground lighting, hazy horizons, formation flying, combat strikes, and join ups all require maximum perception and thus, maximum visual acuity.

There are many things that adversely affect our night vision that are impossible to avoid, such as air field lighting (taxi way, runways, etc.), cockpit lighting, gun fire flashes, flares, etc. We also do many things to ourselves we can avoid, such as turning cockpit lights up too bright, not using oxygen properly, smoking, inadequate rest, and prolonged exposure to bright sunlight.

Lying around in bright sunlight, especially on a light surface such as concrete or sand, for only 2 to 5 hours will reduce your night vision by 30 to 50 percent. Your eyes slowly recover with time, but recovery may take many hours. Since the effect is cumulative, repeated prolonged exposures may adversely affect night vision for as long as a week.

Don't stack the cards against yourself. If you are going to fly nights, help your eye balls by protecting them during the day. Then when you need them most, they will see for you.

Lt Col Jared M. Dunn
PACAF

how to

FLATTEN A PHANTOM

by Lt Col John M. Lowery



Psychologists say we humans are all products of compromise, in our beliefs, behavior, emotions, and the like. So too, aerodynamacists concede, are our modern, high performance aircraft. Without exception they involve many engineering compromises so that the end product will be capable of accomplishing its intended mission.

The Phantom is no exception. This outstanding flying machine was designed as a mach-two fighter interceptor. The fact that it also does a tremendous job as a fighter bomber is a fringe benefit of good design. But it does have aerodynamic compromises with resulting shortcomings.

Shapes that produce good performance at high mach numbers don't necessarily provide the desirable stability and control at slower speeds.

So you wind up with drooping slabs and upturned wing tips to mention two.

If there's any doubt as to what the Phantom can do at its fighting or design speed just look at the Mig kill ratio over North Vietnam. Conversely, if there's any doubt as to what the Phantom will do when maneuvered out of its design speed envelope — just look at our accident statistics and reports.

Slap the controls around at low speed and chances are it'll spin — like almost any other aircraft we own. This in itself is not bad. After all a spin used to be a fighter pilot's last ditch escape maneuver. But because of certain aerodynamic compromises this bird will not always recover . . . because it has a fast, flat spin mode (See "Anatomy of A Spin," TAC ATTACK, Vol. 69). The reason is tail design.

To begin with, the most dangerous spin any aircraft can encounter is the flat spin. In almost any aircraft you can name, if a flat spin is possible, recovery using aerodynamic controls is impossible. Two unique characteristics of the flat spin are the absence of pitch and roll oscillations — it's all yaw — and a near 90 degree angle of attack (fuselage approximately on the horizon, relative wind from directly underneath or parallel to the spin axis).

Flat spins are more of a problem in some of our modern century aircraft because of relatively high fuselage-heavy loading. This results in moments of inertia in yaw ten times larger than the older generation fighters of World War II and Korea. Since a fighter aircraft must necessarily be relatively small, rudder design cannot possibly be large enough to handle the yaw forces generated in a spin attitude. Therefore, flat spins are characteristic of aircraft with low aerodynamic yaw damping. This low damping power of the rudder is usually caused by shielding of the vertical stabilizer by the disturbed wake of the wing and horizontal stabilizers.

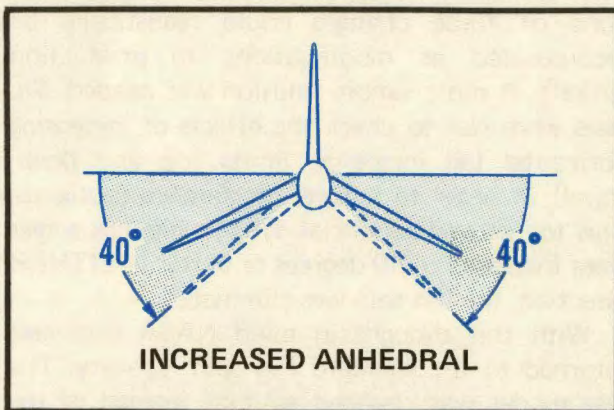
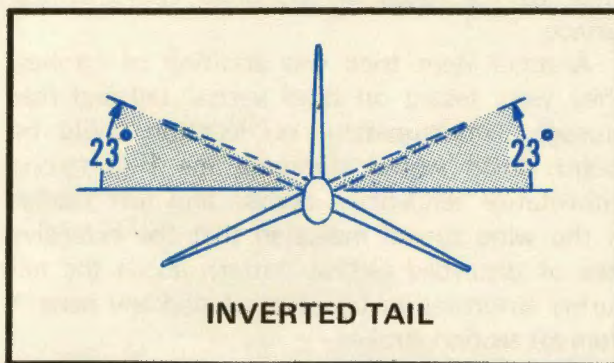
In the F-4, fast, flat spins are possible at all center of gravity positions and control deflections. In the early days of the F-4 several tests were run in NASA's spin tunnel to determine which airframe component contributed the most to the flat spin. These tests centered on the wing and nose section. The data revealed that neither wing nor fuselage nose section (often a very important factor in spins) made any significant contribution. On the other hand, the engineers discovered that changing dihedral angle of the horizontal tail from a negative to a positive value completely eliminated the flat spin.

For a time, interest in the studies lagged and the tests were discontinued. When more F-4s came into service, flat spin accidents began to appear. With renewed interest, wind tunnel tests were resumed, this time concentrating on the tail.

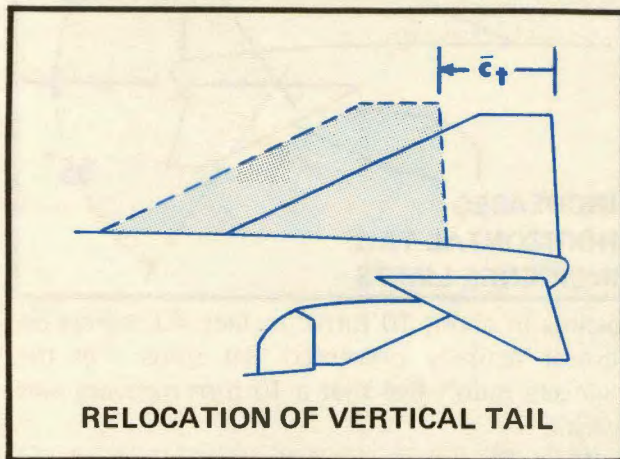
First results definitely established that F-4 flat spins result from aerodynamic interference between the horizontal and vertical tail surfaces. This interference is caused by the negative dihedral of the horizontal stabilizers.

After much experimentation, four techniques were used on the scale models to either eliminate,

or make the flat spin recoverable. Inverting the horizontal tail had already been found effective. So the engineers decided to try increasing the anhedral angle of the already drooping slabs to 40 degrees or more. The results . . . no flat spin.



Then they tried moving the vertical stabilizer forward to get it out of stalled wake of the slabs at high angles of attack. It was moved forward a distance equal to its mean aerodynamic chord. This too, eliminated flat spins. As a matter of interest, when the area vacated by the vertical tail



flatten a phantom

was filled by an auxiliary panel the model would again autorotate or flat spin.

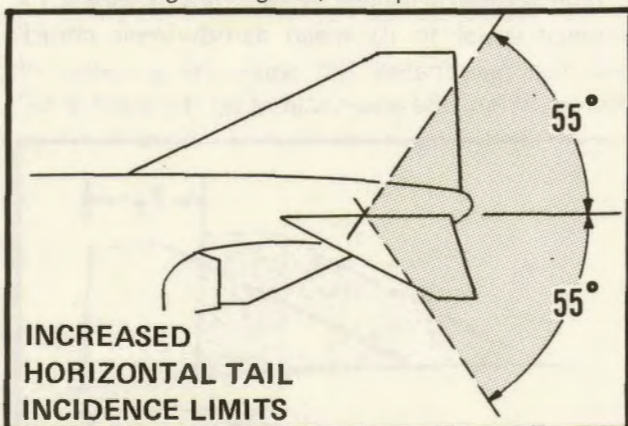
Moving the drooped horizontal tail surfaces rearward also eliminated the flat spin mode. The amount of rearward movement necessary was equal to the mean aerodynamic chord of the surface.

Another item tried was addition of strakes. They were tested on both vertical tail and rear fuselage. Unfortunately, no location could be found which would eliminate the F-4s strong autorotative tendencies. Smoke and tuft studies in the wind tunnel indicated that the extensive area of disturbed airflow pattern about the tail during autorotation (spin) precluded any benefit from aft section strakes.

After due consideration it was obvious that none of these changes could realistically be incorporated as modifications to production aircraft. A more simple solution was needed. So, tests were run to check the effects of increasing horizontal tail incidence limits (up and down travel) in order to reduce interference problems. This too proved beneficial. When incidence angles were increased to 40 degrees or better in EITHER direction, the flat spin was eliminated.

With this thought in mind NASA engineers returned to the standard F-4 spin recovery. The test model was changed so that instead of the standard 26 degrees "up" elevator it was capable of 40 and 55 degrees trailing edge up.

First using 40 degrees, flat spin recoveries were



possible in about 10 turns. In fact, 40 degrees up elevator actually prevented flat spins. Yet the engineers didn't feel that a 10 turn recovery was realistic.

When 55 degrees up-deflection was tried the

improvement was immediately apparent. Consistent recoveries were possible in five to six turns. When the stabilizer up-travel was increased to 90 degrees, recoveries still required four to five turns. It then became apparent that 55 degrees of slab deflection removed most or all of the flow pattern interference caused by the drooping slabs.

Ordinarily, a six turn recovery is not considered adequate. However, recoveries were positive and consistent and altitude loss for a six turn flat spin consumed approximately the same altitude as a two and one-half turn recovery from a steep oscillatory spin. The NASA engineers therefore accepted this as a feasible solution.

CONCLUSIONS

It's still too early to say what use Air Force will make of these findings. Obviously changing slab travel to 55 degrees "up" also has inherent dangers. One is the very great potential for air frame overstress at high speed. Another is dragging the slab on takeoff and landing. Naturally a restriction would be necessary to limit slab travel at high airspeed and in landing configuration.

Our point in presenting this material is to show F-4 aircrewmembers why their Phantom sometimes reacts in an unfriendly manner. Snatch it around in the slower speed ranges and she'll spin. This is not to suggest that a pilot should avoid getting thoroughly acquainted with his aircraft at all speeds. But he should be thoroughly familiar with all the symptoms of trouble, use ailerons with care, and always keep an eye on angle of attack when maneuvering close to performance limits.

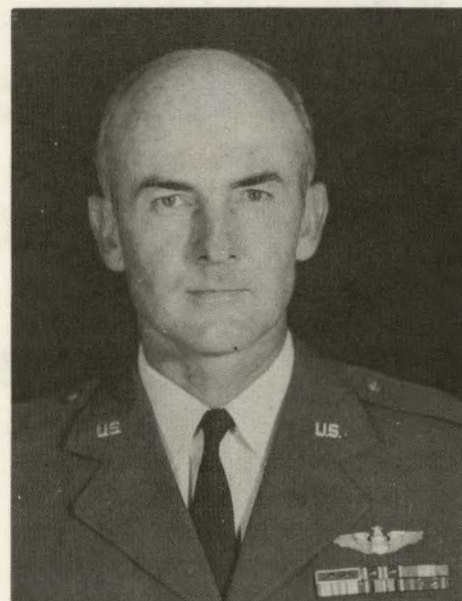
When you're out to best an opponent, fly the bird where it maneuvers best. And if you run out of airspeed "Don't move!" The airplane knows what to do. After all, if you're a real fighter pilot you'll look pretty silly spinning out of the ACM area. Because an accidental spin quickly brands you the loser. ➔

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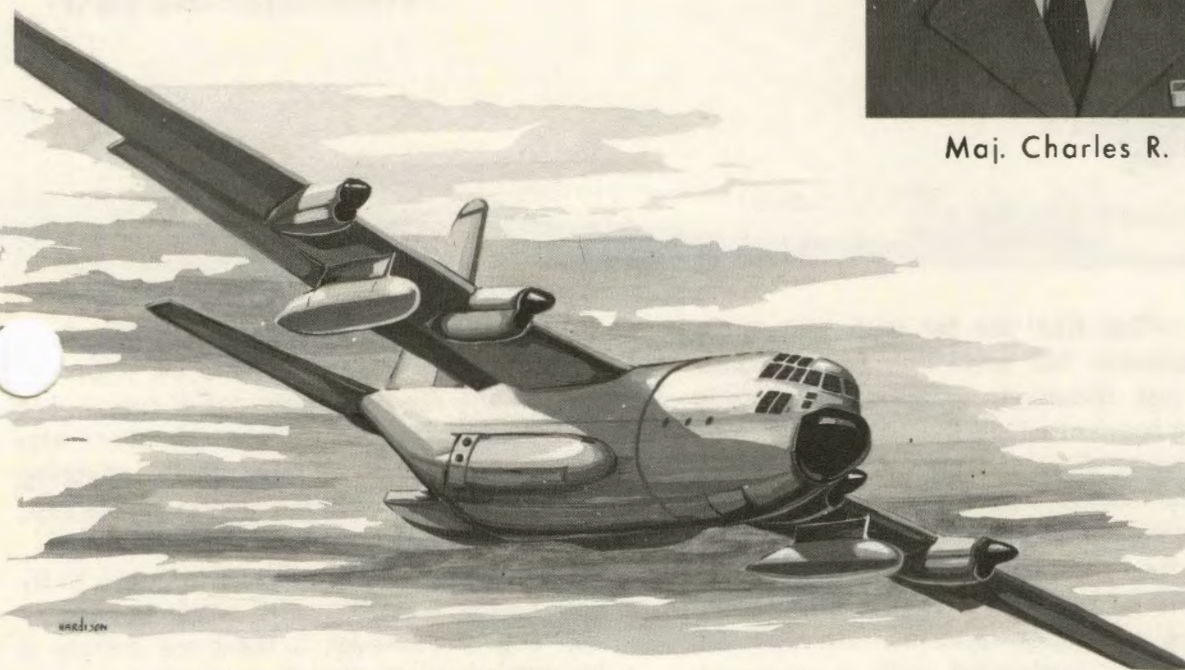
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TACTICAL AIR COMMAND

**PILOT
OF
DISTINCTION**



Maj. Charles R. Douglass



Major Charles R. Douglass of the 61st Tactical Airlift Squadron, Sewart Air Force Base, Tennessee, has been selected as a Tactical Air Command Pilot of Distinction.

Major Douglass completed a personnel aerial drop through the ramp exit on a C-130 RTU mission. After closing the cargo ramp, a heavy loss of hydraulic fluid in the area of the aft door actuator was noted by the crew. An inspection revealed that the aft door actuator had been torn from its mounting, shearing a control cable pulley and jamming the elevator control cable. A C-130 chase aircraft was unable to see any visible external damage.

Major Douglass quickly evaluated the control

characteristics of the aircraft and found there was adequate pitch control response using the elevator trim. Aileron and rudder control were not affected. He decided to make an emergency landing and maneuvered his aircraft for a straight-in approach, maintaining pitch attitude with elevator trim and power application. Elevator tabs and power were sufficient to accomplish a successful landing.

Major Douglass' professional skill in preventing loss of life and aircraft during a critical control situation readily qualify him as a Tactical Air Command Pilot of Distinction.

the **P**RECAUTIONARY **L**ANDING **A**PPROACH



by Maj Vernon D. Hesterman
6314th Support Wing (DSAF)



Safety office files are fat with reports of aircraft accidents that according to all logical reasoning just shouldn't have happened. Let's consider an accident where the aircraft stalls out on the turn to final and crashes short of the runway. The medics remove the human wreckage and the accident investigation board starts to sift through the mechanical debris trying to determine the cause.

Witnesses and tower tapes confirm that the pilot had been confronted with a suspected emergency and in his haste to get the aircraft back on solid concrete he developed a null area between his ears. He became oblivious to all outside influence and instruction and apparently forgot all his past training. Finding no mechanical or material failure, the board can only conclude that the accident occurred as a direct result of panic.

Other pilots, reading the report shake their heads in disbelief and wonder why the man reacted as he did. But if they are wise, they will ask themselves how they would have reacted.

Fortunately, there is another side of the coin. For every emergency that ends the messy way, there are hundreds in which pilots keep their cool

and do a beautiful job of handling bad situations. The Air Force saves a lot of money, pilots get patted on the head and everyone is happy. The record shows that many times, the pilots who received pats, flew Precautionary Landing Approaches and, in case you didn't read the title, that's what this article is all about.

The F-105 Dash One still tells you how to fly a 360 degree approach with a windmilling or frozen engine. However, a flame-out pattern is quite difficult to fly due to the outrageous sink rates that develop in our big birds. As you know, there have been many accidents caused by simply practicing forced landings. Consequently, we haven't been allowed to practice them for years — nor are we expected to be able to successfully fly a genuine flame-out pattern.

In other words, we're saved by the Dash One bold-face comment that says, "Forced landings are dangerous and should be attempted only under ideal conditions. Ejection is normally the best course of action." With a dead engine and no practice SFOs under our belts, we can, for all practical purposes, eliminate the "normally" and say "Ejection *IS* the best course of action."

Ironically, the most serious airbo

Agencies do not always force the toughest decisions. When that J-75 quits turning or some other catastrophic failure occurs, your decision is made for you. If you can, you point the beast away from populated areas and pull the handles. Then you hope the seat and all that good stuff on your back works as planned so you can spend the night with your kid's mother.

The really tough decisions are the ones involving insidious failures or indications of imminent failure. The problem may be a rough engine, high oil pressure, rapid loss of fuel, or any of several other possibilities. Even though the aircraft is still flying, there is no way you can be sure when your plane will become a glider with characteristics of a rock. You have two choices: either abandon the aircraft, or attempt to get it on the ground as soon as possible.

Fortunately for the taxpayers, fighter pilots are a game lot. They never need encouragement to do their all for a crippled aircraft. On the contrary, they must be cautioned not to extend themselves to a point where their survival becomes questionable.

The idea behind a precautionary approach is very simple and begins as a "normal" approach, expedited of course, by air traffic control. It could be a TACAN or a precision instrument approach. But in most cases it's straight-in VFR. The decision-making up to that final critical point is simple. Altitude and airspeed are available, so if it quits — eject.

The crucial period is the final approach. Because it's here the aircraft must be slowed for landing. What if it quits at one mile on final? ... one-half mile? ... one-quarter mile? Should you eject? Watch out! If you are using normal approach speeds when the engine quits, your sink rate will jump to over 10,000 feet/minute in a scant few seconds. There isn't an ejection system in the world that can overcome that trap.

Skimming the Dash One on precautionary landings, you may tend to believe the good book advocates 210 knots as a final approach airspeed. However, make a dry run at a safe altitude. Establish a simulated approach of 1000 feet per minute descent, 210 knots and three to four thousand pounds of fuel, and then pull off the

power, simulating flame out. You will find that rotating the nose will not stop your rate of descent. In fact, the rate of descent will actually increase. In just seconds it's really going down!

Fortunately, the Dash One says, "... depending on the nature of the emergency, the precautionary final approach airspeed can be up to 15 percent greater than that computed for a normal approach in the normal landing configuration." With 4,000 pounds of fuel in an F-105D, 220 knots is the bare minimum to stop a 1,000 feet per minute descent when power is pulled off. This is a straight ahead, smooth, nose rotation and does not allow even a small turn to a clear area. I therefore suggest a minimum approach speed of 220 knots for a relatively low fuel state, and up to 240 knots for an "F" with a heavy fuel load.

During any approach you must consider where the aircraft is going to hit if turned loose. So if necessary, add at least another 5 knots for turn-away ability. The only penalty additional airspeed gives is a longer landing roll. However, the success rate of barrier engagements takes the sting out of this threat.

The point to remember about low altitude bailouts is that it's not the altitude but rate of descent that gets you. Any amount of vertical vector the aircraft has at time of ejection will stay with you when you pull the handles. For a successful low altitude ejection, you must **stop the down vector**.

If you have enough airspeed to convert the down vector to UP ... that's beautiful. With the F-105 ejection system, an up vector is not required. But if you have any appreciable down vector close to the ground, even the rocket and the new chute won't be able to compensate. And you will promptly become owner of a very small piece of real estate.

The precautionary landing approach is simple, easy, and sure. But like any other procedure it must be correctly applied to be effective. When you have an emergency, stay cool. Analyze the situation. If a precautionary approach, as described here, is in order — fly it.

The right decision could keep your wings under your seat ... not on your shoulders. ➤

Corrosion Control

Corrosion control

by Capt G. Chambers
HQ TAC (DMMS)

Each year the Air Force spends millions of dollars replacing or repairing equipment that corrosion has ravished. If undetected, corrosion can account for the loss of aircraft and lives.

Technically speaking, corrosion is the deterioration of a metal by reaction to its environment. It occurs because the metal tends to return to its natural (oxidized) state. As corrosion progresses, metal strength lessens until it fails. Advanced corrosion doesn't always kill people, but it does cost money — money that could otherwise be used to enhance our mission capability or improve living conditions for our people. All aircraft, equipment, vehicles, and even buildings can fall prey to this silent destroyer.

The astronomical cost of corrosion damage is made more appalling by the fact that the cost could be prevented by conscientious application of corrosion control procedures. Where an active program is operating to keep aircraft and equipment clean, painted, and free of corrosion, the destructive force can be held in check. Nowhere is the old adage, "An ounce of

prevention is worth a pound of cure," more appropriate than in corrosion control since clean equipment with a good protective coating is relatively safe from corrosive attack.

In addition to cleanliness, an effective program depends on early detection and reporting of corrosion or corrosion producing conditions. Like cancer, if corrosion is detected early enough, treatment is simple and the disease can be arrested or eliminated. However, if it is allowed to progress without corrective action, costly and complex repairs are necessary to make equipment serviceable again.

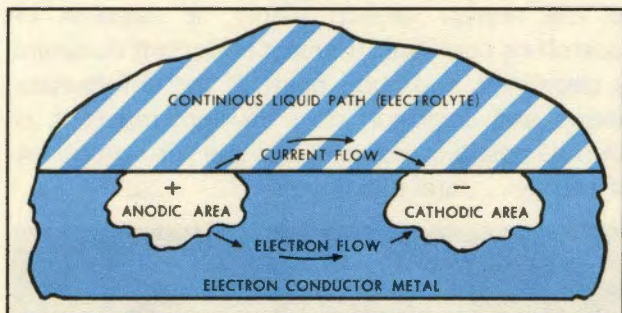
Technical Orders 1-1-1 and 1-1-2 contain the details used by the Corrosion Control experts to keep your equipment clean and healthy. You can help reduce corrosion loss by knowing what it is and how to detect it. In the next few paragraphs, I will attempt to acquaint you with the types of corrosion so your job of identification will be easier.

The most common, and therefore the most important, classification of corrosion

electrochemical corrosion. Four conditions necessary for progression of electrochemical corrosion are (1) something that corrodes (anode), (2) a cause (cathode), (3) a liquid path (electrolyte—usually water and salt or other contaminant), and (4) a conductor. Elimination of any of these conditions will halt corrosion. For example, clean dry surfaces are free of electrolyte and a well painted surface will disrupt the conductor.

These conditions occur everywhere. (See Figure 1.) The anode is the metal most subject to corrosion at a joint of dissimilar metals or a surface pit on a metal sheet. The cathode is a less active metal or another spot on the metal surface. Acids and salts in solution, such as sea water, smoke, etc., are electrolytes and provide the electrically charged particles that allow current

Figure 1

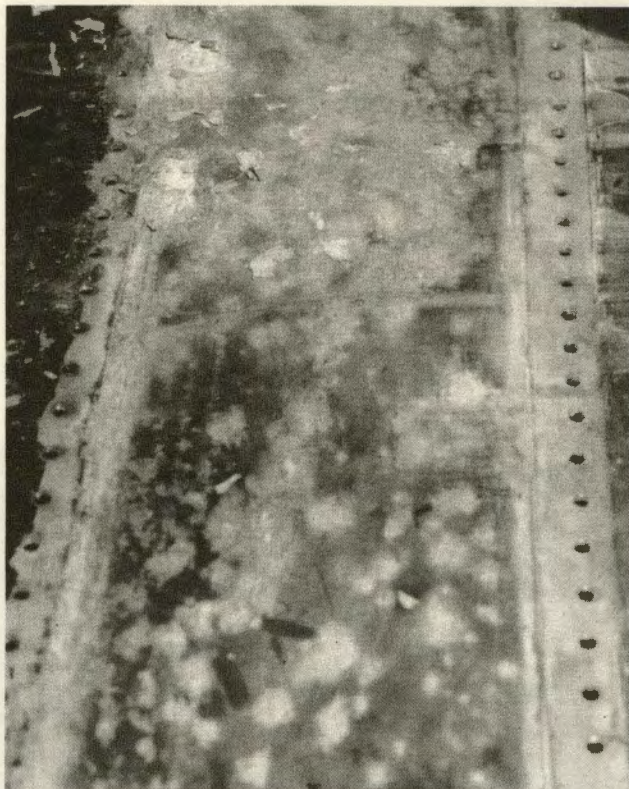


Electrochemical corrosion requires electrolyte path, usually condensate and salt or other contaminants.

flow. The metal itself promotes its own destruction by providing an electron conductor which completes the cycle.

Since this is a cram course, I'll limit the discussion to three general types of electro-chemical corrosion you are most likely to see. The first type is termed chemical corrosion and occurs as a result of direct contact with corrosive materials. Chemical corrosion often

starts as surface etching, recognizable at first by a general dulling of the metal — then a rough or frosted appearance. A more advanced stage, common in aluminum, magnesium and their alloys, is pitting which appears as a white or gray powdery deposit. When the deposit is wiped off, tiny pits or holes can be seen in the surface. If not arrested at this stage corrosion will penetrate the metal and attack the grain structure, setting up intergranular corrosion. As intergranular corrosion progresses beneath the surface, it weakens the metal and the only cure is replacement of the affected area.



Corrosion attacked inside surface of 101's lower torque box wing skin. Damage required replacement.

The second major type, galvanic corrosion, occurs because of the many different types of

corrosion control

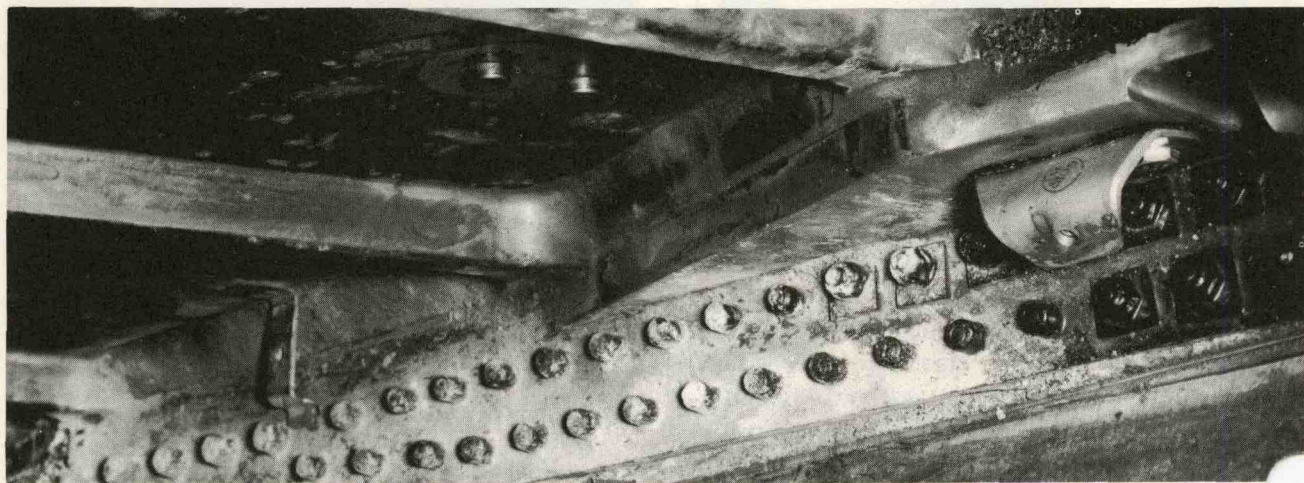
metals used in modern aircraft. Galvanic corrosion occurs when these dissimilar metals are in contact and an external circuit is provided by the presence of moisture. The current flow between the metals carries particles from one metal and deposits them at or near the other. Galvanic corrosion is usually recognized by a build-up of corrosion deposits at a joint. Although galvanic corrosion is more troublesome than chemical corrosion, it can be arrested if detected early.

Exfoliation corrosion is not entirely a type in itself, but rather a more advanced and severe corrosion. It is a form of intergranular corrosion and can occur as a result of either chemical or galvanic corrosion. However, its unique manifestation, that of "lifting up" the surface grains of a metal, make it an important indicator of advanced intergranular corrosion.

Other types of corrosions that cause trouble are concentration cell, stress and fatigue. The names are different, but the signs are similar to the types discussed above and the final

classification should be left to the experts. The individual's job is to recognize corrosion and report it. So how about it guys? Look over your birds and their supporting equipment. If they aren't clean and properly painted — write them up. On those few aircraft with bare skin showing, watch for the white or gray powdery signs of corrosion. Watch painted areas for bubbles, cracks, and chipped paint because there is a good chance corrosion is developing at that spot. Check closed areas carefully for signs of trapped water. Look at the cables in wheel wells, flap wells, equipment bays, etc., to be sure corrosion preventative compound is properly applied. Also eyeball the lines, fittings, and aircraft structure in these areas because corrosion can strike anywhere, or any piece of metal. When you find something wrong make sure you write it up to be corrected.

Everyone, from the commander, the operator, to the newest wrench turner, is essential in controlling corrosion. It's most important deterrent is cleanliness and good paint. If the unfortunate occurs and corrosion does develop, report it as soon as possible. You can save the Air Force a lot of money . . . and possibly grief. ➤



Section of a 101 wing spar, where it passed through a fuel cell cavity, was saved by corrosion control.

4-LINE CUTS ARE OUT

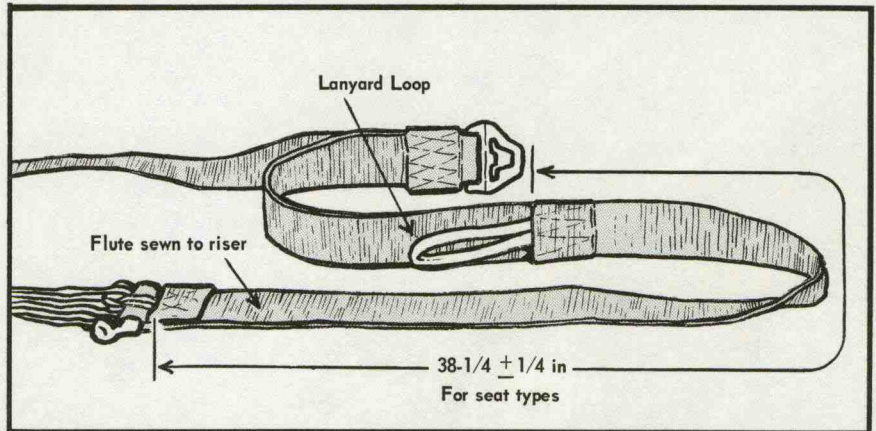
by Don Reynolds

That hook blade knife you've been carrying to make a "4-line cut" during an unexpected parachute descent will soon take its place with the Bowie knife and broadblade sword. Back-pack, chest-pack and seat-pack parachutes soon will be modified by appropriate TCTOs with "Four Line Jettisoning Lanyards," antiquating the knife.

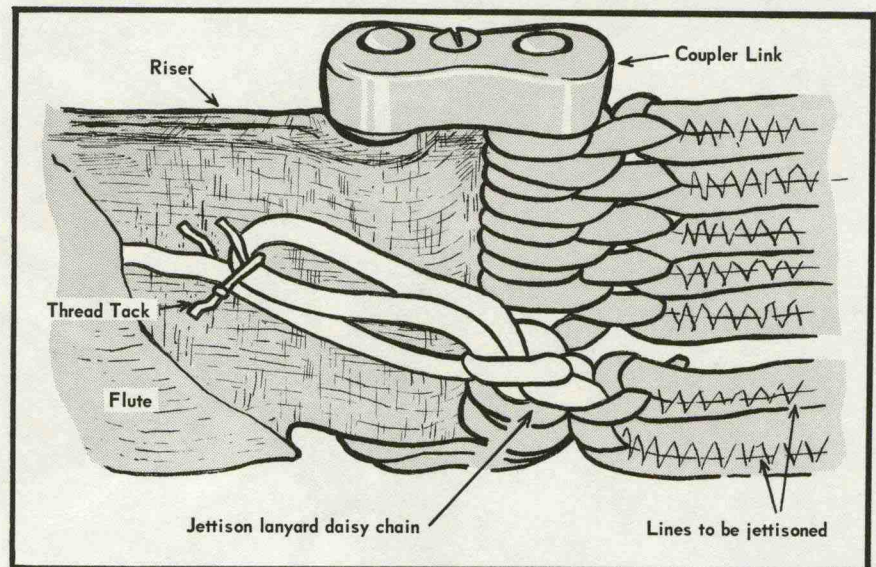
A pull loop and lanyard is being installed on the inside of each rear riser. A firm tug on each loop releases a daisy chain coupling, formed by the lanyard at the riser and suspension line connector link, jettisoning two lines from each riser.

Steering the chute after jettison is exactly the same as after the old four line cut. ➤

Pull-loops and lanyards, installed on the inside of left and right risers, release two canopy lines at each riser connector link. Lanyards are housed in flutes sewn to risers. To use, an escapee simply pulls on the loops, breaking four threads; one stowing each loop to risers, and one tacking each daisy chain coupling, shown below. Hook blade knife, previously installed on risers, no longer is required and is not attached to the system.



Riser and line coupler links are the same as used in previous parachute systems, but installation of two canopy lines on each coupling has been changed. The two lines are secured to link by the jettison lanyard which forms a daisy chain coupling. The coupling is a kind of knot and will not release until the lanyard is pulled, breaking the daisy chain tack, and extended to disengage the daisy chain coupling. Jettisoning lanyards are expected to be installed on back, seat, and chest pack parachutes.



Bristol F.2B



Flight Leaders

by Lt Col Carl E. Pearson

became a World War I legend "almost" overnight. After a near-disastrous entry into combat against Baron von Richthofen's flying circus in 1917, pilots of Bristol Fighters changed their tactics. They quit fighting like conventional two-seaters and started dogfighting single-seater style. That's when it's fame spread.

Pilots exulted, "Where she scores tremendously is in her power to dive... many Germans who dive on the tail of one, miss and go on diving, are overtaken and destroyed."

Enemy pilots didn't think a two-seater could hold together in a screaming dive. But pilots of Bristol Fighters dove near-vertical for thousands of feet. Airspeed indicators exceeded max readings of 130 mph and reached 60 to 90 mph a second time around... an estimated 230 mph! That's far beyond speeds early fighters could take before shedding fabric... or wings.

Considered the most formidable two-man fighter of the war, the British-manufactured Bristol Fighter began its career as a recon type.

Empowered with 120 hp in its recon role, the early development of the 275 hp Falcon III engine by Rolls Royce assured the operational success of the Bristol F.2B. Over 5200 in the Bristol Fighters series were built before war's end. Some remained operational almost as long as the Gooney Bird... the last were scrapped in 1938.

Wings equal in length at 39 feet 3 inches with raked tips, the lower wing had a rearward stagger of one-fourth its chord. Fuselage length varied with engine type, requiring 25 feet 10 inches when powered by the Rolls Royce Falcon. Weighing in at 1930 pounds empty, the F.2B grossed out at 2800 pounds fully loaded.

Max airspeed at full blower pegged at 125 mph, about 10 mph slower than the speedy Spad and Albatros. When necessary, Bristol Fighters overcame that handicap with their power-on dive. A fuel endurance time of three hours gave it good fighting range and time to hassle with visiting circuses. A service ceiling of 20,000 feet allowed the F.2B to use altitude as a fighting tactic. Shortly after the war's end in 1918 an F.2B powered by a 300 hp Hispano-Suiza V8 reached unofficial altitude record of 29,000 feet over Dayton, Ohio.

Pilots literally shared their "office" with observer-gunners. In their closely grouped cockpit arrangement the rear seat moved fore and aft, allowing the observer to sit facing either way. This helped his seeing and wireless reporting of target information. "Togetherness" allowed a short reach to alert pilots when enemy fighters attacked.

Bristol designers had aerial combat in mind. Highly maneuverable and well protected in both fore and aft fields of fire, F.2B observers scored about as many kills as their pilots. The pilot's synchronized Vickers machine gun fired thru the prop arc. Designers tunneled the engine's upper fuel tank to allow center line gun mounting. It complicated manufacture, but provided engine-heat gun warming and eliminated the frozen oil stoppages of external mounts. Also, gun cocking handles were directly in front of pilots.

The observer's ring-mounted, twin Lewis guns swept a 360 degree field. Lightweight and drum-fed, their spare ammo stowed close at hand for rapid reloading. To permit maximum depressed angle of fire the tail unit was redesigned and more than a third of the fin and rudder was set below elevator level. To further reduce blind spots the fuselage tapered to a knife edge with minimum aft cross-section. In addition, the fuselage was mounted high between the staggered wings to permit observers firing at lowest possible elevation over the pilot's head. Upper longerons forward of the pilot's cockpit sloped downward to improve his forward vision. It was built to fight!

Bristol designers considered in-flight emergencies too. It wasn't completely dual-control equipped, but observers had a small emergency stick they could plug into a socket for elevator control. They also provided handgrips on cables running thru their cockpit for rudder application. Not fancy, but enough to help out during emergencies. World War I versions of what we now call crew coordination saved plenty of lives... pilot types primarily.

Crew coordination still pays big life-saving dividends. Pilots, it's up to you! ➔

CHOCK TALK

chock talk

bum trade

The A-26 pilot watched oil pressure on number two engine drop slowly to 60 psi. Meanwhile, oil temperature climbed from 72 to 80 degrees... typical engine failure warnings. Finally when oil pressure hit minimum, he punched Two's feathering button and called it a day.

Maintenance troubleshooters couldn't find the expected metal filings on oil screens, but they did find air in the line to number two's oil pressure gauge. Also, they discovered that the gauge was replaced the day before — without bleeding the system.

Some hurrying specialist "saved" a few minutes, but wasted a sortie, much troubleshooting time, and still ended up bleeding air out of the system. Worst of all, it could've set the stage for some unnecessary aircrew bleeding!

flammable fuel blankets

Fuel quantity indicator problems plagued an RF-101C. Trouble-shooters found No. 1 fuel tank upper probe and the fuel quantity control panel defective. To remove and replace, the fuel line was disconnected with an appropriate red-X entry on the 781A.

After installation, an instrument technician applied power to check fuel quantity indicator operation. He was fully aware that the fuel line was still disconnected but counted on the newly installed control panel to keep the line closed. It didn't!

The new panel shorted and passed fuel through the open line. Before power could be

...incidents and incidentals

disconnected about 15 gallons of fuel spilled into the aft section and over the fire blankets of both engines.

Subsequently, proper fire precautions were taken until fuel stopped draining from the Voodoo. Next day, repairs were completed and the blankets appeared free of residual fuel. Maintenance preflighted the bird, running each engine in excess of 5-minutes with no discrepancies. It was released for flight.

During pre-taxi check, the crew discovered camera system trouble. So the pilot called for specialists — who asked him to shut-down the engines. As engine master switches closed, the ground crew reported fire in the exhaust area of both engines. Line fire crews saved the aircraft.

The moral of this little tale is that fire blankets, saturated with fuel, cannot be purged using normal procedures. The only sure way is to pull the engines, remove the blankets, and replace if required.

dart gets plane

Postflight inspection of an F-104G after a dart tow mission revealed dents in the left tail section on both vertical and horizontal surfaces. The pilot hadn't noted any abnormal circumstances during flight, but orange paint at the dents indicated an unstable dart release.

After a look at the dart, inspectors determined that upon release it probably slipped from the two front sway braces okay, but hung up on the two rear ones, this caused a dipping and rolling release.

Their conclusions were confirmed by inspection of other dart-rigged aircraft. They found several loosely connected units. One bird had a very loose sway brace pad and suspension lug. Looked at yours recently?

with a maintenance slant.

sooner or later

A minute piece of safety wire gradually works its way to the emergency fuel switch and activates it, flooding the engine with more fuel than it can use and confounding the pilot with an engine bucking, belching, and backfiring from an apparently incurable cause. He barely made it back.

Another small piece of safety wire broke, allowing a nut to loosen and flood the engine with buckets of oil. The single-engine landing was successful.

A 3/8" nut catches a bonding strap and binds the elevator control. Luckily, it happened at altitude.

A small bolt comes loose and lets a cockpit light fall on the throttle quadrant, jamming the throttle on power application. It could have happened on a go-around from a simulated forced landing.

A worn Dzus fastener comes loose and is inhaled into an engine, causing it to flame out.

One item out of over 200 on the checklist is overlooked and the aircraft stalls and crashes on a night takeoff. Both crew members eject into the runway from the inverted position. The last armed bomb is found at dawn.

A single stitch with too strong a thread holds a moment too long and the useless weight on his back helps grind a pilot into the ground.

A minute trace of moisture seeps into a cannon plug and causes two full tip tanks to jettison into a populated area.

A mal-designed valve cap causes a leak. The tire blows on takeoff.

A one-degree doppler error causes a 60-mile miss in landfall. The aircraft crashes well short of the airfield.

A bent cannon plug prong fails to transmit a signal. With a rackful of bombs still clamped to its belly the fighter bomber has to maneuver against a formidable opposing enemy fighter.

All too often an unsafe practice, a bad part, a

recurring condition may go for months without serious consequences. Then, right in the middle of our complacency, an accident knocks the smugness right out of us.

If it's not right the first time, do it over. Sooner or later it will have to be done right, so why not do it now? If you have to wait for an accident to pinpoint and cure a problem, then YOU are part of the problem.

Flight Safety Bulletin
23rd TFW, McConnell AFB, Kan.

too close for comfort

A recent OHR indicates that quick check personnel and arming crews are getting overly familiar with jet engine intake ducts. In this particular case the checkers were busily working and unaware that the pilots were trying their darndest to wave them back.

Engine damage in the form of hats, ear protectors, and people has been commonplace since the days of the old P-59. Look guys, we like having you around. So don't end up as just another piece of FOD.

proper tires

In case you didn't know, airplane tires can be hazardous if used on ground vehicles. Although they may look alike, aircraft tires are built for a completely different job.

Aircraft tires are designed for intermittent use. According to Goodyear, constant use as a vehicle wheel would almost certainly lead to tire failure. In recent months there have been several costly and even tragic accidents resulting from use of aircraft tires on certain industrial vehicles, trailers, and small custom-built sport and racing cars.

Keep this in mind and don't become another statistic.

MAINTENANCE MAN OF THE MONTH

Staff Sergeant Charles L. Troutman of the 479 Tactical Fighter Wing Field Maintenance Squadron, George Air Force Base, California, has been selected to receive the TAC Maintenance Man Safety Award. Sergeant Troutman will receive a letter of appreciation from the Commander of Tactical Air Command and an engraved award.



SSgt Troutman



Sgt Buckley

CREW CHIEF OF THE MONTH

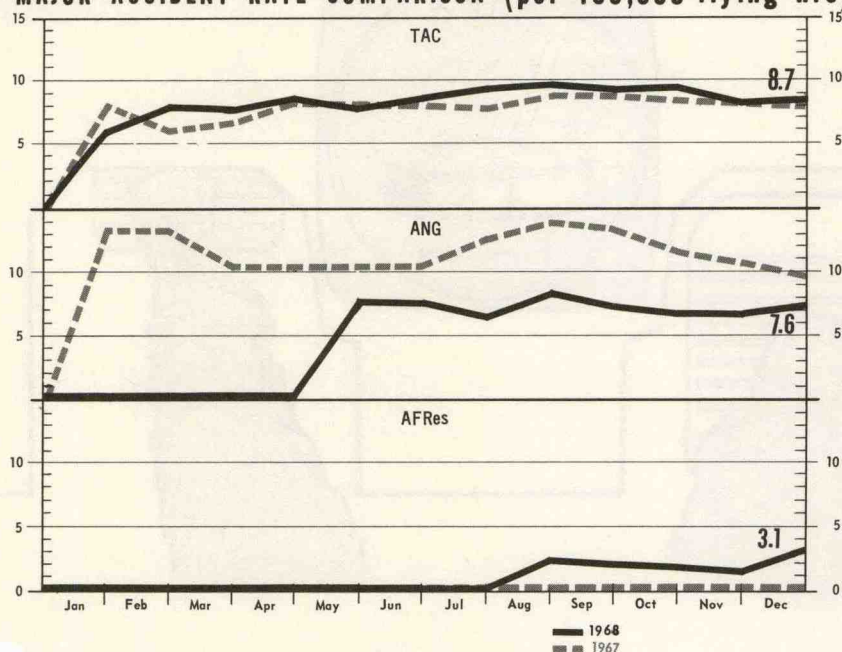
Sergeant Fred T. Buckley, Jr., of the 62D Tactical Airlift Squadron, Sewart Air Force Base, Tennessee, has been selected to receive the TAC Crew Chief Safety Award. Sergeant Buckley will receive a letter of appreciation from the Commander of Tactical Air Command and an engraved award.



TAC TALLY

MAJOR AIRCRAFT ACCIDENT RATES
AS OF 31 Dec 1968 *

MAJOR ACCIDENT RATE COMPARISON (per 100,000 flying hrs)



UNITS

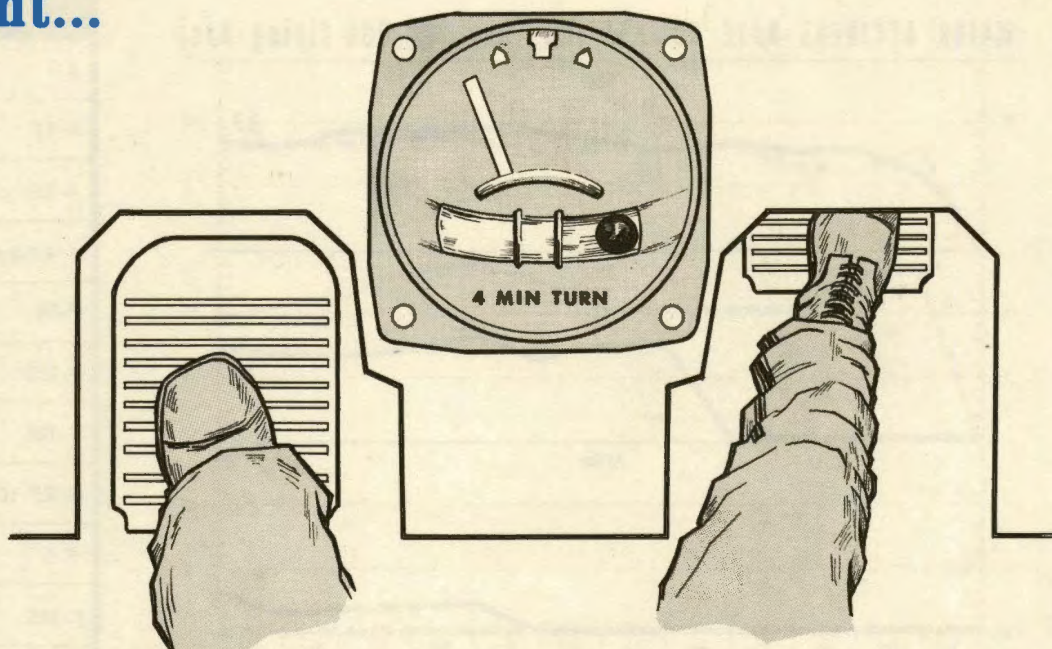
THRU DEC 1968			THRU DEC 1967		
9 AF	5.6	6.8	12 AF	9.1	9.9
4 TFW	8.0	4.6	23 TFW	24.5	14.2
15 TFW	8.0	23.8	123 TRW	11.8	10.9
33 TFW	9.9	7.4	27 TFW	7.4	9.1
113 TFW	17.4	11.6	140 TFW	4.5	15.8
4531 TFW	14.0	0	479 TFW	9.3	7.7
363 TRW	5.0	7.6	474 TFW	26.3	0
64 TAW	3.1	0	67 TRW	8.3	9.5
316 TAW	0	0	75 TRW	0	21.1
317 TAW	0	4.2	313 TAW	0	0
464 TAW	0	2.2	516 TAW	3.4	0
4442 CCTW	0	5.8	4453 CCTW	12.8	5.7
			4510 CCTW	6.0	8.5
SPECIAL UNITS					
1 SOW	7.6	4.7	4500 ABW	3.5	0
4410 CCTW	14.6	10.1	4440 ADG	0	0
4409 SUP SQ	0	0	4525 FWW	33.9	22.6
			4416 TSQ	37.8	0

AIRCRAFT	THRU DEC	
	1968	1967
TYPE	TAC	ANG-AFR
A-1	50.7	23.5
A-37	21.5	0
A-26	30.0	33.9
F/RF-84		7.1
F-86	13.3	28.4
F-111	28.5	0
F-100	10.6	13.4
F/RF-101	15.1	27.7
F-5	14.1	15.4
F-105	28.4	16.3
F-104	8.9	4.4
F/RF-4	10.4	12.6
C-47	0	3.9
KC-97		0
C-119	0	2.9
C-123	12.1	4.2
C-130	1.1	0.5
T-29	0	0
T-33	1.9	4.3
T-39	6.2	0
C-7	0	20.9
O-1	7.3	10.3
O-2	7.1	0
OV-10	0	14.5
RB-57	0	27.3

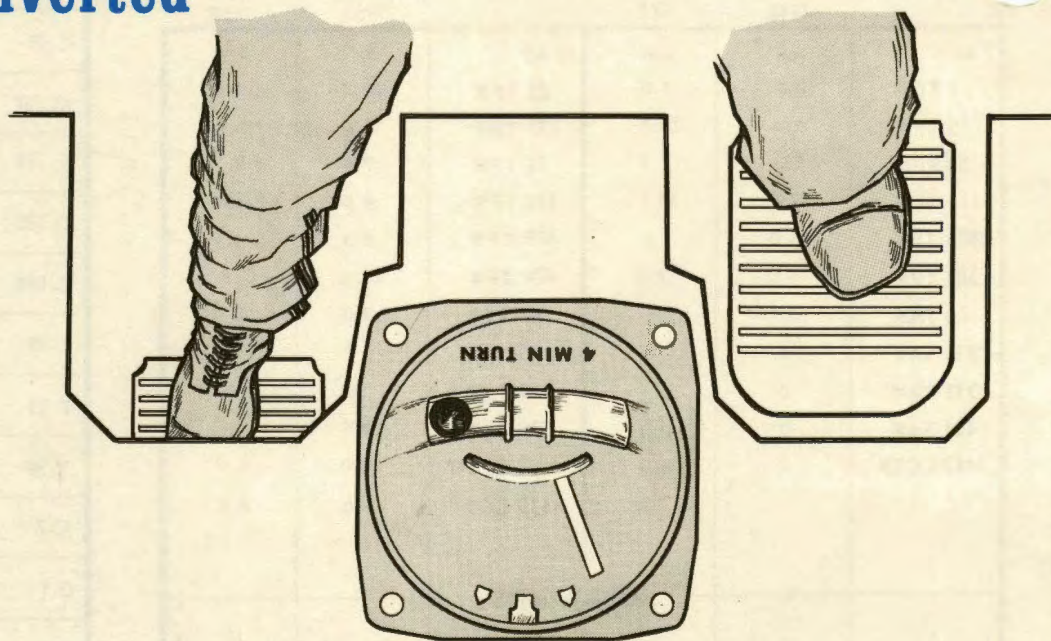
* ESTIMATED FLYING HOURS

SPIN RECOVERY

upright...



...or inverted



your turn needle **ALWAYS** points
in the direction of spin.