Aerospace SAFETY

UNITED STATES AIR FORCE
APRIL 1971

an aircraft lost in an accident will never hit the target

UNITED STATES AIR FORCE

APRIL 1971

Aerospace SAFETY

FOR AIRCREWS, MAINTENANCE & SUPPORT TECHNICIANS

SPECIAL FEATURES

REGULAR FEATURES

DEPARTMENT OF THE AIR FORCE • THE INSPECTOR GENERAL, USAF

SUBSCRIPTION—AEROSPACE SAFETY is available on subscription for $4.00 per year domestic; $5.00 foreign; 35c per copy, through the Superintendent of Documents, Government Printing Office, Washington, D.C. 20402. Changes in subscription mailings should be sent to the above address. No back copies of the magazine can be furnished. Use of funds for printing this publication has been approved by Headquarters, United States Air Force, Department of Defense, Washington, D.C. Facts, testimony and conclusions of aircraft accidents printed herein may not be construed as incriminating under Article 31 of the Uniform Code of Military Justice. All names used in accident stories are fictitious. No payment can be made for manuscripts submitted for publication in the Aerospace Safety Magazine. Contributions are welcome as are comments and criticism. Address all correspondence to the Editor, Aerospace Safety Magazine, Deputy Inspector General for Inspection and Safety, USAF, Norton Air Force Base, California 92409. The Editor reserves the right to make any editorial change in manuscripts which he believes will improve the material without altering the intended meaning. Air Force organizations may reprint articles from AEROSPACE SAFETY without further authorization. Prior to reprinting by non-Air Force organizations, it is requested that the Editor be queried, advising the intended use of material. Such action will insure complete accuracy of material, amended in light of most recent developments. The contents of this magazine are informative and should not be construed as regulations, technical orders or directives unless so stated.

APRIL 1971 AFRP 127-2 VOLUME 27 NUMBER 4

THE ROLE OF ***SUPPORT*** IN THE USAF MISSION . . . . .

Everybody knows that the mission of the U. S. Air Force is to fly and fight. It's not too tough to identify this mission and the role played by the knuckle busters on the flight line. We do find, though, that it's tough sometimes to weave the function of the support force into the big picture. We can, however, give you some examples of how they should not fit into the big scheme. Let's talk for a moment about a young airman we recently heard about.

He took his six-month-old baby to the dispensary (the baby apparently had a bad cold). The medics gave him some nose drops and aspirin for the baby and sent him home. The airman wasn't satisfied with this treatment so he took the baby to a local doctor. After a careful examination, the doc determined that the child had pneumonia and admitted it to the hospital.

After the dust settled and the baby was well, the hospital naturally presented the young airman with the bill, which he was unable to pay. Next question, how about CHAMPUS? He didn't know about CHAMPUS nor the benefits he was entitled to under the program (the education for which falls under another support function). He took his problem, and rightly so, to his supervisor who helped him get the whole thing squared away.

Remember, though, during the course of this experience, the young airman was working at his job which involved repair of aircraft engines. Now it's rather obvious that this young man was under a great deal of mental stress, his baby sick with pneumonia, and a hospital bill bigger than his wallet. Who could we pin the blame on if the young troop skipped a step or two on the checklist, and the omission resulted in a lost aircraft or a dead crew?

We can't hide our heads in the sand and refuse to admit that this type of thing does happen. It's the responsibility of the Air Force to insure that everybody is physically and mentally able to function at peak efficiency. Was this man able to devote his undivided attention to his job?

It's not our intention to single out one particular support function and throw rocks. This type of thing can happen in similar areas. How about a sloppy mess hall that offers poor quality food to our men. Ever had a thorny pay problem and find a disinterested type who instead of trying to help you, only showers you with paper work and red tape?

These examples are representative of situations that we can't ignore. There may be complacency in *your* support function because those who serve in this capacity are unable to relate to the major role of the Air Force. Believe me, there *is* a relationship and every support function commander is obligated to insure that his troops are providing the very best service, so we can do our mission of "flying and fighting." ★

SUCCESS STORY

Maj John T. Taylor, Chief of Safety
Ellington AFB, Texas

This story is primarily for you Safety engineers / technicians who have nearly reached the "bitter end" of your will to continue fighting to correct safety deficiencies. The deficiencies we're discussing are those which have been in existence for two or more years. You have brought them to the attention of management, but you get the feeling that your efforts are a useless endeavor. Let me boost your morale with a success story at Ellington Air Force Base, Texas.

In the fall of 1967 we Safety types at Ellington got together and formed a mutual alliance for accomplishing a joint, overall base safety program. Initially this alliance consisted of myself as Base Safety Officer, and other safety officers for NASA-MSC (Manned Spacecraft Center), the U.S. Coast Guard Station (Houston, on base), the 446th Tactical Airlift Wing (Air Force Reserve), and the 147th Tactical Fighter Group (Texas Air National Guard). It has since grown with additional units being assigned to the base.

Our first order of business was an accident prevention (safety) survey of the base, restricted to our "most critical" items in only the airfield area proper. Some of the findings of the survey follow.

Soil erosion of serious proportions was discovered near aircraft operation areas. Since we had aircraft occasionally leave the paved surfaces, it was evident that it was only a matter of time until one found one of these five-foot ditches. The mishaps shown in photos 1 through 3 proved our hypothesis to be correct.

Aircraft arresting systems capability consisted of two modified MA-1A chain type arresting gear on runway 17/35 and two BAK-9 sys-

1. CY 1968

2. 1969—T-34 right main gear collapsed during landing. Aircraft swerved off.

3. 1970—T-33 Brake failure.

tems on runway 04/22. None was equipped to accommodate non-tail-hook aircraft. Only one arresting system, the BAK-9 on the approach end of runway 04, was capable of approach end engagement, and its capability was marginal, due to surface irregularities on both sides of the hook cable and the fact that the cable was in a depression caused by a cut made across the runway when the BAK-9 arresting gear was installed. One look at photo 4 should prove convincing.

4. BAK-9 aircraft arresting barrier.

Poor vegetation control and blocked drains, precluding proper water runoff, made Ellington a wildlife paradise. We were home for such varieties as the Atwater prairie chicken, two alligators, red fox, wolves, deer, stray cows, and other assorted species.

Airfield lighting was woefully inadequate. Night operations were unsafe in most areas. We usually had most of our runway and taxiway lights during good weather, but when it rained and we needed them most, they shorted out—ancient wiring and fixtures couldn't take the moisture. Only the instrument (?) runway, 04/22, was equipped with high intensity runway lights (HIRL). Only 04 had approach lights and these were of marginal value for night operations and worthless during bad weather. The runways were equipped with threshold lights and 22 had VASI lights, but only an ASR approach was available to this runway! Further, our primary instrument runway, 04/22, was only 6800 feet long. Not very good for fighters and high performance trainers such as the T-38.

Night operations, especially during inclement weather, were positively unsafe on the parking aprons, due to no lighting and poorly defined guidelines. The fact that mishaps were infrequent attests to the professional skill of the pilots. Some visiting aviators were not so fortunate, as depicted by photos 5 through 7. The edges of aprons, taxiways (except the southeast) and runways were not stabilized with macadam or concrete. At night it was difficult to tell the difference between the paved surface and the mud.

Approach aids consisted of an ancient GCA in fixed position which provided precision approaches (PAR) to runway 04 and surveillance (ASR) service to all other

5. CY 1969—WV-1 stuck.

6. CY 1969.

7. Navy 3-2 dropped.

SUCCESS STORY

CONTINUED

runways. This equipment's age was offset by its being operated by highly professional personnel; therefore, ground controlled approaches (GCAs) could and still can be flown with confidence. Other approach aids consisted of a TACAN and an omnirange, both fine for day VFR practice approaches.

There were obstacles in the runway overruns. Vehicles frequently crossed the approach end of runway 17 overrun and drivers often failed to stop and check for approaching aircraft. Fences off the ends of all overruns were not of the frangible, break-away type. The approach to runway 04 contains power lines, a highway, railroad, junk yard, a sewer treatment plant, and a drainage ditch. Approaching runway 35, aircraft must cross this same area, but in addition there is a power pole three feet below the lower limit of the glide slope, and rough terrain.

At first our survey seemed doomed to failure. Nevertheless, we continued to press the issue and our efforts received a real welcome boost from the USAF Director of Aerospace Safety. In July 1968 they conducted an aircraft accident prevention (flight safety) survey of Ellington. Their findings confirmed ours. Base surveys for calendar years 1968 and 1969 were repeat performances boosted by safety surveys from our major air command, Headquarters Air Force Reserve. We continued our combined efforts and our higher headquarters kept up their support. Ultimately things began to happen.

NASA-MSC funded for strobe lights at the ends of 04/22 and 1600 feet of overrun for runway 22. We now have a local base rescue (LBR) helicopter unit, a vehicle assigned to safety, eroded areas filled in, drains cleared, and expanded vegetation control which has discouraged the wildlife.

A million dollar contract has been let to refurbish our long (9000 feet) runway, 17/35, as the primary instrument runway. This project includes high intensity runway lights, proper runway markings for instrument flight operations, and modern approach lighting. The Texas Air National Guard is funding the installation of two BAK-12 arresting systems. Further, our GCA is being sited on a turntable, and an ILS has been funded and the site surveyed. My boss, the base commander, thinks this is pretty darned good! We Safety types know that perseverance does pay off! ★

TO be or not TO be

Sqn Ldr Donald Melvin, RAAF
Directorate of Aerospace Safety

Last year the USAF recorded the lowest accident rate in its history. We didn't just "luck out", either; that 3.0 accident rate was a result of hard work, cooperation and determination. Unfortunately, we could have done better, as the following random sample of transport aircraft and helicopter accidents shows:

Two H-43 helicopters were destroyed, one with the loss of two lives, due to maintenance malpractices. In one, the overspeed governor shaft was not replaced after work had been performed on the fuel control. In the other, a control rod was not properly safetied after installation, and it subsequently failed with catastrophic results.

An AC-119G experienced engine failure just after takeoff on a night mission. Aircraft performance was not sufficient to maintain flight, and six crew members died in the crash and ensuing fire. The TDR confirmed that this low-time engine quit because of failure of the primary impeller drive due to cumulative stresses from numerous "out of tolerance" conditions in the impeller system.

When a reciprocating-engine aircraft is refueled with JP-4, it's not going very far. It didn't! Scratch one C-54D two miles off the end of the runway.

An incorrectly adjusted nosewheel steering cartridge caused a C-123K to leave the runway on the takeoff roll. The pilot retarded throttles to idle, but the aircraft continued on and came to rest in a swamp—with the jets still burning at 100 percent. Had the pilot selected reverse, the jets would have been shut down and the aircraft would not have gone into the water, which ultimately corroded the aircraft beyond economical repair. Thus, two mistakes destroyed an aircraft.

Two maintenance technicians were detailed to taxi a C-131A aircraft to its parking spot on the ramp. Number one engine started normally, but number two back fired badly and would not start. The aircraft was taxied on one engine. After it was parked, the technician decided to look at the troublesome number two. Lo and behold! Number two cylinder was missing, and no entries had been made in the form 781! An engine change was the order of the day.

The common denominator in all of these examples was that a technical order was not diligently followed. The loss of five aircraft was bad enough, but what value can be placed on the eight crewmembers' lives? Unit Effectiveness Inspections are still regularly revealing gross deficiencies in the proper use of TOs.

There never seems to be enough time during a task to follow a TO; but time is always found to examine the consequences. There is no excuse for not using the relevant TO, no matter how simple the task or how many times you've done it before. Supervisors must cooperate by insisting and insuring that TOs are used. ★

this train don't carry no passengers

the GIB--
passenger or participant?

Capt Richard Anderegg
78 Tactical Fighter Squadron
APO New York 09405

The F-4 back seat is occupied by a variety of tradesmen: pilots, navigators, EWOs, radar-navs, bomb-navs, flight surgeons and instructor pilots. Once in the "pit," however, they all mold into a unique oneness—**the Phantom GIB.** All too often, though, the result is a phantom gib, a passenger, a man along for the ride, who shares nothing, says little and might care even less.

How does a young tiger fresh from pilot training, an eager fighter-gator straight out of Mather or an experienced SAC nav-bomb turn into a back seat warm body in a Mach 2 aircraft? Maybe his aircraft commander likes to play Thackery Thud pilot and tells him to stay *cold mike* until instructed to do otherwise. Maybe he has the "I can fly better than he can" attitude or, perhaps, he feels that decision making responsibility is not his and consequently does not feel inclined to contribute to the mission. A good bet might be boredom. Never mind the causes, though; corrections are my interest.

One of my good buddies in SEA let the A/C and bird bust the minimum altitude on a nearly VFR night; the F-4 hit the ground a mile or so short of the runway and burned, but both walked away uninjured. My friend, the GIB, didn't mention the minimum altitude until they had passed through it—too late. I firmly believe each GIB should have his own personal minimums and should discuss them with the A/C before each flight. Do you have a hard, absolute altitude at which to start recovery from a dive bomb pass? Or do you assume that your A/C does? How about a minimum airspeed or two? One for IFR; one for VFR. Flying three feet in trail and hitting the ground second isn't much consolation for you or your family.

All of you strong minded A/Cs can relax; I'm not advocating yanking on throttles and stick from the back seat. I've invested well over two years in the engine room, and I've never taken an airplane away from anybody. It simply isn't necessary, if the GIB is totally involved in the mission and is absolutely positive the A/C is aware of what's happening.

The airplane has a fine intercom that is best put to use by doing the old "I'll tell you mine, if you'll tell me yours" trick. Mike Batsel was an old head GIB in the Triple Nickel when I started my tour in SEA, and he believed in a continuing, uninterrupted commentary from back to front. Some crews prefer the commentary to run front to back and others mix it up. Whatever the direction of dialogue, both people should be aware of unusual occurrences. Silence is not golden in the F-4.

How well do you know the front seat, you back seaters? Well enough to remind a temporarily disoriented A/C where the ARI circuit breaker is? A passing acquaintance isn't good enough if you're flying a demanding mission. Knowing his cockpit as well as your own makes things a lot more comfortable when the going gets tough.

Night flying is when the GIBs of the world excel. One of the finest tail gunners I've ever seen in action is Van Horn, a GIB with the 22nd at Bitburg. Van always believed that a back seater's job at night is to be a standby altitude reference system. Lights on nice and bright (the inside ones, you know) seat lowered, hands on the canopy rail and a constant cross-check of the numbers and dials. It's hard enough to see outside in the daytime and damn near impossible at night, so keeping heads up on the gages can be a rewarding and contributing occupation.

I was briefing for a night mission last year when an A/C mentioned that he wondered if GIBs sometimes get altimeter fixation on night dive bomb passes. He asked if we were cross-checking airspeed and attitude as we called off altitudes. I allowed as how I pretty much concentrated on the altimeter 'cause that was the priority information. Not a good technique, I found out a couple hours later. We started to roll in, and I stuck my head in the scope to get a quick dive toss lock-up. The horizon line came to wings level and I locked her up. Smartly pulling my head from the scope, I called 10 grand, 9, 8 . . . . . . then looked at my ADI. Black over gray. Hmmmmm. After much immediate confusion and yelling between cockpits we got the airplane rolled upright and pulled out. The A/C had continued his roll out into a 45 degree dive—inverted. Nowadays, I look at all the dials and numbers.

The pit is not a command position, but it does require a responsible attitude. It demands a dedication that can't be ignored. I truly shocked myself a few months ago when I dragged an enroute supplement out of the map case and realized that I wasn't sure which number was the field elevation. A small indication that my instrument procedures were slipping? NO, A BIG ONE! I was slowly sliding into a bad case of the backseat drearies. The prime example of a complacent assistant fighter pilot.

A receptive, responsible attitude is essential to a successful mission. The desire and drive to set workable minimums, to actively participate in the mission, to keep the guy in front informed at all times and to constantly improve personal knowledge are the ingredients for a top-notch crew. Not having the pole in our hands is no reason to become a passenger. This train don't carry no passengers. ★

THE I.P.I.S. APPROACH

By the USAF Instrument Pilot Instructor School, (ATC) Randolph AFB, Texas

TERMINAL APPROACH CHARTS

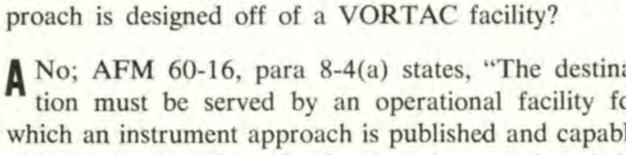
Q What are the geographical coordinates on an approach chart?

A The coordinates on the approach chart indicate the *approximate* center of the aerodrome, expressed to the nearest minute.

Q Can I fly a designated VOR instrument approach procedure using TACAN equipment when the approach is designed off of a VORTAC facility?

A No; AFM 60-16, para 8-4(a) states, "The destination must be served by an operational facility for which an instrument approach is published and capable of being flown with navigational equipment aboard the aircraft." When an approach is designed using a VORTAC facility, it is normally designated a VORTAC approach. This is permissible when the azimuth elements can support a VOR/DME or TACAN instrument approach (requires transmitting antennae to be within 100′ of each other). If these azimuth requirements are not met, the approach must be designated either VOR or TACAN, whichever provides final approach course guidance. By flying the VOR approach while using TACAN, you would not have *proper final approach course guidance*.

Q The legend of the low altitude instrument approach procedures (charts) show the following:



Please explain "Way-Point" (RNAV).

A Way-Points are used for Area Navigation (RNAV). According to FAA Advisory Circular #90-45, dated 8/18/69, Way-Point is defined as a pre-determined geographical position used for route-definition and/or progress-reporting purposes that is defined relative to a VORTAC station passage. Two subsequently relayed Way-Points define a route segment. At present there are no USAF aircraft *certified* to use Area Navigation routes and/or instrument approaches.

Q What are terminal feeder routes on instrument approach charts and what are they used for?

A Terminal feeder routes are bearing and distance from an enroute structure to the initial approach facility/fix. They are used to transition from the enroute structure to the initial approach facility/fix for the instrument approach to be flown. Be aware that for some TACAN or VORTAC approaches, the feeder routes are to the *facility*, not to the initial approach fix. This normally is done because of air traffic routing requirements.

POINT TO PONDER

Assume you are cruising at FL 300, 75 NM DME from destination and ATC clears you for an enroute descent to cross the 25 NM DME at 5000′. What pitch change could you make to reach 5000′ at the 25 NM DME? ANSWER: 5 degrees (no wind).

A simple and quick computation was made to arrive at this answer; simply divide the altitude to be lost (25,000′) by the miles to fly (50NM). This gives you a descent gradient of 500 ft/mile. Since a 1 degree pitch change provides a descent gradient of 100 feet per mile, regardless of airspeed, 5 degrees decrease in pitch from *level flight* will give you the necessary 500 feet per mile descent.

After establishing the 5 degree pitch change, check to see if you lose 500′ within one mile. Adjust your pitch 1 degree for every ± 100′ difference from the 500′. For example: If you lose 400′, increase your pitch to 6 degrees; if you lose 700′, decrease your pitch to 3 degrees. This will help to compensate for wind.

Since this technique will give "ballpark" figures, always "round" mileages and altitudes off to numbers you can easily work with, i.e., 33,000′ to 30,000′; 82 NM to 80 NM. This technique may appear complicated; however, after using it a couple of times, you will find it very easy and certainly a handy guide. ★

VIOLATIONS

FLY YOUR ASSIGNED ALTITUDE

Lt Col Lucien O. Sonnier, Directorate of Aerospace Safety

The number of Air Force flying violations varies from year to year, but there is one thing we can count on: the types remain the same. Home town boys are still compelled to show off before the folks; pilots are too proud to take notes or repeat altitudes; navigators rely solely on questionable equipment when making ADIZ penetrations. The most common quote of violating pilots remains, "but I was VFR."

Flying violations for 1970 involved FAA, ADIZ, AFR and one national boundary infraction in which a C-131 on a cross-country flight crossed another country's border inadvertently.

One-half of the infractions were violations of FAA regulations. These ranged from an ANG F-86H landing on a taxi strip to an A-1 and F-4s buzzing below 1000 feet over congested areas. The rest were general air traffic control violations such as a T-33 climbing, or a B-52 descending, through assigned altitudes; a C-130 flying the wrong airway; a B-52 off course 150 miles; a T-33 SID deviation and a T-33 flying through Restricted Areas without clearance.

An F-4 driver acknowledged a change of altitude from 310 to 290 but 80 miles later, met a Boeing 727 at FL 310 head-on for a near-miss. The airline captain said the F-4 filled half of his windshield as it went by. The T-33 mentioned above climbed through assigned FL 250 and also found himself head-on to a 727 airliner at FL 270.

There were four ADIZ violations involving a KC-135, two C-141s and a Reserve C-97.

AFM 60-16 was reported violated five times. An F-84F and a T-38 were reported buzzing and two T-38s were doing acrobatics, one on an airway and the other in an airport control zone. An Army UH-1D pilot reported an F-101 buzzing close to his aircraft but the investigation could not substantiate the allegation.

The only reason most of these violators were caught was because the transgression was reported by someone else. How many unreported violations occur remains unknown. Another question that comes to mind is, "how many cause unknown accidents were the direct result of a pilot violating regulations?"

Death and destruction are a high price to pay for immature showing off. Ego gratification is certainly not becoming to a true professional, and every pilot of substance accepts this as a fact of life. ★

ben~~d~~t with the wind

The "Hun" pilot was number two in a flight returning from a day combat mission. Everything had gone well, the ordnance had found the target, everything OK. Taking over visually from a straight-in, precision GCA, the pilot maintained a crab down final, compensating for a 22-knot crosswind, and transitioned to wing-low in the flare. After a normal landing, the airplane began veering left and the pilot straightened it out with differential braking. Positive control re-established, the pilot raised the flaps and deployed the drag chute. When the chute popped the airplane veered left again, and full right rudder had no effect.

He darned near made it. If the runway'd been a little wider, or he'd realized that nosewheel steering was inoperative, or he'd jettisoned the drag chute when the airplane headed off the second time, he'd probably have been okay. But the upwind wheel went off the edge, dug into the sand and another crosswind landing accident found its way to the big computer's memory bank.

Orville and Wilbur realized the effect the wind had on their machine. They went to a lot of trouble to move their operation to a place that had very constant, favorable wind conditions. Since that time, wind at or near the surface has contributed to more bent hardware than any other weather phenomenon, excepting, possibly, lightning and hail. In the past decade the Air Force has had some 300 aircraft mishaps in which wind was a contributing factor. If it were just wind alone, most of us could cope pretty routinely with the problem. But there are a passel of other factors which can complicate the problem.

• **LOW CEILINGS:** It's a basic rule that a good landing starts with a good approach. This is doubly true with a crosswind to complicate things. If ceilings are low, and the breakout point doesn't allow a lot of time to line up and establish the proper correction for crosswind, things can go bad in a hurry.

• **SLICK RUNWAYS:** That neat little crosswind limitation chart in the back of your Dash 1 is based on a dry—repeat, *dry*—runway. Any time runway conditions are such that tire friction is decreased, crosswind tolerance of the airplane is similarly decreased. Hydroplaning is a serious problem in and of itself, but most hydroplaning *accidents* happen in crosswind conditions.

• **GUSTY WINDS:** Maintaining a tight rein on your bird is essential, and a gusty crosswind—even one well within limits—can cause real problems. With a strong, steady crosswind, the pilot can establish smooth (albeit considerable) control inputs throughout the approach, flare, touchdown and rollout. Throw in a big gust, or take one away, and suddenly the established control inputs are inappropriate and the time for rapid corrective action is here!

• **DRAG CHUTES:** Once the thing is deployed, it tends to act like a great big weathervane, and in strong crosswinds adds to the pilot's problems. In addition to its weathervaning tendencies, on a slick surface the drag chute will cause considerable downwind side loads.

A number of other things can have a direct effect on the sweat-factor of crosswinds. A nosewheel, for example, exerts a counter-force to the wind in a weathervaning situation (the pivot point being the main gear, of course), but a tailwheel, particularly a castering tailwheel, offers virtually no resistance to the push of a crosswind. By the same token, in a hydroplaning situation the side friction on the main wheels is practically zero, while that of the nosewheel, which isn't hydroplaning, is unchanged. The *nosewheel* then becomes the pivot point, and useless as a steering device.

There are a few new airplanes being produced on which the main gear is set well back toward the tail. Because the flat-plate area ahead of the gear is greater than that aft of the gear (even including the vertical stabilizer), these aircraft tend to weathervane *away* from the wind.

Anytime the relative wind is at an angle to the longitudinal axis of the airplane, the downwind wing is at least partially blanked out. Since this is the wing we try to raise in a wing-low approach, higher than normal aileron inputs may be required. This problem is seriously aggravated with a swept-wing; the relative wind on the upwind wing approaches an angle *perpendicular* to the leading edge, giving very high lift conditions, while the relative wind on the downwind side moves toward an angle *parallel* to the leading edge with a resultant decrease in lift. In addition, since the relative wind is always (hopefully) from the front, and the wings sweep aft, the tendency of the fuselage to shelter the downwind wing is increased.

The Navy can minimize the problem by turning their runway into the wind, but we land-lubbers have to cope. There are a lot of things we can do, and while the list below is by no means definitive, perhaps you can identify an area or two in which some extra attention wouldn't be wasted.

1. **Know thy airplane.** Review the Dash 1 limitations and recommendations. Practice crosswind landings when the opportunity arises. As in all things, talking the problem over with older, wiser heads can't hurt (we have to learn from the mistakes of others; none of us will live long enough to make them all ourselves).

2. Be ready to take **fast** corrective action. Several birds went off the runway last year still flying their drag chutes. Expeditious jettisoning might have made the difference.

3. Whatever you do, **don't** get locked into a situation that doesn't leave you some kind of an out. Stay flexible, stay alert for changing conditions. If we can bend *with* the wind a little, we won't end up getting bent *by* it. ★

NOISE ! NOISE ! NOISE !

Maj John P. Meade, Directorate of Aerospace Safety

Many of us make noise while making a living, but not many of us enjoy it. To some, noise is a valuable guide to the performance of mechanical contrivances. To others, it's a woofer laboring over the latest stereo hit. Somehow, the racket from our neighbor's air conditioner, his son's car, or the local utility company's jack hammer can never be conveniently turned off. To most of us, then, noise is a nuisance—or worse, a health hazard.

Noise has become such a problem that many states and municipalities have adopted ordinances regulating it. Coverage ranges from the noise level of entire neighborhoods to that of "animals, birds, hawkers, and peddlers," and penalties range from 25 to 500 dollars and/or 60 days in the local cooler. The latest, most comprehensive, is the Walsh-Healey Public Contracts Act, which compels manufacturers to protect their employees' hearing if they deal with the Federal Government.

What is noise? Noise has two aspects. Taken one way, noise is something you sense, something you feel inside—like a headache. You can hear noise, recognize it as a low-pitched rumble or a high-pitched whine. Technically defined, noise is any unwanted sound. And although this definition may seem naive, it is also remarkably sensible. It combines both aspects of noise: the sound outside of you and the feeling inside of you. According to this definition, too, one man's noise can be another man's music. *Bach* is noise to some; *Three Dog Night* is noise to others.

USAF HEARING CONSERVATION PROGRAM

The Air Force conducts one of the largest and most comprehensive hearing conservation programs in existence. The purpose is twofold: **to conserve the hearing of all military and civilian personnel routinely exposed to noise, and to insure continued retention and utilization of skilled and valuable personnel.** This program is large because it encompasses all military and civilian personnel who are exposed to potentially hazardous noise. Additionally, audiometric examinations are performed as part of entrance and separation physicals on all military and civilian personnel, regardless of whether they are routinely exposed to hazardous noise. The program is comprehensive because it incorporates the following efforts:

There is an education and indoctrination program concerning the undesirable effects of noise. This program covers undersirable noise, ear protective devices, and methods and techniques used to effectively control or limit undesirable noise exposures.

Next, areas where potentially hazardous noise exposures exist are identified and specific noise exposure limits are established for people working there. Ear protection devices are then issued to each individual who must work in these potentially hazardous noise areas.

Prior to an individual's starting work in these areas, pure tone threshold audiograms are completed, representing a pre-exposure baseline, and periodic reevaluations are routinely accomplished on all these individuals.

Lastly, all hearing conservation data and information are maintained in permanent records and files of the individuals concerned. This last step will assist and protect the best interests of both the person and the Air Force.

Prevention of noise-induced hearing losses requires that noise control measures be initiated at the beginning of the individual's noise exposure work life and continued throughout his career. Such prevention depends greatly on awareness of potentially hazardous noise exposure and discipline on the part of the man to wear the ear protection devices furnished him. Ironically, many men who routinely work in extremely hazardous noise environments will not lose their hearing due to this noise because it is so intense that they use their ear protection; yet they will expose themselves to off-duty noise (trapshooting, motorcycle and sport car racing) that subsequently may cause a loss of hearing.

Extensive research, primarily by Major Donald Gasaway and his group at the USAF School of Aerospace Medicine, Brooks AFB, Texas, clearly emphasizes the fact that noise does not have to elicit pain or even discomfort for it to cause a permanent loss of hearing acuity. In fact, noise which does not elicit ear pain or discomfort constitutes the largest range of exposures which eventually cause permanent sensorineural type noise-induced losses.

In order to protect people from this insidious noise, engineering surveys are accomplished throughout bases and at specific duty stations. Through accurate sound level measurements, dangerous areas and operations can be identified and proper protective measures employed. These will include proper ear protection, limited exposure time, and periodic audiometric examinations to determine if the first two actions are accomplishing the desired effect: *protection of the person*. In the event that ear protective devices are not sufficient to prevent damage, then it becomes necessary to use engineering and operational measures to reduce noise. Such measures might include the use of engine exhaust and intake suppressors, sound-isolated engine test stand control booths, increasing the distance between the noise source and operating personnel, and a reduction of exposure time.

While there are many sources of noise on an air base, jet engines are probably the most frequent contributor. The engines of most jet powered aircraft produce noise that exceeds the threshold for unprotected ears and limit individual exposure time even with the use of ear plugs and muffs.

For example, the J-57 engine in the F-100, at 250 feet behind the engine, produces noise that should limit the unprotected person to 2.5 minutes per day, and only one hour with plugs or muffs. With both, permissible exposure increases to 10 hours per day. The use of afterburner reduces all these times by 75 percent.

One of the worst is the J-75 engine in the F-106, which produces 136 decibels (db) and 144 db in afterburner. Times for it are (100 feet behind the engine):

	Unprotected	W/Plugs or Muffs	W/Both Plugs and Muffs
No AB	5 sec/day	1 min/day	19 min/day
With AB	1 sec/day	18 sec/day	3 min/day

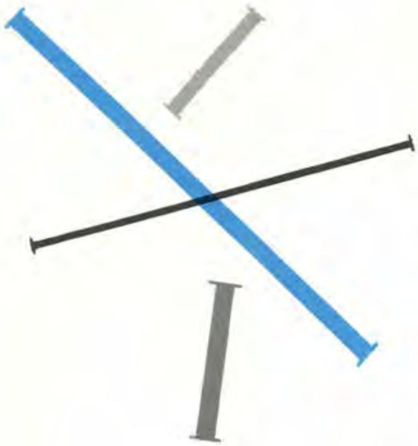
So you can see the importance of using plugs and/or muffs. The newest aircraft in the inventory, the C-5, also has the biggest engines, but at 250 feet behind the engine, the noise is only 115db, considerably less than that of the KC-135 and the C-141 engines.

In summing up the program, we can say that the individual is the key to its success. All attempts directed at educating noise-exposed personnel must be aimed directly at the individual. If this effort is successful and each individual is thoroughly convinced that unprotected exposures to noise may result in hearing loss, then avoidable hearing losses will be kept at a minimum. Remember, the hearing you save will be your own! ★

REQUIRED EAR PROTECTION

DECIBELS	REQUIRED EAR PROTECTION
0-85 DB	NO PROTECTION REQUIRED
85-100 DB	EAR MUFFS OR EAR PLUGS REQUIRED
ABOVE 100 DB	EAR MUFFS AND EAR PLUGS REQUIRED
135-145 DB	EAR MUFFS AND EAR PLUGS REQUIRED. LIMITED TIME EXPOSURE
ABOVE 145 DB	PROHIBITED

(doubtful) attitude (director) indicator (disaster)



Maj Richard E. Hamilton
Directorate of Aerospace Safety

There I was, making an 0200 takeoff, the weather at minimums. I had just picked up the flaps when the GIB screamed, "Roll out! Roll out!"

"Why?" I said, "the ADI is level."

His voice went up about two octaves, so I decided he was serious. I'm not sure how high we were when he got us out of inverted flight, but it wasn't high enough. I still don't know how we missed that hill off the end of 22.

How many times have you heard a similar "war story"? F-4 crews have a good supply of such stories. They follow a familiar theme: night, weather—in other words, tough going. For example:

- Immediately after takeoff, in night/weather, the aircraft commander transmitted that he had lost his flight instruments. During the ensuing maneuvers to get the aircraft back to the field, the aircraft struck the ground. Two fatalities and the loss of one Phantom.
- While transitioning from formation to instrument flight, at holding fix, the wingman became disoriented and lost control of the aircraft. The aircraft commander could not determine the attitude of the aircraft during violent maneuvering. Result: One F-4 destroyed, one fatality (the GIB forgot to hook up his chute risers).

What are we doing about it?

You probably know that TCTO 1F-4-924 will add a standby attitude indicator to the front seat. The first 200 of these kits should have been in the field by March 1971. The target date for fleet conversion is December 1971. Additionally, new maintenance ground test procedures have been implemented and more sensitive test equipment has been ordered to measure ADI bearing wear. The experts are continuing to test the ADI in order to determine the exact cause for failure. Fixes take time, however, so the same problems may be with us for awhile.

Regardless of these fixes, one problem will always be with us. That problem is instrument interpretation. Even when we have two attitude references in the front cockpit, we will have to make the right choice when they disagree. The back-seater, whether pilot or navigator, must be able to recognize unusual positions and warn the aircraft commander.

Have your local procedures been reviewed and updated to provide complete crew coordination training for your GIBs? Do you feel that elements of your program are worthy for inclusion in command supplements? Have you submitted recommendations to the MAJCOMs? Remember, the final responsibility for the major portion of GIB training lies with each individual aircraft commander. Can your GIB give you the kind of crew coordination *you* need? ★

REX RILEY'S CROSS COUNTRY NOTES

An alert transient services NCO brought to our attention that perhaps most pilots were unfamiliar with some rather important aspects of TO 00-20-5 (which deals with flight reports and supporting maintenance records.) The two paragraphs, which are of primary concern to transient pilots, are important enough to quote for your information.

"1-91. If routine inspections and minor repairs cannot be made promptly, because of lack of personnel or material, and the pilot of the aircraft desires to proceed on the flight without accomplishment of such inspections or minor maintenance work, the aircraft may be given an Exceptional Release. When such circumstances prevail, the pilot will be advised that maintenance was not performed because of lack of facilities, parts, or personnel, and a brief entry to that effect will be entered on the AFTO Form 781A. The transient maintenance officer will place his signature in the Discovered By block for this entry. When stops are made at non-Air Force installations the pilot of the aircraft is responsible for the accomplishment/omission of the required routine inspection or minor maintenance, to include applicable AFTO forms' entries, i.e., preflight, postflight, etc. The pilot will grant the Exceptional Release and sign the release on the form.

"1-92. If the pilot desires omission of the required routine inspection or minor maintenance work in order to permit prompt resumption of flight, even though personnel and facilities are available locally to make the required inspections and to accomplish the necessary maintenance work without undue delay, a written request to such effect will be entered on the AFTO Form 781A by the pilot. The base transient aircraft maintenance officer may grant such a request if he concurs that the aircraft is in safe operational condition. In such cases, the Exceptional Release will be signed by the transient aircraft maintenance officer. When this is impracticable, the pilot will grant the Exceptional Release and sign the release on the form. (A duplicate copy of the AFTO Form 781A and 781H pertaining to such entries may be made to indicate work or servicing accomplished or refused. These copies will be retained on file by the transient aircraft maintenance officer for not less than 30 days.)" ★

THE

REX RILEY *Transient Services Award*

BUCKLEY ANG BASE

AURORA, COLO.

LORING AFB	Limestone, Me.
McCLELLAN AFB	Sacramento, Calif.
MAXWELL AFB	Montgomery, Ala.
HAMILTON AFB	Ignacio, Calif.
SCOTT AFB	Belleville, Ill.
RAMEY AFB	Puerto Rico
McCHORD AFB	Tacoma, Wash.
MYRTLE BEACH AFB	Myrtle Beach, S.C.
EGLIN AFB	Valparaiso, Fla.
FORBES AFB	Topeka, Kans.
MATHER AFB	Sacramento, Calif.
LAJES FIELD	Azores
SHEPPARD AFB	Wichita Falls, Tex.
MARCH AFB	Riverside, Calif.
GRISSOM AFB	Peru, Ind.
PERRIN AFB	Sherman, Tex.
CANNON AFB	Clovis, N.M.
LUKE AFB	Phoenix, Ariz.
RANDOLPH AFB	San Antonio, Tex.
ROBINS AFB	Warner Robins, Ga.
TINKER AFB	Oklahoma City, Okla.
HILL AFB	Ogden, Utah
YOKOTA AB	Japan
SEYMOUR JOHNSON AFB	Goldsboro, N.C.
ENGLAND AFB	Alexandria, La.
MISAWA AB	Japan
KADENA AB	Okinawa
ELMENDORF AFB	Alaska
PETERSON FIELD	Colorado Springs, Colo.
RAMSTEIN AB	Germany
SHAW AFB	Sumter, S.C.
LITTLE ROCK AFB	Jacksonville, Ark.
TORREJON AB	Spain
TYNDALL AFB	Panama City, Fla.
OFFUTT AFB	Omaha, Nebr.
ITAZUKE AB	Japan
McCONNELL AFB	Wichita, Kans.
NORTON AFB	San Bernardino, Calif.
BARKSDALE AFB	Shreveport, La.
CHANUTE AFB	Rantoul, Ill.
KIRTLAND AFB	Albuquerque, N.M.

footnotes to folly

"OK, I'M PARKED BY A FIRE HYDRANT, SO WHAT?"

"AH! COME ON, CHIEF, YOU'VE GOT TO BE KIDDING--MUSH?"

"HOLD ON, HARRY, WE'LL
HAVE YOU OUT OF
THERE IN 30 MINUTES."

"I'LL SOUR ON YOUR STOMACH."

"HE'S GOT TO BE
AROUND SOMEWHERE.
HIS HAT'S STILL HERE."

"NO, SARGE, YOU CAN'T
BURY IT HERE."

Maj David H. Hook, CAF, Directorate of Aerospace Safety

Chances are good that a great many T-Bird drivers who were around during the years of the Great Flameout panic think that the problem was solved way back in the middle 1960s. At that time, we discovered that anti-icing alcohol would turn into a gooey mess, plugging up some critical holes in the main fuel control. Figuring—rightly—that the cure was worse than the original problem, we disconnected the alcohol system. We also improved the fuel control and added an anti-ice inhibitor to the fuel.

So what's the problem? Well, we did reduce the flameout rate by about fifty percent, but a glance at the accompanying graph will tell you that the flameout problem not only persists today but seems to be on the increase. The figures do not include flameouts that were due in any way to a malfunction of any aircraft or engine system. If the present trend is not reversed, at least seven pilots this year can look forward to their T-33s winding down unexpectedly at an awkward moment.

HIGHER RISK IN "PLEASANT" MONTHS

If you fly a T-Bird a review of the circumstances surrounding recent flameouts may help you to avoid being one of the seven. First of all, during flight through heavy precipitation, a flameout should **not** be "unexpected;" the flight manual is very specific on this point. In recent years only a few flameouts fit into this category. Here are the circumstances surrounding the rest:

Cruising Level: FL 240 to FL 290 the "comfortable" altitudes. (These old birds seem to climb more slowly every year, and the pressurization isn't all that great.)

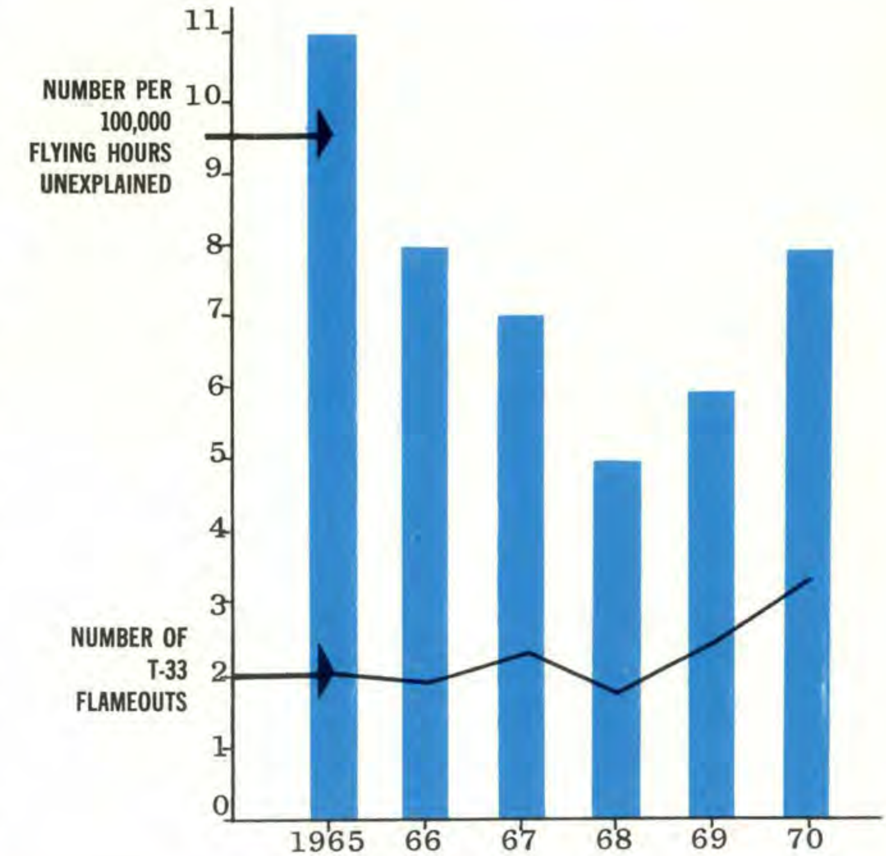
Season: The "pleasant" months, May to October in the northern hemisphere, when air temperatures are generally higher than normal at these flight levels.

Weather: Varied, but generally visible moisture was present. A few aircraft merely climbed through clouds and were cruising in clear air. Most were cruising in haze or stratus cloud for an hour or so. Some were in light precipitation, encountering very light rime icing.

Time at Altitude: About one hour at a fixed throttle setting. Generally, flameouts occurred about the time the tip tanks went dry and the main wing tanks were turned on.

The causes of these unexpected flameouts remain a matter of conjecture even after all these years, and there are many theories, of varying degrees of merit, to explain the flameouts. These theories fall into two basic categories: an incorrect fuel-air ratio at the burners; or an interruption of fuel flowing to the burners.

An incorrect fuel-air ratio is most likely to occur when heavy precipitation or any amount of icing is encountered. The flight manual warns of induction icing, where a crust of ice forms over the inlet screens of the impeller, restricting the flow of air and resulting in engine surging and high EGT. The fuel-air ratio might also be disturbed by ingestion of large quantities of water, either as slush or heavy rain. Converted to steam by the compressor, this water causes burner blowout due to a lack of oxygen. Ice encrustation of the main fuel control aneroid bellows is also thought to cause a false sensing of higher altitude, thus resulting in burner blowout due to insufficient fuel. During some flight tests in March 1965, a T-33 was subjected to an abnormally heavy ice accretion at 16,000 feet and −24°C temperatures, and no engine difficulties were noted. Nonetheless, inlet ice and heavy precipitation are proven causes of some flameouts.



FUEL SYSTEM PROBLEMS

To grasp the scope of the problems within the fuel system, we need to understand the nature of JP-4. Present standards call for delivery to the aircraft of a fuel that contains 0.1 percent anti-icing additive and no free water. "No free water" means only that at delivery temperature any water present will remain in suspension as microscopic drops; large drops of water will not form on the bottom of the tank. However, *the fuel will very likely be saturated or nearly saturated with suspended water*. As the temperature of the fuel decreases, eventually the level of super-saturation will rise to the point where free water drops will precipitate. At this point the anti-icing additive goes to work, dissolving in the water and lowering its freezing point.

The temperature of the fuel changes in many ways. Cold soaking occurs at altitude. As the stuff is pumped it warms and, as it flows through an orifice or a filter, it cools. Consequently water and even ice are very likely to be present to some degree at various locations in the fuel system on every flight.

Flying in moisture in any form—precipitation, cloud, or even humid clear air—aggravates the fuel-water problem. Under these conditions, compressor bleed air, which pressurizes the tip tanks, will be heavily laden with water vapor. As this air cools, the water condenses, accelerating the formation of pools of water in the tips. Then, as the amount of free water increases and dilutes the anti-icing additive, the freezing point of the water rises. If this free water gets past the low pressure fuel filter into the engine fuel system, flameout becomes a very real possibility.

ENGINE FUEL SYSTEM ICING

There are many points where ice can form in the engine fuel system, particularly in the main control which is filled with orifices and crevices where ice can cause trouble. In the mid 1960s several modifications were made to reduce the susceptibility to icing, but still the opportunities for ice formation persist. Flameout occurs when ice finally blocks the flow of fuel, as indicated by a low or zero fuel pressure reading.

FREE WATER AT THE FUEL MANIFOLD

Even if the free water doesn't freeze in the engine fuel system, flameout might occur if a large enough slug of water arrived at the burners instead of JP-4. In this case a significant change in the indicated fuel pressure would be unlikely. Although the validity of this theory has not been determined, flameout due to "free water fuel starvation" doesn't appear to be too far-fetched. Pooled water in the tips could pass into the fuselage tank, and turbulence caused by fuel entering from the wing tanks could send a slug of water instead of fuel into the engine fuel system.

INVESTIGATION CONTINUES

As a result of 1970's flameout record, the T-33 System Manager at Sacramento has instituted an intensive study of the unexpected flameout phenomenon. Victims and flight safety officers will be required to submit detailed reports to describe flight profiles as accurately as possible.

First of all, if an unexplained flameout occurs and a relight is obtained on the emergency fuel system, pilots will be expected to remain on the emergency system for the remainder of the flight so that the fluid inside the main fuel control at the time of flameout may be analyzed. Secondly, maintenance personnel will be expected to search in every conceivable cranny for any evidence of water in the aircraft and engine fuel systems.

Finally, the pilot will be asked to state such particulars as:

1. Elapsed time and fuel consumed prior to takeoff.

2. Elapsed time, fuel load, and engine and flight data at the time of flameout.

3. Instrument changes or fluctuations before, during, and after flameout.

4. Route weather and flight conditions such as OAT, cloud type, visible moisture, icing.

5. Fuel tank sequence and time of selection.

AVOIDANCE AND PREVENTION

An obvious over-reaction to this article would be to prohibit T-33s from entering clouds. We could also prevent flight accidents by locking aircraft in hangars. However, as this flameout problem seems to be related to a GRADUAL BUILD-UP of water in the fuel system, the sensible approach is to minimize the time spent in cloud and to avoid prolonged flight in the conditions described earlier in this article. Cruising above 30,000 feet may be inconvenient and uncomfortable, but the air holds a lot less water.

Another obvious method of prevention is for maintenance personnel to thoroughly drain the fuel system prior to flight. Work order cards and checklists give all the pertinent details. Particular care must be taken to insure that the tip tanks are free of water. To make this easier, a modification has recently been approved to install spring-loaded drains on the tips.

If an unexplainable surge, fluctuation, or decrease in rpm occurs in flight (where I come from it's called the "Lake Superior Twitch"), select Emergency Fuel, leave it there, and have an investigation made for evidence of water in the main fuel control and high pressure filter. If the engine quits completely, a snappy selection of Gangstart before the rpm decays will hopefully relight the fire with a minimum of anxiety.

In 1970 only one Bird refused to relight after an unexplained flameout. A fault in the ignition system prevented any current from getting to the igniters. Similar problems in other aircraft were identified, so hopefully this failure won't occur again.

The "pleasant" months will soon be here. If you're a T-33 driver, you might want to brush up on your SFO patterns *now*. Careful preflight planning during the flameout season may also save you some inconvenience and excitement midway through your flight. ★

F-105 FLIGHT CONTROL CORROSION

George E. Kammerer, SMAMA, McClellan AFB, Calif.

F-105 Flight Control Stick Link Rod Corrosion PN 79F340012-1

How would you like to fly the airplane the part above came from? The part is a pitch control link rod from an F-105. As the result of two separate instances of such severe corrosion of F-105 pitch control link rods, SMAMA, prime AMA for the '105, initiated an urgent TCTO.

As shown in the photographs, one end of one of the link rods was sawed off for lab analysis. Chemical analysis indicated that urine appeared to be a factor in the corrosion of the part. This may indicate that maintenance/service personnel and crew members best be more careful about relief container spillage in the cockpit. The other, and most severely corroded, control link rod had been immersed in water or exposed to an excessively moist environment in a non-draining control stick well of an F-105 based in Florida over a period of time. This part is the only magnesium component of the system, and magnesium is very susceptible to corrosion.

Since phase injections require inspection of the subject area, specifically during the fifth phase, it is hard to believe that the degree of corrosion indicated occurred between inspections. Is it possible that the difficulty of adequately checking the area may have been a factor in these inspections being done superficially, or not at all?

Interim urgent action TCTO 1F-105-1155, 3 Feb 71, has been sent out to all F-105 units. The above photograph of a grossly corroded control link should assure compliance with the TCTO and required phase inspections. And those actions just might prevent some major accidents. ★

Tech topics

briefs for maintenance techs

torque it, durn it!

Immediately after takeoff, a C-7 lost torque on the Nr 2 engine. The pilot shut the engine down and took the airplane back to the hangar. There the maintenance types discovered a loose valve adjustment nut on the Nr 1 cylinder. Since there was no record of local maintenance on that cylinder, there was no way of knowing who failed to properly torque the nut.

help maintenance help you

There was a time when it was easier for a pilot to tell the crew chief about some of the small things that required fixing than it was to write them up. That was in days long past, when the pilot flew the same aircraft every day, and he met the same crew chief every time he flew. Today it's different. The pilot usually flies a different aircraft every time out. Even if he should happen to draw the same bird two times in a row, his chances of being launched by the same crew chief are slim. So now if you notice a minor discrepancy that you feel should be fixed, your only recourse is to write it up. If you tell the crew chief, you may be telling someone who was assigned to the aircraft for one day only, or even if he is the regular crew chief, he might break his leg on the way home, so he goes to the hospital with the discrepancy you told him about still in his head.

The next day your buddy goes out to fly the same bird. Of course, a different crew chief launches him, and neither one knows anything about the loose instrument shroud you told the old crew chief about. Your buddy is now cruising along and he decides to make a seat adjustment. In so doing he places his hand on the instrument shroud for support. The shroud then comes all

the way loose and pulls the firewall shutoff for Nr 1 engine. Now your friend is suddenly flying on one engine—primarily because you didn't write it up.

The importance of making a complete write-up with all details is obvious. Include everything that happened before, during and after the problem appeared. This you should do, even if you intend to brief the maintenance crew, because any number of things could happen to you or to the maintenance people you talk to before the man who actually does the work arrives at the aircraft.

The point is *write it up* no matter how minor it may seem and *give all the details* so that the man who comes to fix it will know as much as you do about the discrepancy.

sloppy maintenance

Shortly after takeoff, the T-37 pilot found that he could not retard the left throttle past 80 percent. He declared an emergency and accomplished a modified pattern with speed brakes and flaps to control the air speed. The left engine was shut down in the flare using the fuel shut off T-handle. When maintenance got the bird back, they found that safety wire was not installed on the ball joint jam nut (Ref. TO 1T-37-567 Fig 18) allowing the jam nut to back off and the throttle linkage to disconnect. The last work done on the throttle linkage was for a stiff throttle. This is not really the way to fix a stiff throttle, is it?

clamp woes

While turning base after completing an FCF, the pilot of an F-106 detected a faint odor of fuel fumes. Then, during landing roll, he was advised by the tower that the right gear appeared to be smoking. What appeared to be smoke was apparently vaporized fuel draining from a ruptured fuel line. As the aircraft parked, a large stream of fuel poured from the engine bay area in the vicinity of the tail hook attach fitting.

Investigation revealed that the high pressure teflon/woven wire fuel line had chafed through. The line runs from the bottom of the fuel filter to the left side of the fuel pump. The prime suspect for hose chafing is improper clamping. Don't underestimate the importance of clamping—use the right clamp and install it properly.

follow the TO

If it is necessary to park your bird tail-to-tail with another, be sure you follow the TO for distance and snubbing of controls. He might start up. Of course, the more distance you can put between you and the aircraft behind you the better off you are, as the people in the following incident found out the hard way.

A C-130, parked 535 feet from, and tailed to, another C-130 was performing an engine operational check. The crew chief of the bird that was *catching* the blast noted his aircraft bouncing around, so on the advice of the flight line expediter, wrapped a 5000 pound tie down strap around the copilot's rudder pedals and the right side of the copilot's yoke. Soon the right arm of the copilot's yoke failed at a point midway between the hub and the interphone button.

Inspection of the break area indicated a previous crack. Snubbing the controls in this manner is prohibited by C-130 maintenance TOs. TO 1C-130B-1, page 2-39, Fig. 2-4 states, "At 500 feet with engines at full power prop blast equals approximately 30 knots"—a good size breeze. However, the normal built-in hydraulic aircraft snubbers will do the job better than trying to tie the controls together in the cockpit.

MORE

Tech topics

wet feet

A C-123 at the beginning of his takeoff roll started drifting to the left of centerline, but was brought back toward the center with nose wheel steering. Transition from nose wheel steering to rudder was done at 50-55 knots. At about 60 to 65 knots the aircraft started veering to the left again. The pilot tried to correct but when it became inevitable that the aircraft would leave the runway, power was retarded to idle. The aircraft went off the side at the 1033 foot mark, and the left tire failed, followed by the nose gear failing and tucking under. The aircraft came to rest in a marsh—two feet of water. The crew plus two passengers departed the aircraft and one of the passengers received minor injuries.

It was determined that this joy ride was caused by maintenance. During the last phase inspection, card number 161, item one, had not been completely complied with. The card calls for removal, disassembly, lubrication, reassembly, and reinstallation of the nose wheel centering cartridge. But the cartridge had been removed and washed without disassembly, then reinstalled. Furthermore, during installation, proper adjustments were not made.

This is one of those cases where it is very easy to reflect and say, for instance, if the pilot had used proper technique he could have avoided the accident. However, the fact is, if maintenance had done their job correctly, the situation would never have developed in the first place.

more on torque

The T-38 was Lead of a two ship flight on a night instructor pilot trainee mission. On the go during the seventh touch and go landing, as both throttles were advanced to military power—BANG! The front seat IP took over, selecting max afterburner on both engines. The liftoff was continued, but an attempt to raise the gear was unsuccessful. The fire warning lights came on for both engines. The wing man reported, "It appears you have a fire." The IP was able to attain about 1000 feet and 180 KIAS, but the flight controls became sluggish and unresponsive. Both pilots successfully ejected below 500 feet.

The wreckage gave up a couple of clues as to what had caused the BANG and ensuing fire: (1) a "B" nut on hose assembly, PN R1007-P40163A5, of the variable guide vane actuator fuel inlet port, Nr 1 engine, was not properly torqued; (2) the leaking fuel was ignited when a first stage compressor blade failed. The resulting fire was intense enough to cause failure of critical flight control components. The engine failure by itself would not have caused any control problems, but the loose "B" nut provided fuel for fire, and we lost another aircraft because of improper torque.

don't toss it

If you are going to toss equipment around near a running jet engine, you'd best be prepared for the engine to swallow some or all of it.

While an F-100 was preparing to taxi for takeoff, the pilot displayed his two cockpit pins to ground personnel and motioned for them to pull the nose gear and tail hook pins. After removing the two pins, the ground man threw the pins to the pilot. (The ladder was not used because it didn't fit properly. The base only had one ladder for F-100s and it was being used at a location across the field.) The first pin tossed was caught by the pilot; however, the second was sucked forward out of the pilot's reach and ended up in the engine intake. The point is, if you are ever caught in a similar situation, plan ahead how you're going to get the pins to the pilot. A tote sack or some other method might work but don't toss them.

spit run

If you are not a recip engine mechanic, you most likely do not know what the term *spit run* means. If you are a recip engine mechanic, you know the term and the associated dangers if it is not done properly. The following incident is a prime example of what can happen when you try to cut corners.

The newly installed number two engine on a T-29 had been prepared for a depreservation run. Tech data had been followed with the exception of installing the depreservation drain plug hoses. It is impossible to install the drain hoses with the lower cowling installed. The engine was started, using the primer, and ran for 10-15 seconds, when a fire was noted. The operator attempted to blow out the fire by advancing the throttle; however, 700 RPM was all he could attain, so he released the primer but kept the engine rotating with the starter. The fire was extinguished by firemen and the damage was confined to the external part of the engine.

The fire was caused by an accumulation of fuel and corrosion preventive compound that puddled in the lower cowling from the lower cylinders. It probably ignited from a spark plug lead, even though the leads had plastic covers. It is believed that the spark jumped around the plastic to the ground. This outfit has decided to remove the lower cowling and install the drain hoses before spit running any more engines. In addition, they recommend metal caps on the loose spark plug leads rather than plastic. This would prevent any spark from jumping. Following tech data is still the best way to prevent such mishaps.

dangerous cargo

During offload of cargo from a C-5, the cargo deck non-skid material at approximately fuselage station 780 (left side pallet position) was noted to be raised and discolored white. It was determined that the discoloration was caused by liquid leaking from one of the pallets. The unidentified liquid had run into cargo tie-down fitting sockets and had trickled rearward in the roller conveyer channels and the guide rail channel. A loadmaster who felt and smelled the liquid said it was similar to photographic developing solution. To correct the problem the cargo floor was washed and mopped prior to the aircraft proceeding to its home station, where the affected area was washed with a water and soda solution.

A few days later the aircraft entered an isochronal inspection, at which time surface corrosion between fuselage station 700 and 1240 was discovered. SMAMA technical personnel were asked to determine the extent of damage and corrective action necessary. They determined the liquid to be sulphuric acid, and that it had damaged the main cargo area and the lower crawl area. Inspection and repair time was estimated at 800 manhours.

Lessons to be learned here are: (1) know the type of cargo you're carrying (this crew was unaware that they were carrying anything of a corrosive nature); (2) be sure AFM 71-4 is complied with; (3) should *any* liquid be spilled, identify and clean it up properly before further flight. Also be sure the spill and all clean-up actions taken are entered in the AFTO 781-A forms. Superficial identification in the first place delayed neutralization action in the second, increased the amount of damage considerably, and could have created a safety of flight hazard. ★

AGE--REPAIR OR REPLACE IT?

Frank C. Espiritu, SAAMA, Kelly AFB, Texas

Is your repair of aerospace ground equipment (AGE) based on the 65 percent repair criterion cited in Air Force Manual 67-1? Are you expending a large quantity of man-hours in maintaining your equipment? Does your organization have a low AGE in-commission rate? If the answer to any of these questions is yes, then you apparently have not heard of Air Force Regulation 66-31, Technical Order 00-25-240 or TOs 35-1-24, -25 and -26. These documents contain the philosophy and criteria as well as the guidelines for determining one-time repair expenditure limits for AGE.

These directives came about because, in years past, AGE was bought for specific weapons systems on the premise that it would phase out with the aircraft. But, it just didn't work that way. Unless the item became totally obsolete, or completely worn out, we kept it and repairs frequently exceeded its worth.

Finally, based on a study by SAAMA (MMR), Hq USAF published AFR 66-31, "Uniform Repair/Replacement Criteria for Air Force Aerospace Ground Equipment," dated 2 June 1969. This was followed by TO 00-25-240, 25 August 1969, after which each AMA managing AGE published technical orders as follows:

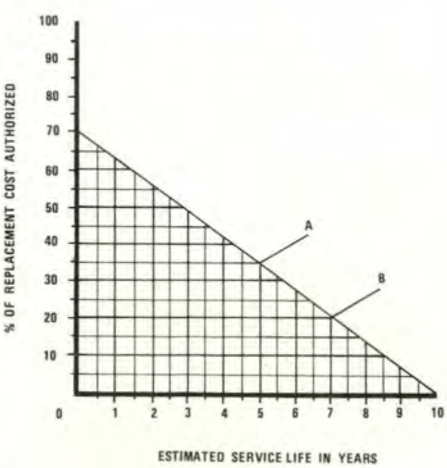
- SAAMA—TO 35-1-24, "Air Force Economic Repair/Replacement Criteria for Selected SAAMA Managed Aerospace Ground Equipment," dated 30 December 1969. This technical order applies to AGE managed by SAAMA in Federal Stock Classes 1710, 1730, 1740, 2835YZ, 3655, 4120, 4910, 4920, 4930, 4940, 6125 and 6130.
- WRAMA—TO 35-1-25, dated 1 September 1969. It applies to AGE managed by WRAMA in Federal Stock Classes 4310, 4320, 4520 and 4610.
- SMAMA—TO 35-1-26, dated 1 November 1969, which applies to AGE managed by SMAMA in Federal Stock Class 6115.

The Air Force Uniform Repair/Replacement criteria are intended to cause a decision at the time an item of equipment is in need of repair and are based on the following elements: service life, maximum allowable one-time repair expenditure limit, equipment age, replacement cost and repair cost estimate.

The service life and maximum allowable one-time repair expenditure limits are established by the AFLC activity having item management responsibility for the equipment, based on age of the equipment and its unit cost. The activity possessing the equipment prepares the repair cost estimate based on the required maintenance.

All AGE does not require the same amount of surveillance; therefore, for the purpose of applying the economic repair criteria, AGE has been divided into the following categories:

• High dollar aerospace ground equipment which costs $2,500 or more. These items are assigned maximum allowable one-time repair expenditure limits and estimated service life. They are listed in TOs 35-1-24, 35-1-25 and 35-1-26 by FSC, P/N and Noun in a convenient table citing the repair expenditure limit for each year of the estimated service life of each item.



Charts similar to this are used by each AMA to compute repair expenditure limits.

When the repair cost estimate for AGE in this cost category exceeds the maximum allowable one-time repair expenditure limit, the owner must submit to the FSC IM a detailed description of the deficiencies and a detailed repair cost estimate on AFTO Form 375, "Aerospace Ground Equipment Repair Cost Estimate."

• Middle dollar AGE which consists of items costing $200 or more but less than $2,500. These items are listed in the technical orders by FSC, P/N and Noun, with a table showing the repair expenditure limit. When the repair cost estimate for AGE in this category exceeds the one-time repair expenditure limit, the owner will advise the FSC IM. However, submission of a detailed description of the deficiencies and a repair cost estimate are not required. The FSC IM will advise the possessing organization whether the item will be replaced or repaired.

• Low dollar AGE which consists of items costing less than $200. These items are not identified in the technical order. AGE in this cost category will be repaired if the repair cost is less than 50 percent of the replacement cost. Notify the FSC IM of disposal action by letter in accordance with AFM 67-1.

The senior maintenance officer at a specific activity may authorize repairs of equipment without prior FSC IM approval, provided a mission essential requirement exists for the item, but he must be prepared to fully justify and support his action to higher headquarters.

The FSC IM will determine if items should be replaced or repaired and will so notify the submitter within three days.

Activities at all levels concerned with maintenance of AGE should insure that all personnel become thoroughly familiar with the new responsibilities and procedures delineated in AFR 66-31, TOs 00-25-240, 35-1-24, 35-1-25 and 35-1-26. ★

NUCLEAR SAFETY AID STATION

COLES CRANE BOOM

Subsequent to a reentry vehicle (RV) mating operation, an inspection of the Coles Crane Boom was conducted and several cracks were found in the welds of the inner boom section. Another Coles Crane was inspected and several cracks were found on the welds in the same location. Repair procedures and technical assistance were immediately furnished by the depot. A follow-on X-ray inspection of the boom sections was performed on the same two cranes and numerous other cracks were found. The cracks which were not visible without the use of X-ray were in various stages of propagation, and ranged in length from one-half to three inches. The importance of strict compliance with inspection procedures specified in TO 33D4-2-43-1 for L-3010 Coles Cranes cannot be overemphasized. The consequences of handling nuclear munitions with defective or unsafe handling equipment can be serious. The true professional will always take time to ensure that Aerospace Ground Equipment is in A-1 condition prior to use in nuclear weapon operations.

SOMEBODY GOOFED!

A recycle team discovered a damaged Minuteman lightweight spacer with three cracks propagating radially from a point on the spacer. Several other smaller areas of damage were observed. Using instructions from the depot, the reentry vehicle (RV) and spacer were removed without incurring further damage. A job well done. Investigation showed that the spacer bottom correctly fitted gouge marks on the Pen Aid rim. Additionally, a broken stud lined up with another gouge which included thread marks. That old enemy of nuclear safety, "Personnel Error," was evident. The Missile Maintenance Team (MMT) probably lowered the RV onto the Pen Aid in a misaligned position. When the weight of the RV settled, this caused the damage.

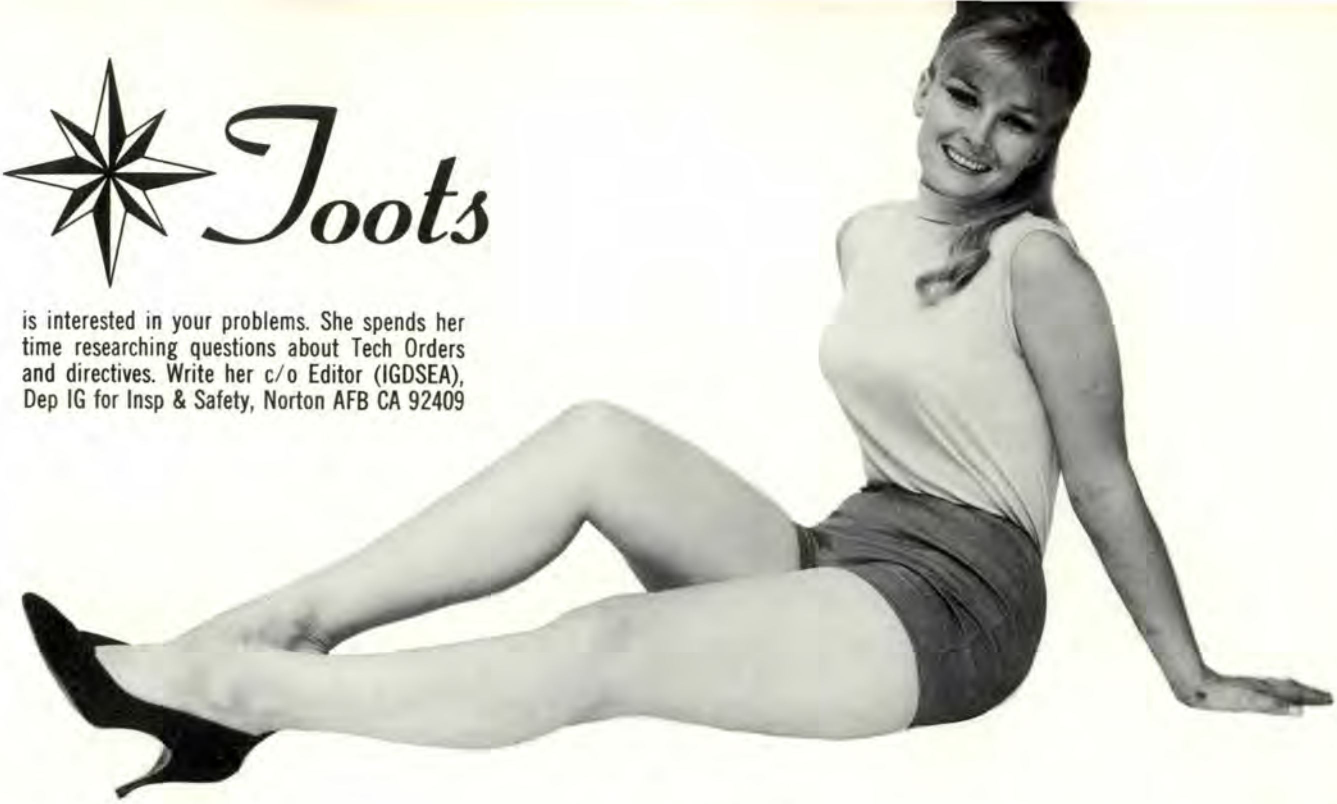
MMT personnel have been briefed on this nuclear safety deficiency. An examination of MMT training procedures to determine quality and sufficiency of training given is being accomplished. A request for a special training session for all MMT personnel to include hazards and proper procedures during RV mate/demate is being submitted. In the interim, are you certain your procedures are safe enough to prevent this type deficiency? ★

SLIPPING CLUTCH

A convoy was enroute from a launch facility to the Strategic Missile Support Base (SMSB). The reentry vehicle, guidance and control (RV/G&C) van was stopped because the tractor clutch was slipping. A national defense area was established, and the vice wing commander and the wing director of safety went to the scene. Another tractor was dispatched and was used to return the RV/G&C van to the SMSB. The cause of slippage was not determined by the base motor pool. Why not? Is your vehicle being maintained in proper running condition? Is your motor pool maintenance team really doing a good job? If not, let somebody know about it.

Toots

is interested in your problems. She spends her time researching questions about Tech Orders and directives. Write her c/o Editor (IGDSEA), Dep IG for Insp & Safety, Norton AFB CA 92409



Dear Toots

After much discussion locally, I've decided to write you about one aspect of a maintenance officer downgrading a red X. Specifically, whose name is entered in the "Discovered By" block when the downgraded entry is reentered in the first open block in the 781A?

TO 00-20-1 paragraph 3-24 is so vague on this matter that no mention is made of the "Discovered By" block.

1st Lt John J. Weber, Jr.
320 OMS
Mather AFB, Calif.

Dear John

In order to answer your question about paragraph 3-24, TO 00-20-1, I called the OPR for information. They said the correct way would be to print the name of the individual who made the original entry in the "Discovered By" block where the original discrepancy has been reentered. They also said that 00-20-1 is in the process of being rewritten. A note was made to change paragraph 3-24 when they get that far. However, I suggest you submit an AFTO 22 just in case they lose their notes.

Toots

Dear Toots

Recently a question was brought up on making pen and ink changes to technical orders. In TO 00-5-1 it states that "issuing instructions requiring activities to make pen and ink changes to the technical content of technical orders is unauthorized." However, we have recently received instructions to make pen and ink changes to TO 1T-38A-6WC-2, -4, and IT-37B-6WC-4. These changes were arrived at during a maintenance management review conference.

My question is who has the authority to make pen and ink changes to tech orders and at what staff level?

Sgt George D. Goodson
3550 Fld Maint Sq
Moody AFB, GA 31601

Dear George

I wrote to the OPR for TO 00-5-1 and they, in turn, queried SAAMA, the SM for the T-37 and T-38 aircraft. SAAMA states that no instructions were issued by them during the T-37/T-38 MMR Conference to make pen and ink changes to TOs 1T-38A-6WC-2, -4 or 1T-37B-6WC-4. On the contrary, the MMR attendees were advised that changes to technical orders (workcards) would be distributed within the 106 day limit outlined in AFLCM 66-20. In short, the T.O. is correct.

It appears someone in your outfit misunderstood. Thanks for writing.

Toots

Ops topics

SUSPICIONS CONFIRMED

A couple of really valuable lessons can be learned from a recent incident in SEA. They aren't new lessons, by any means, but they'll bear repeating.

A C-123K was making a VFR approach to one of the larger airfields (runway length was no problem). The aircraft commander, an IP, was in the left seat. The copilot, making the landing from the right seat, flared abruptly and when the aircraft ballooned he wiped off all the power before the IP could stop him. The airplane descended smartly, and hit the runway hard enough to cause some concern on the part of the crew.

Lesson One: Quick reactions are the order of the day during training in critical phases of flight. Don't get behind the student!

After the landing, the crew inspected the gear and found no damage. That cursory inspection might have been a link in the chain of events leading to a major accident, except for the professional attitude of the IP. Despite the fact that their inspection disclosed no damage, he wrote the airplane up for a hard landing. A closer inspection by maintenance revealed a cracked nose gear oleo mounting flange.

Lesson Two: When in doubt, write it up! ★

OVER-WATER BAILOUT

In a recent over-water ejection a crewmember actuated only one of the two parachute riser releases upon entering the water. Water temperature was 41°F and the crewmember, well aware of the limited survival time at that temperature without an antiexposure suit, decided to board the life raft first, then disconnect the other riser. He became entangled in the suspension lines, however, and found it impossible to board his life raft because the canopy had become submerged. Had it not been for the presence of two local fishermen, whose efforts were severely hampered by the crewmember's entanglement, it's quite likely that the crewmember wouldn't have made it.

Procedures for parachute water landings are spelled out in TO 14D1-2-1.

"After the parachute opening at the preset altitude of 14,000 feet or below, the following instructions should be complied with:

1. Check the canopy.

2. Remove the oxygen mask or pressure helmet visor.

3. Actuate the release on the survival kit to inflate the life raft.

4. Check to insure the raft has inflated properly. If the raft has not inflated properly, and time permits, the raft can be pulled up and complete inflation can be accomplished orally.

5. Inflate the underarm life preserver by pulling sharply downward and slightly outward on the lanyards extending from the lower front corner of each container. If a failure occurs, the life preserver can be orally inflated prior to entry into the water, thereby reducing possible confusion after the water entry.

6. Connect the inflated cells together with the Velcro straps provided. If individual preference indicates the raft can be boarded easier with the cells disconnected, connect cells after boarding raft.

WARNING: When your feet touch the water, immediately operate canopy releases to spill the parachute. In any water landing, altitude is difficult to determine. *Do not* release the canopy until the feet touch the water, no matter how close you think you are.

After a water landing, entanglement in the suspension lines is a possibility. It is recommended the canopy be discarded, rather than retained as in the past.

The foregoing procedures should be used day or night after bailout over water or over land where the possibility exists of drifting over water or where position is uncertain." ★

The GUNFIGHTERS of the 366th TFW are having their SECOND PRACTICE REUNION for all officer members in Tampa, Fla., 30 April-2 May 1971. All members, past and present, are requested to write for details and to submit their address to: GUNFIGHTERS, Box 6586, MacDill AFB, Fla. 33608.

AERO CLUB TRAINING

An Aero Club student pilot, out solo, dinged his trainer when the runway came up unexpectedly and smacked the airplane. The airplane subsequently entered a porpoise, helped along a little by out-of-phase control movements by the student trying to salvage the landing instead of going around for another try, and slid to a stop minus the nosewheel.

One additional finding by the investigator centered around the fact that this club, in accordance with Federal Air Regulations, permits students to solo in more than one type of aircraft. Most Commands now urge their aero clubs to pick a trainer and stick to it. This makes real sense. A reasonably aggressive student can win his private license in about five months, and there's plenty of time after that for him to broaden his horizons in other types of aircraft. It makes little sense to add the problems of dual currency to the multitude of problems the low-time pilot already has to cope with. ★

FLIP CHANGES

DD-175: The location identifier, if assigned, will be used in the destination block (e.g., KSKF vice Kelly AFB) to facilitate computer processing of flight plans. (Section II, FLIP Planning, N&S America and Pacific editions.)

Airport Traffic Area: The vertical limits of an airport traffic area are now up to but not including 3000 feet above the airport elevation (Special Notice, Section II, FLIP Planning).

FLIP Planning: Section IV of FLIP Planning has been deleted. Users should remove Section IV and the accompanying separator. (Special Notice, March issues of the IFR-S.)

ARTC Radar: "Radar Contact" will not normally be reported to the pilot when he is handed off to another controller after radar contact has once been established (IFR-S), Pilot Procedures with ARTC Centers). ★

RECYCLE TRICYCLE MAY EQUAL BICYCLE

There's an ol' school of thought that says, "if you put the gear down and it indicates unsafe, you go through all sorts of procedures to get it down and safe. Once you do, *don't* touch anything, just land!" Maybe there were some conditions we don't know about but a recent incident tells us that everyone doesn't adhere to this policy.

After a number of TAGs the gear down resulted in an unsafe left main. The pilot pulled the emergency "T" handle and the left gear immediately indicated down and locked. Suspecting a bad sequencing valve he recycled the gear. With the gear handle up, the red light in the handle stayed on. The landing gear circuit breakers were pulled to determine if all gears were up and locked. The gear stayed up and the red light stayed on. The control tower verified the left main gear door was open. The gear was lowered normally and all gear indicated safe. The aircraft was landed without incident. But it seems to us that trouble shooting a gear problem should be done on jacks not on downwind. ★

P-47 THUNDERBOLT
PILOTS ASSOCIATION
10TH ANNUAL REUNION
ANTLERS PLAZA HOTEL
COLORADO SPRINGS
COLORADO
MAY 1, 2, 3, 4, 1971

For Information Contact:
Herb Fisher, President
Port of New York Authority
111 Eighth Avenue
(Room 1409)
New York, N.Y. 10011
Telephone: (212) 620-8396

DECEMBER ASM

While looking for something to read the other night I came across a relatively unused copy of *Aerospace Safety* (Dec 70 issue). Being a private pilot I began to thumb through the copy and stopped on the article, "What's A Left Downwind?" Needless to say, I was horrified at the thought that this so called "private pilot" did not know what he was doing. Several other persons in this shop commented on that particular article (also in the "private pilot" category). Your magazine had quite a few miles put on it before the circulation stopped.

You might be pleasantly surprised to know that the men in this shop are not maintenance types. We are, in fact, "intel people" and of course interested in our aircrews. The December issue pointed up some very interesting highlights of AF flying, and gave quite a few of us a better understanding of what problems pilots can encounter.

One specific point was noted by several of us "pilots." The cover photo by Kenneth L. Hackman (Aerospace Audio Visual Service) was absolutely fantastic. Would it be possible for us to obtain or purchase a copy of the photo that adorned the cover of the December issue?

Although not on distribution for your magazine we will undoubtedly "hunt" copies as they become available. *Aerospace Safety* has provided a somewhat better understanding to us non-maintenance types, of what goes on behind the scenes of Air Force flying, and Air Force safety.

SSgt Richard R. Pelech
460 Tac Recon Wg
APO San Francisco 96201

Thanks, Dick. We'll try to get a copy of the photo for you.

PORTABLE NOSE DOCKS

I was just reading through your January issue and noticed the article on page 29 about portable nose docks at Ubon RTAFB, Thailand.

I would like to point out that Ubon is not the only base in SEA to have portable nose docks. Korat has had them for well over a year and has had much success with them in preventing the forward area of the aircraft from getting wet in rainy weather. The portable nose docks at Ubon look quite similar to those at Korat (wonder if they stole the idea from Korat?).

I would like to take this opportunity also to congratulate you on a really fine publication; it's really a pleasure to sit down and take a few minutes to read over all the interesting articles that you have every month. The magazine really helps out the maintenance troops a lot in looking over their areas and checking to see if they can eliminate any problems that have been written about in your articles.

Keep up the good work and we here all are awaiting your next issue of *Aerospace Safety*.

TSgt John P. Breese
460 FIS
Kingsley Field, Ore.

"PROJECT CLEAN SWEEP"

Kudos to the 307th FMS at U-Tapao in their "Project Cleansweep." The concentrated five day maintenance attack appears to be an excellent program to keep the high altitude bomber force in combat ready posture. However, I could not help but notice the picture of Sgt L. J. Smith, standing on the engine nacelle of a B-52, engaged in a spray painting operation without the use of some sort of protective face mask. It's great to repaint your aircraft, but why your lungs?

Maj Thomas D. Miller
Director of Safety
4454 CCTS
Davis-Monthan AFB, Ariz.

Wish we could say we were just checking to see who's alert.

☆ U.S. GOVERNMENT PRINTING OFFICE 1971 431-463/8

UNITED STATES AIR FORCE WELL DONE AWARD

Presented for outstanding airmanship and professional performance during a hazardous situation and for a significant contribution to the United States Air Force Accident Prevention Program.

Major
DONALD L. HEDRICK
318th Fighter Interceptor Squadron, McChord AFB, Washington

Major Hedrick was scheduled to fly a functional flight check in an F-106A. All pre-takeoff and power checks were completed satisfactorily. The takeoff roll was uneventful until liftoff, at which time the aircraft went into a 20 degree right bank. Full left elevon and left elevon trim would not level the wings. The right wing was extremely low and aft stick pressure was required to keep the wing from striking the ground. With a combination of left rudder and aft stick pressure, Major Hedrick flew the aircraft in a climbing right turn to a safe altitude. As airspeed increased, right bank increased; however at 185 knots the aircraft could be held wings level with left stick pressure and left rudder. A straight in approach was flown, and the landing was made without any directional control problems, after the main gear was on the runway.

This malfunction of the flight controls was caused by the right Hydraulic Elevon Package (HEP) valve not maintaining the pre-adjusted neutral position. Major Hedrick's timely applications of correct flight control inputs in proximity to the ground saved not only his own life but a valuable aircraft. WELL DONE! ★

running is great

but
rushing
leads to
accidents