UNITED STATES AIR FORCE • AUGUST 1971

Aerospace SAFETY

Cover photo by SSgt Jerry A. Montrose, 1365 Photo Sq, Norton AFB, Calif. Silhouette of F-106s against background of lights of Tokyo Ginza.

UNITED STATES AIR FORCE

AUGUST 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.

AUGUST 1971 AFRP 127-2 VOLUME 27 NUMBER 8

HIGH ANGLE OF ATTACK in the swingwing

In the T-33, it is called "the tumble." Tony LeVier, in a December 1969 article for *TAC Attack,* called it "the thing." In aerobatics competition it is called "the Lomcevak." The F-4 experiences a "post stall gyration." Regardless of the term used to describe the maneuver, it can be a serious problem in any airplane. To operate his particular airplane safely, the pilot must understand the how and why of these characteristics.

Over the past several years, words such as post stall gyration and yaw divergence have become part of the "fighter-pilot lingo." These flight characteristics are not brand new things peculiar only to our modern aircraft, but the modern machines are easier to get into a flight region where there may be a problem. Any aircraft, at high enough angles of attack, will exhibit some sort of departure in either roll and/or yaw.

The F-111, both the bomber and the fighter versions, will "depart" if they exceed certain angles of attack. This article is written to let you know some of the whys of how you get there, what you may see if you do depart, and what you can do to give yourself the best chance of recovery. The deep stall investigations in the F-111 are still continuing at the Air Force Flight Test Center, so this is written to bring you up to date on where we are at the present time. As the tests continue, more positive data will be provided to the using commands.

CAPTAIN STUART R. BOYD
Air Force Flight Test Center
Edwards AFB, Calif.

HIGH ANGLE

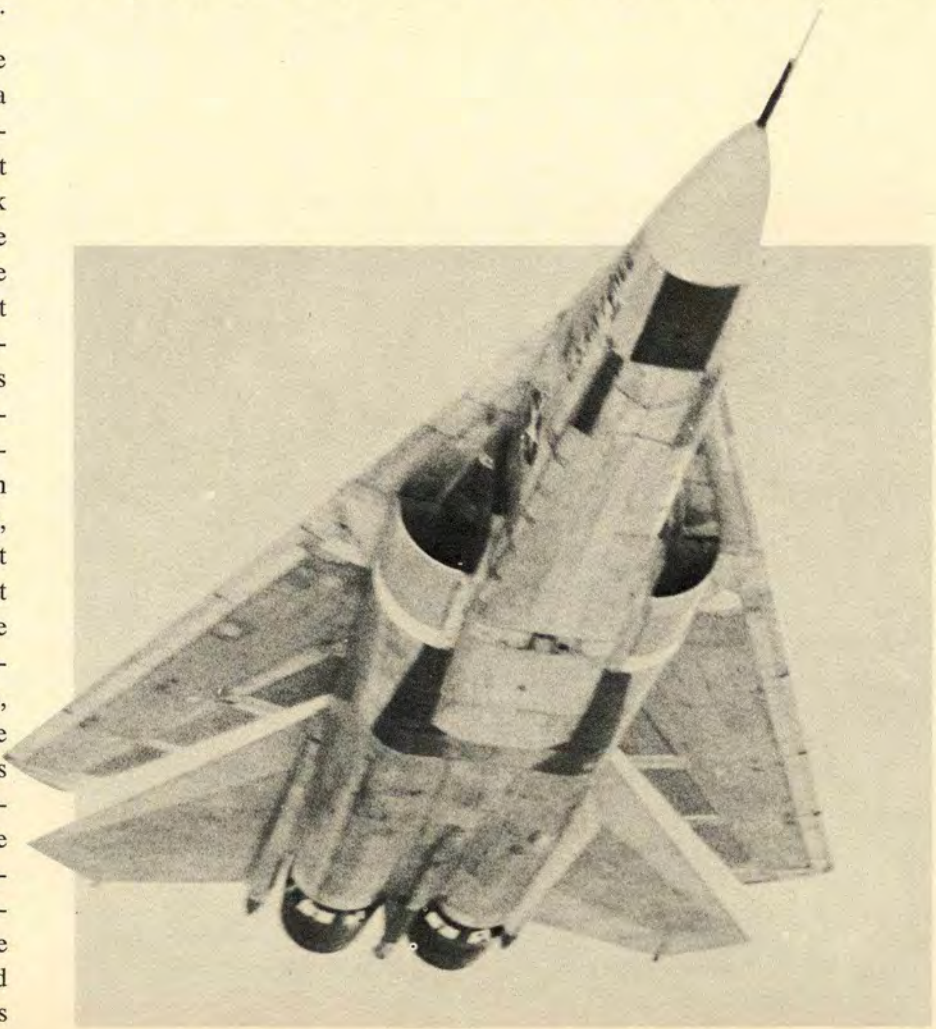
First of all, how do you get there? If you adhere to the published Flight Manual angle of attack limits, you'll never get there. Some things, however, are peculiar to the F-111 and make these angle of attack limits easier to exceed than in some other aircraft in the inventory. One of the most important items is the shape of the lift curve.

Figure One presents approximate lift curves for both an F-111 and a T-33. Note that the T-33 curve exhibits a definite break where lift begins to decrease as angle of attack increases. In the cockpit you see this as the point at which the nose begins to fall or as a "g" break. Not so with the F-111. As angle of attack continues to increase, so does lift. This is due to the lift contributions of the wing glove and fuselage. You need to add a new term to your vocabulary at this point, and this is usable lift. Usable lift can be understood by looking at Figure One and Figure Two at the same time. As the curve for directional stability goes through zero, the airplane no longer exhibits the "desire" to fly straight ahead. This effect is caused by a number of factors, but the easiest way to visualize this is by considering that the vertical tail is blanked out by the fuselage at high angle of attack. In the case of the T-33, we saw a stall and its associated flight characteristics before we lost directional stability. In the case of the F-111 lift continues to increase beyond the point at which we lose directional stability, so prior to the aerodynamic stall, in the classical sense, the airplane will turn "sideways." Any increase in lift beyond this point is useless—thus the term usable lift.

With the F-111, the point at which directional control goes to zero is somewhere around 25 degrees angle of attack with wings level, and no aileron or rudder inputs. The exact number is not yet available, but since the aircrew is prohibited by the Flight Manual from operating in this area, it remains academic. If Flight Manual limits are used, you'll never see anything close to this figure.

CONSTANT STICK FORCE

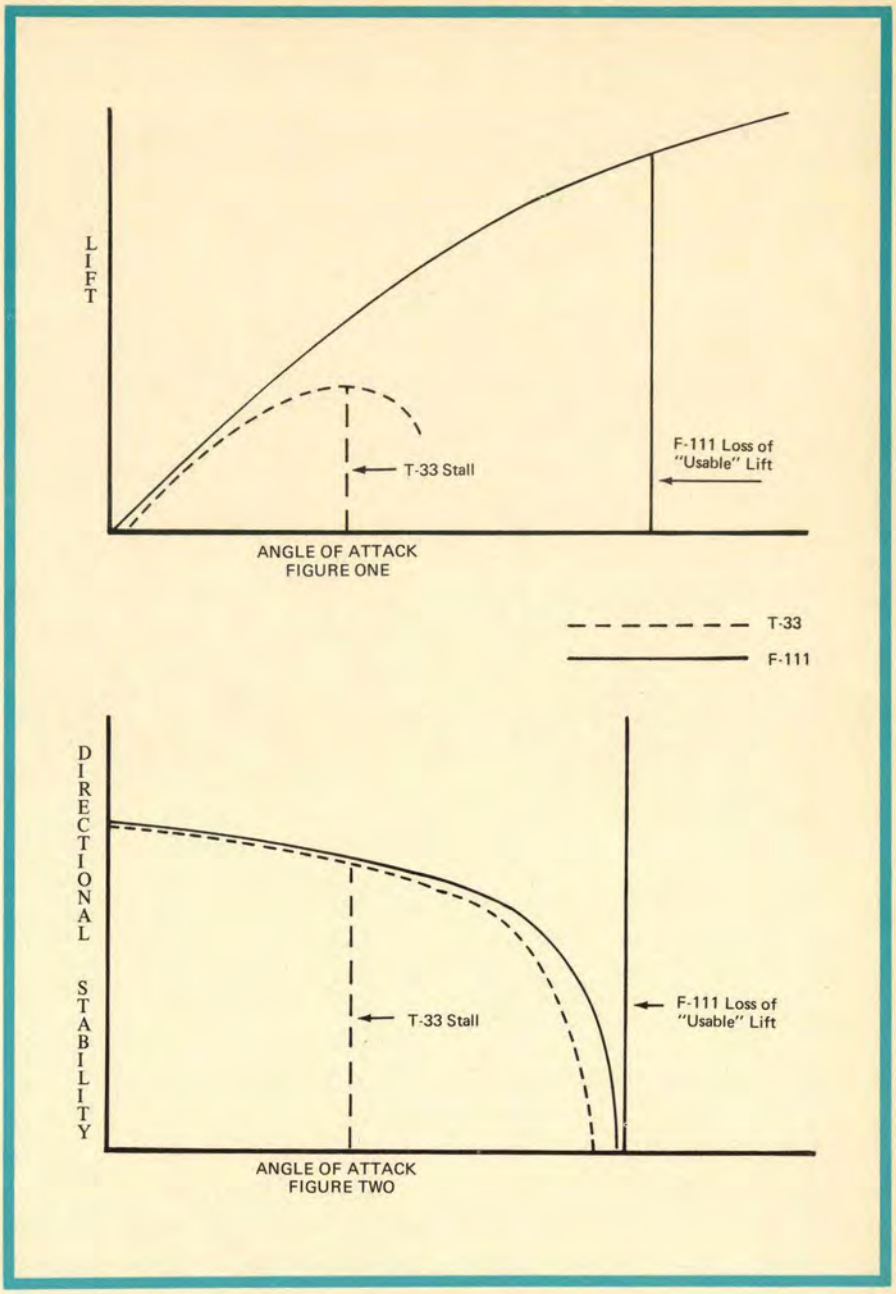
The command augmentation feature of the control system gives you two things: approximately a constant stick force per "g", and auto trim to maintain one "g" flight if the stick is neutral. How it does this is not important to this article and the details are contained in the Flight Manual. If you pull back on the stick you should get about the same number of "gs" for each pound of force applied. This happens anytime the flight control system switch is not in the takeoff and land position, or the slats extended, and is



independent of airspeed, wing sweep, or stores loading. Assume you are flying at the handbook limit angle of attack. Your induced drag is high and you are losing airspeed. If you do not push the stick forward, the same "g" load will be commanded. Since the airspeed is decreasing, "gs" will be decreasing and the flight control system will command nose up stabilator to maintain commanded "g". Nose up stabilator means increased angle of attack, and if you're not watching your angle of attack tape—you will exceed the angle of attack limits.

Another situation which also must be considered is the one in which the aircraft is stabilized at one "g." If the airspeed is decreasing, the aircraft is going to attempt to maintain one "g" flight and this means that the angle of attack will be increasing.

Due to the aerodynamic characteristics of the aircraft, and due to the design of the flight controls, the aircraft can easily be flown through the angle of attack limits. It's conceivable to imagine a pilot, who is not monitoring his flight instruments, getting into this area where he doesn't belong.



ALPHA INDICATOR

What happens if you get there? Again, this area is still being investigated, but some things can be said at this point. Buffet is usually present, even below angle of attack limits, so this is not a good cue. The intensity of the buffet is dependent on airspeed, wingsweep and "g" loading, so again buffet intensity is not a good indication. Heavy buffet should be avoided. If you encounter it, you're getting beyond where you should be. Lateral instability or wing rock is also not a good cue. As the angle of attack increases, airflow will begin separating from the wings and wing rock would start, except for the roll dampers. The roll damper is designed to correct for uncommanded roll deviations, and it does an excellent job. This same roll damper that makes the airplane fly like a Rolls Royce at high speeds on the deck is masking the initial indications of increasing angle of attack. By the time you actually perceive wing rock, your dampers will have already been deflected to their maximum authority, and things are getting serious very fast. As mentioned previously, there is no break in the lift curve, so unless you watch the alpha tape, your actual indication of stall may be when the aircraft departs.

Other than the alpha tape, the rudder pedal shaker is a positive

HIGH ANGLE

indication of very high angles of attack. There are some things, however, which you should keep in mind regarding this system. At wing sweeps forward of 45 degrees, in the clean configuration, rudder pedal shaker will not actuate until you're already beyond the handbook limits. Also, the rudder pedal warning will probably be masked by airframe buffet. The warning system sums both pitch rate and true angle of attack, so if you are maneuvering, you will find that it actuates below the published angle of attack limit. Including pitch rate in the warning system gives you a greater safety margin in the maneuvering environment. When you feel the rudder pedal shaker, make a positive forward stick movement to decrease angle of attack and monitor your alpha tape. Because it may be masked by buffet, don't count on the rudder pedal shaker exclusively, especially when maneuvering.

Suppose, for some reason, you discover yourself at a high angle of attack. What should you do? First of all, do not use aileron or rudder as these control inputs may induce enough yaw to contribute to a departure. If you simply release the stick the system is going to assume you want one "g" flight at that pitch attitude and respond accordingly. If you are climbing, and airspeed is decaying, you will continue to climb and angle of attack will continue to increase. The solution to the problem is nose down on the stick. Regardless of trim settings or damper positions, you always have nose down stabilator authority. Maintain this control relationship until angle of attack is below handbook limits.

DEPARTURE

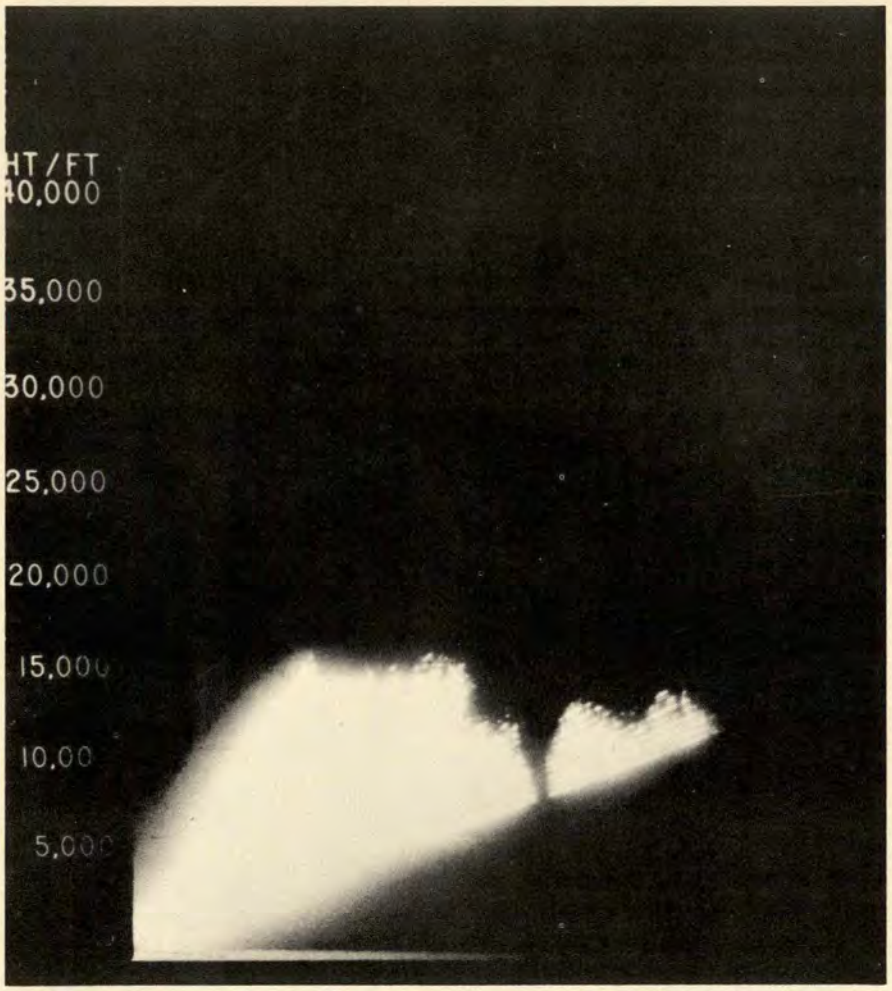
What about the departure? Flight tests indicate a very smooth departure. Test pilot comments are to the effect that they really felt that the aircraft was controllable, even after departure was verified by the flight test data. This was because the departure was not violent or radical, as might be expected. All during this departure, however, angle of attack, yaw rate and roll rate are continuing to increase.

The rudder is not effective, but the stabilators are, so forward stick must be used to decrease angle of attack. If you put the stick forward, and then relax forward pressure when you note a decrease in angle of attack, you may not have solved a thing. Due to the design of the angle of attack probe, the airflow around the aircraft may cause the indicator to decrease at high angles of attack. You must maintain nose down stabilator until you get other indications that you are really flying again. This other indication is airspeed. Maintain full forward stick until airspeed is well above 200 knots and increasing. Any other control inputs during the recovery could easily result in a spin or another departure.

Prior to a departure, the damper system will attempt to oppose any aircraft disturbances in roll, pitch or yaw. After the departure, the roll damper will seriously hinder the post-stall recovery and tend to induce a spin, and it should be turned off after the stick is full forward. It should be emphasized, however, that the stick should be held full forward and no aileron or rudder inputs should be introduced while the roll damper is being turned off.

The F-111 does not exhibit previously undiscovered flight characteristics. You must, however, pay close attention to your angle of attack. If you find yourself outside of the established limits, get back to where you belong as rapidly as possible, as the situation may get worse. If the airplane departs, use the published recovery procedures immediately, and give them plenty of time to work. All indications are that the post stall gyration recovery procedures will work if you give them a chance. Finally, if you are below your minimum recommended ejection altitude, don't be a hero. ★

mini Thunder Storm



MAJ EUGENE B. BROCK, Det 28, 26th Weather Squadron, Wurtsmith AFB, Mich.

In this age of mini, midi and maxi dresses, it is well to think of thunderstorm buildups in analagous terms. Most pilots have observed the "midi" thunderstorm, with tops reaching 25-45,000 feet. In the tropics and associated with severe weather over continental land masses at mid latitudes, tops to 55 to 60,000 feet are observed (the "maxi"). But here I wish to point out the less frequently observed but important phenomenon of the "mini" thunderstorm.

Necessary ingredients for thunderstorm activity are vigorous upward motion of air, adequate liquid moisture available and upper level temperatures capable of producing ice crystal cloud tops. Due to the latter requirement, most thunderstorms are thought of as being limited to tops of at least 25,000 feet. However, in an unstable, cold air mass, thunderstorms with tops well below 20,000 feet can occur.

At Wurtsmith Air Force Base, Michigan, we recorded one of these "mini" thunderstorms on 1 May 1971. The thunderstorm, which was associated with a cold frontal passage, was observed continuously by the writer through the use of the AN/FPS-77 Weather Radar. The accompanying photograph is a vertical cross-section taken along an azimuth of 150 degrees True and covering a distance of 30 nautical miles from left to right (with Wurtsmith at the lower left corner). The thunderstorm, the nearer of the two echoes shown, was 11 nautical miles SSE of Wurtsmith, with a diameter of eight miles. The radar top of the thunderstorm is shown to be 16,000 feet. The temperature at that altitude was approximately −23°C (−10°F), sufficiently cold to produce the ice crystal top characteristic of thunderstorms.

Pilots are always warned to expect severe turbulence, severe icing and hail with all thunderstorms. We heard thunder, saw lightning and experienced a rain shower with this thunderstorm. There were unofficial reports of one-fourth to one-half inch diameter hail occurring at a golf course a few miles south of the base, in the vicinity of the radar return.

MORAL OF THE STORY: AVOID FLYING THROUGH TOWERING CUMULUS CLOUDS WHERE POSSIBLE. THEY'RE BUMPY AT BEST AND COULD BE HAIL LADEN "MINI" THUNDERSTORMS IF THE OUTSIDE AIR TEMP IS COLD ENOUGH. ★

The trip

MAJ DAVID H. HOOK
Canadian Forces
Directorate of Aerospace Safety

"Come into my office for a moment, please, Burlap."

"Sure, Boss." Swallowing with just a hint of nervousness, First Lieutenant Zachary Burlap, Jr., USAF, followed his flight commander across the crew room.

"Hooo, boy! What now?" he muttered to himself. "Don't tell me the old scoundrel found out about that - - -. Naw, news doesn't travel that fast. Maybe, he's gonna mention that blown tire again. Hey, I know! He wants to thank me for getting the bird back in time for Charlie's cross-country this morning." With this cheering thought, Burlap mentally reviewed some modest replies that would be suitable for the occasion.

"Have a seat, Zack," said the major, "and tell me about your weekend trip."

"Well, Boss, it was great! I met this swingin' chick in a quiet little place just outside the Centerville gate, and you wouldn't believe - - -." The upraised hand of his fearless leader cut the story off just as Zack was waxing enthusiastic. "Zack, that's not quite what I had in mind. Were your flights unusual in any way?"

"Heck no, boss. Why the flight to Centerville was VFR all the way. I had to dodge a few CBs at altitude, but the arrival was no sweat. There was a bit of weather coming back in here, but I wasn't worried because I know this field like the back of my hand. Why I even got the bird back on the line in time for its scheduled trip today. I didn't notice anything unusual, why?"

Zack thought he heard the major sigh. "You don't happen to remember what the weather was last night, do you, Zack?" the major inquired benignly.

"Well, the reported weather was kinda tough, if that's what you mean," said Zack, "but the viz looked pretty good when I broke out at minimums. I'd say that it was not less than half a mile."

"Half a mile," mused the major as he glanced down at his desk. "This weather report states that the RVR was 20 at the time you landed. You don't happen to recall what squadron orders say about minimum weather approaches, do you?"

"Pilots with 500 or more hours total FP/IP time are authorized to make weather approaches to field minima," quoted Zack. "And - - - -."

"That's a close-enough interpretation," the major interjected. "Let's see, you have about 540 hours FP time, right?"

"Right, sir."

"OK," said the major, his jaw tightening perceptibly. "You've got a whole lot of experience in the past year or so. So I'm willing to accept your judgment that the forward viz from your cockpit was a half-mile. However, there's another small matter that I'd like to discuss.

"Sergeant Croochief advised the Ops officer this morning that your aircraft's fuel tanks were almost empty when you landed. He estimates that your usable fuel amounted to about 300 pounds. Any comments?"

Zack's mind flashed over the dozen or so "reasonable" excuses for returning last evening that his subconscious had dredged up overnight, and he was tempted to try a couple of the better ones. Short-of-cash, Out-of-fresh-clothes, and Bumped-out-of-the-VOQ were quickly rejected as lacking in force and originality. He even toyed with

using the Sick-kids-at-home routine, but he figured the flight commander would remember that Zack was single. So in the end, Zack decided to tell the truth—well, most of it anyway.

"I checked out of the Q around nine AM yesterday, and went down to base ops. The weather here was down to zero, but I didn't have much money and I had nowhere else to go anyway, so I hung around ops waiting for the weather to break.

"Around noon the forecaster said that he thought the weather here would lift at four o'clock, so I went ahead and planned the trip to take off about three. At two o'clock I got a formal briefing for the 175-1, and the forecast for here at my ETA at 1640 was prevailing two hundred overcast and one-half mile, intermittently one hundred and a quarter. Light rime icing was forecast for the approach. The alternate was supposed to go no lower than five hundred and two.

"I've busted that kind of ceiling dozens of times here, so I wasn't the least bit hesitant in flying. When I arrived at the aircraft at twenty-to-three, the Transient Alert people were changing a tire. (They'd found a cut on the preflight). They were short staffed, and they had to interrupt their work a couple of times to park transients. The aircraft was finally placed in commission at 1530, and as I was only a half-hour behind my proposed departure, I decided to get a clearance and go.

"The clearance came in right away, so I cranked up and arrived at the runway around 1540. I had to wait for radar release, but I finally got airborne at 1545.

"EVERYTHING PROGRESSED smoothly enroute, except that the headwinds were stronger than forecast, and I was using more fuel than I'd planned. A half-hour from home I checked the weather with Metro, and the duty forecaster confirmed the weather was two hundred and a half, and my alternate was down to five hundred and two. There still wasn't any sweat, so I pressed on, arriving at the initial fix with about 30 minutes fuel—enough for a looksee here, then a hop into the alternate.

"Unfortunately, that's when the runway at the alternate closed temporarily and the weather here was confirmed at one hundred and a quarter, RVR 20. I didn't have anywhere else to go, so I started down for the ILS.

"I don't know what happened exactly on the first approach, but apparently the visibility wasn't too bad. I had the ground in sight at least a mile and a half from the runway, so I transitioned to a contact approach. Funny thing though, I saw all kinds of lights from streets and houses, but I never saw the approach lights, and I didn't see the runway until it slid by under the left wingtip.

"I knew that a landing from that position would have been extremely risky (Might as well show a little humility, thought Zack) so I made a go-around and called for a missed approach. Approach control wanted me to climb up and hold, but as my fuel was down to 12 minutes or so, I declared an emergency and requested another ILS.

"AFTER THEY CLEARED an airliner out of my way, I made the smoothest low altitude procedure you ever saw. This time I stayed right on the dials past the middle marker down to decision height, looked up, saw the approach lights and landed no sweat. Why, the whole procedure only took about eight minutes, and I had plenty of kerosene left to taxi back to the ramp."

To Zack's surprise, the major's face softened slightly into a wry, tight little smile as the room fell silent. When it came at last, the major's voice sounded as though its owner were at the bottom of a deep well. "Zack," the voice echoed resonantly, "there seems to be some hope for you yet. For a second or so, I thought you were going to foul up the end of your story by making some kind of nutty comment about how great and skillful an aviator you are. Your restraint is commendable; however, there are a few other matters that demand our further attention. You were that far (the major held his thumb and forefinger a la Maxwell Smart) from busting your rear end and my airplane!"

"Yes Sir," admitted Zack, even to himself.

"Awright," said the major. "Let's see where this trip went wrong. First of all, have you any ideas as to why you missed the first ILS approach?"

"It wasn't the TACAN/ILS switch or the receivers," said Zack, "because both flags were out of the way, the audio signal was strong, and I had the correct course set in. When I first saw the ground, both the glide path and the localizer needles were within one dot width of center. I don't know why I missed the approach."

"This weather report might provide you with a clue, Zack. You

The trip

were given a surface wind of 60 degrees off your tail at 10 to 15 miles per hour. I checked the wind at 2000 feet, and it was right on your tail at 20 during both your approaches."

Zack's face lit up. "Got it! The old windshear trick!" And as soon as he said that, his face fell. "Hooo boy, and while I was looking out the window trying to fly VFR, I drifted off the localizer."

"Right," said the major. "Let's assume that you were on the localizer at a mile-and-a-half from the threshold and that your crosswind component suddenly increased by ten knots, or say 15 feet per second, and you didn't alter your heading. At a ground speed of 180 knots it would take you 20 seconds to reach the outer approach lights. In that time you could drift 300 feet or more off the centerline."

"Yah, but I still shoulda seen the approach lights," said Zack.

"Where were you looking for them?"

"Out the front window," came the forlorn reply.

"NEXT TOPIC!" the major announced in a gravelly tone. "I was just talking with the chief FAA controller, and he advises me that I can expect to receive a copy of a violation report on you. Perhaps you can guess what for?"

Zack, who was still mulling over the windshear problem, allowed as how he hadn't the foggiest notion.

"What is your clearance limit when you're cleared for an instrument approach?"

(Boy, this guy asks some dumb questions.) "To the field, of course," said Zack.

"Nope."

"Nope?"

"Nope! Your clearance is not only to the field but to the depicted missed approach limit. When you went around, you not only violated your clearance limit by turning back to the outer marker, you endangered the lives of everyone on that airliner. What's more, you maneuvered on the wrong side of the field as if you were flying a closed pattern. If you tried a trick like that at a strange base in hilly terrain, you'd probably hit the ground."

Zack thought he had a good reply to this one. "Well, Chief, I know this area by heart, so I knew I wasn't going to hit anything. Besides, I was so low on gas, I had to turn right away."

"That brings up a new point, Burlap. With what fuel loads are you required to declare minimum and emergency fuel?"

"Ahhh, 1500 and 1000 pounds, Boss."

There was silence. The major's stony expression seemed to demand further comment from Zack.

"Ahhh, well, you know, I was, ahh, going to declare minimum fuel at the initial fix, you know, and, ahhh . . ." Zack's voice trailed off.

"No, I *don't* know. Do you?"

"No," said a squeaky voice that Zack barely recognized as his own.

"If you had declared minimum fuel *and* if there really was no other place to go, approach control would likely have held the airliner well out of your way until you landed or ejected. At least they would have been able to offer you vectors back to the marker in a race track pattern for a low-fuel procedure. Your declaration of low fuel caught them by surprise, so they decided to let you flail around in your own pattern, as you *seemed* to know what you were doing. The controller pointed out, however, that he thinks he might have shortened your pattern by as much as two minutes by bringing you over the outer marker on an inbound heading. Your teardrop procedure wasted time and fuel."

Zack pondered that thought for a moment, then nodded his head in dumb agreement. The vague uneasiness which had gripped him earlier was giving way to a mild, but definitive, panic.

"OK, Burlap, now we come to the nitty-gee," quoted the major, his voice rising. "Why did you wind up in such a predicament in the first place? You knew midway through your flight that you would be skosh on fuel and the weather wasn't all that good—with no sign of getting better. Why push your luck and try to stretch it in here? Surely, you're not going to tell me that you wanted to get the bird back for good ol' Charlie?"

Zack's mouth had been popping open and closed as he tried to insert an answer after each question, but since he *was* going to claim his utter dedication to getting the bird back to Charlie, he was left without an answer; his jaw just sagged open as though he had a bad case of adenoids.

"What was the *real* reason, Zack?" said the major very quietly.

"I, uhh, had a, you know, - - - a date."

"A date," repeated the flight commander in a flat tone. His face showed neither triumph nor satisfaction at the admission, just a look of sad resignation. "You'd risk your neck, busting bad weather with low

fuel just for a date? Zack, Zack! Where did I go wrong? Haven't I always told you that your first priority must be to preserve the health and well-being of Number One? Sure, we have to be able to fly to field minima on operations, and we do it frequently when we're caught airborne and the weather moves in. However, we also try to get ourselves on final approach with a comfortable fuel reserve and a good alternate in our hip pocket. As far as I'm concerned, you blew it when you didn't make a diversion after you noticed the fuel state falling behind on the Form 70. You did keep a flight log, didn't you?"

"WELL, I MADE ONE OUT, CHIEF, but you know how those things never work out, especially when ATC keeps you on the ground. I - - - -."

"Never mind, Burlap. Do you recall your planned fuel reserve, in minutes, for the initial fix?"

"It was about 50 to 55 minutes at max endurance."

"And you arrived with how much?"

"About half-an-hour's."

"How much?"

"Twenty-five minutes."

"Enough," declared the major, "for a penetration, two missed approaches and an ejection!"

"Yessir."

"Burlap, you had GETHOMEITIS, a most insidious disease that afflicts all of us at one time or another. Its most common symptom is abominable judgment (or should I say abdominal?) based on an uncontrollable desire to get home regardless of the obstacles. If not treated at the first outbreak, the disease is often fatal. You with me, son?"

"Yessir."

"Now that you've survived your first, and hopefully last, bout with gethomeitis, you should know about a few other guys who weren't so lucky.

"Two F-4s were out on a cross-country and they'd had to RON two nights because the weather at home was bad. When it finally lifted at home, they elected to take off in formation even though the weather was below two hundred and a half. Number two didn't even have a chance to make some of your mistakes. He crashed shortly after takeoff.

"Another crew was also delayed two days at an intermediate base because of poor weather along the route and at home. A forecast of isolated thunderstorms, moderate turbulence and light rime icing didn't faze this crew, and they launched for home in their small utility aircraft. The pilot had about as much experience as you, but he crashed a half-hour after takeoff, taking two other people with him.

"The last one was the saddest of all. Five people were lost when a transport crashed on the third ILS attempt in one hundred and three-quarter weather, with light rain and fog and a crosswind component of 16 miles per hour. The visibility averaged 26 RVR but dipped as low as three-sixteenths of a mile. They had enough fuel to go somewhere else, and they should have had the same amount of sense.

"Altogether, ten lives were lost to gethomeitis in three accidents where there was no mission requirement to return to home base. You," said the major, stabbing his index finger toward Zack, "could have been the eleventh."

Zack fidgeted nervously and with obvious embarrassment. "Look, sir, I've got no excuses. Until you described it, I just didn't realize what a serious fix I was in. I'll admit that I was sweating a lot on that second approach, but I guess I was never too concerned. I know now what they mean by overconfidence. You can bet I won't get into another corner like that again!"

"Burlap, it's very tempting to make sure you don't get into a corner by taking you off status. In fact, the Colonel and I just finished a discussion on that subject. However," the major continued, "you're not a bad pilot, and there seems to be a trace of some socially redeeming value in your attitude now, that wasn't there ten minutes ago. If you learn from these mistakes *and* from the experience of others, you just might survive your youth after all."

"In any case, you are now working on your second, and last, chance. Instead of using poisoned darts, I'm only going to nail your hide to my office wall with small tacks. First, you're going to be the special subject of the attention of our friendly flight examiner for a week or so. He is going to try to repair any other flaws in your aeronautical education. What happens after that depends entirely on you. The Colonel will administer the violation when it arrives. Any questions?"

"No, sir."

"Get outta here."

As the door closed behind a grateful Zack, the major's expression changed slowly to a wry grin as he reflected on his own close calls of earlier years. "They may be bigger, but today's kids are just as dumb as we were!" he muttered to himself. ★

THE I.P.I.S. APPROACH

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

CIRCLING APPROACHES

Correction: IPIS Approach, July 1971. Item 3 under "Keep 'em High" should read 10,000 feet instead of 20,000 feet.

The following discussion is intended as a general review of circling approach procedures and techniques. It is impossible to cover every conceivable situation that may occur. The fact that a circling approach is a visual flight maneuver often conducted in weather conditions below VFR minimums makes it worthy of increased attention here and in instrument training sessions. Pilot judgment is the most critical element in the successful accomplishment of a circling approach.

Q I am flying an approach to Runway 23 which has a circling MDA of 940 feet. I intend to circle to Runway 36 which has a circling MDA of 1020 feet. Which MDA do I use?

A 940. The IFR Supplement states, "The circling MDA and weather minima to be used are those for the runway to which the final approach is flown—*NOT* the landing runway." The words "final approach" refer to the *instrument* final approach. The reasons for having differing circling MDAs for different runways were discussed in the April 1969 issue of this magazine.

Q Upon reaching MDA, which direction should I circle to land?

A AFM 60-16, para 5-7c, requires aircraft approaching to land at an airfield with an operational control tower to circle to the left unless otherwise directed. This will be further clarified in the forthcoming AFM 51-37 as follows: "The pilot is expected to circle to the left, i.e., make a left turn to final approach, unless:

"1. He requests and receives permission to do otherwise; or

"2. He is directed by the controlling agency to do otherwise; or

"3. He is required to do otherwise by restrictions on the approach chart."

The path flown to arrive at a base leg position is normally up to the pilot. However, every situation is different. Any misunderstanding between the pilot and the controlling agency, normally the tower, must be clarified before performing the circling maneuver.

Q When may I descend below circling MDA?

A You may descend below MDA when you have visual reference with the runway environment and when you are in a position to execute a normal landing.

Q What should I do if I am unable to maintain visual flight at my circling MDA?

A You cannot descend below MDA unless you meet the criteria established above. If you cannot maintain visual flight conditions, you must execute the missed approach. Make an initial climbing turn toward the landing runway and continue the turn until established on the missed approach course. If radar is available, conform to vectors when provided by ATC.

Q What obstruction clearance is provided at circling MDA?

A A 300 feet obstruction clearance is added to the height of the controlling obstacle and the sum then rounded off to the nearest 20 foot increment.

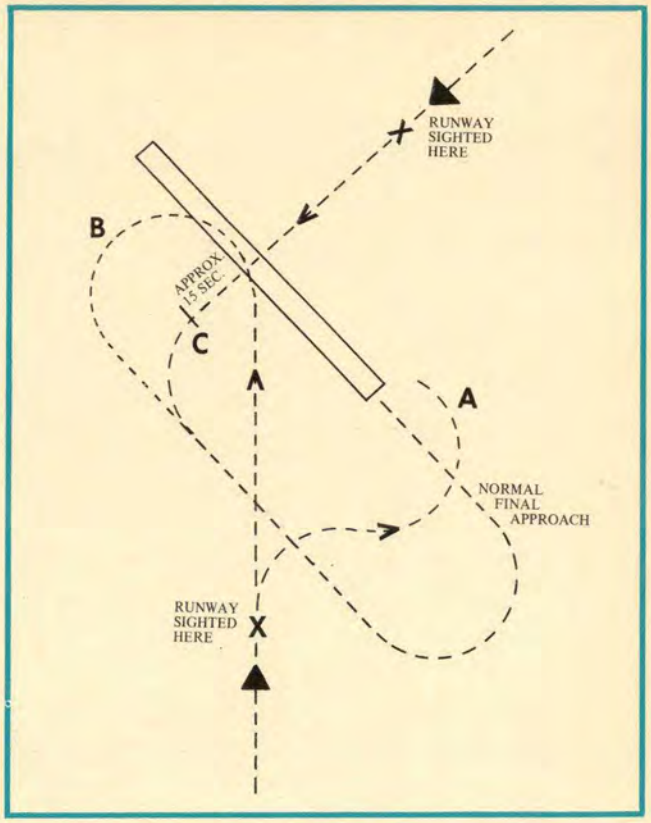
Q What techniques would you recommend to help the pilot plan and fly a circling approach?

A It is difficult to provide guidelines that will apply to all aircraft in all situations. The most common problem associated with a circling approach is overshooting the final approach course. Contributing causes are: (1) visual deception in that the aircraft is considerably lower than a normal VFR pattern which makes range estimation difficult; and (2) pilot proficiency in that we fly circling approaches so seldom either "for real" or for practice. With these factors in mind, we recommend the following:

1. Allow adequate airspace to maneuver to final approach. Taking the shortest route to the runway often results in either an overshoot of final approach or a continuous descending turn to touchdown, both of which are undesirable. This is shown in Example "A."

2. DON'T RUSH THE MANEUVER! Take the time you need to safely maneuver the aircraft to a normal final approach. If this means flying to the center of the airfield, making a shallow turn to downwind, and establishing a one-mile final approach, then do so. This is shown in Example "B."

3. If you must overfly the runway on a nearly perpendicular heading, DO NOT start your turn to downwind immediately over the runway. You will have the necessary lateral spacing if you delay this turn approximately 15 seconds after passing the runway. This is illustrated in Example "C."



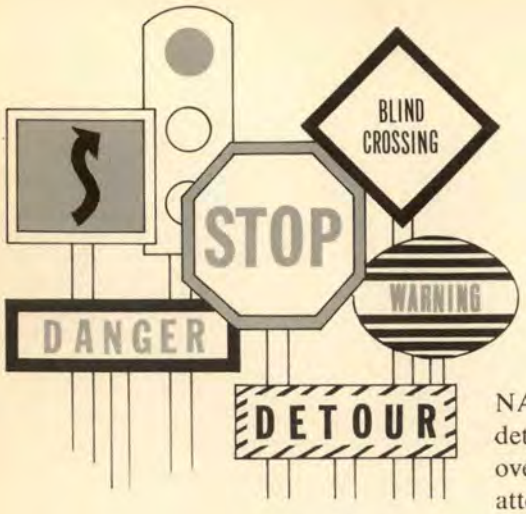
4. Know your capabilities and your aircraft. Don't hesitate to go-around and try it again if your first approach is not satisfactory. Don't succumb to "target fixation" watching the intended landing point. Cross-check all available instrument and visual references.

5. Circling MDA is a *minimum* altitude. Only the weather conditions will preclude circling at a higher altitude.

6. Don't turn down the opportunity to practice a circling approach! How often do you terminate your flight with a precision, straight-in, full-stop?

POINTS TO PONDER

The USAF IPIS claims NO corner on the "good idea market." If you have a technique, personal preference, or different approach to some area of instrument flight that you feel could benefit other pilots, please feel free to drop a note to: USAF IPIS/FTYI, Randolph AFB, TX 78148. We hope to make this monthly article more than a one-way flow of information. For example, many of the techniques discussed in this article were recommended to us by a MAC troop at Charleston. ★



TEN DANGER SIGNS

OF A HEARING LOSS

Courtesy of MAICO Hearing Instruments

Loss of hearing may make an individual a hazard to himself and others. The Air Force has a well defined and effective hearing conservation program; nevertheless, individuals can aid in early detection of hearing loss. The following is presented with permission of MAICO, a leading manufacturer of hearing instruments.

There are numerous symptoms which can serve as warnings of an impending hearing loss. The individual who is losing his hearing may not realize it himself, but his personality is changing gradually. Often his family and friends will notice these personality changes very early, hence suspect a hearing loss even before the affected individual has any idea of what is happening.

Taken individually, these symptoms may not indicate loss of hearing . . . they may be caused by something entirely apart from hearing loss. However, where several of these symptoms are found and where they seem to become progressively worse, it is generally wise to consult a doctor for a hearing checkup!

You can check yourself or—better yet—have a member of your family evaluate your hearing on the basis of these TEN DANGER SIGNALS. A hearing problem, when detected early, can almost always be overcome satisfactorily by medical attention or a properly fitted hearing aid, so you can see how important an early evaluation can be. These are the symptoms to watch for:

• **SPEECH DETERIORATION.** If a person slurs his words or drops word endings, if speech is "flat" sounding, he may not be hearing correctly. The ears guide the voice, both in loudness and pronunciation. If someone complains that he has difficulty communicating, he should have his hearing tested!

• **FATIGUE.** If he tires easily when listening to conversation or to a speech, it may be the result of straining to hear. Under these circumstances, he may become irritable or "touchy" very easily.

• **INDIFFERENCE.** It is easy for a person to become depressed and disinterested in life in general when he can't hear what others are saying. This is a perfectly natural reaction.

• **SOCIAL WITHDRAWAL.** Not being able to hear what is going on around him causes the hard of hearing person to withdraw from situations which might prove embarrassing.

• **INSECURITY.** Lack of self-confidence and fear of mistakes creates a feeling of insecurity in many hard of hearing persons. No one likes to "say the wrong thing" or do something that might tend to make him look foolish. Often these people are also worried about the possible loss of their jobs because of their hearing problems!

• **INDECISION — PROCRASTINATION.** Loss of self confidence makes it increasingly difficult for hard of hearing persons to make decisions. They are apt to "drift along" with the situation rather than face important decisions which they would have found easy to make previously.

• **SUSPICIOUSNESS.** Because he often hears only a part of what is said, the hard of hearing person may suspect that others are talking about him or that portions of the conversation relating to him are deliberately spoken softly so that he will not hear them!

• **FALSE PRIDE.** The hard of hearing individual wants to conceal his deafness. Consequently, he often pretends he is hearing when he actually isn't . . . and even when all his friends and associates *know* he isn't.

• **LONELINESS AND UNHAPPINESS.** Though everyone wishes for quiet now and then, *enforced* silence can be boring and even somewhat frightening. Persons with a hearing loss often feel "left out of things." Since many of them are older, they may have fewer friends and less opportunity for contact with others. They are often inclined to feel sorry for themselves, misunderstood or neglected.

• **TENDENCY TO "HOG" THE CONVERSATION.** Many hard of hearing people tend to dominate the conversation, knowing that so long as it is centered on them and they can control it they are not so likely to be embarrassed by some mistake. ★

PRIMED FOR AN ACCIDENT . . .

During liftoff for a training mission the fighter's right wing folded. Full left aileron and rudder failed to correct the right roll condition. The aircraft touched down to the right of the runway and slid to a halt. The crew escaped with minor burns but the aircraft was destroyed by fire.

Cause: The crew chief failed to assure that the right wingfold mechanism was locked during preflight inspection, and the pilot missed it on the external inspection.

The F-106 came to rest 2100 feet from touchdown after all attempts failed to lower the right main gear.

The accident was classed as major. The cause—maintenance. The crew chief had improperly installed the gear safety pin bag which resulted in binding and failure of the right main gear door forward actuator cylinder eyebolt assembly.

A support type aircraft made a forced landing in a field when both engines quit after four hours of flight. The crew and passengers escaped without injuries.

Maintenance error. The fuel quantity indicating system was incorrectly calibrated. The indicators indicated 1175 pounds remaining when the engine failed due to fuel starvation.

In each of the above accidents, maintenance had failed to properly do the job. Errors in aircraft maintenance are almost always costly, as was proven by each of these accidents. Regardless of the job, whether a major overhaul or an alert launch, it must be done correctly. Don't make an aircrew or passengers pay for your mistakes. ★

. . . SHORT

In a summary of its 1970 aircraft accidents a major command stated that ". . . landing is the most likely time when pilot factor accidents will occur."

Historically, the landing has been the most hazardous phase of flight. In February of last year in an article titled "Landing Short," *Aerospace Safety* reported on a five year history of aircraft accidents involving short landings. The picture wasn't very good. To recap briefly, there were 18 in 1965, 32 in '66, 11 in '67, 25 in '68 and 16 for the first nine months of 1969. This would indicate that we could have expected something in the neighborhood of 20 for 1970.

But it didn't turn out that way. In addition to having the best accident record in Air Force history, we also must have set some sort of record for avoiding short landings. There were only six major accidents in this phase in 1970, three minors and 10 incidents. Obviously we were doing something right.

We in the safety magazine business modestly disclaim any credit for this; however, we can't help but feel a tiny glow of satisfaction, because we hit the subject hard in a number of articles during 1970.

Although the number of landing short accidents last year was way down, the cause factors remained the same. Of the total 19 accidents and incidents, 15 were laid on the pilot, IPs bought two (supervisory) and one was charged to maintenance. Of the six majors, five were pilot factor.

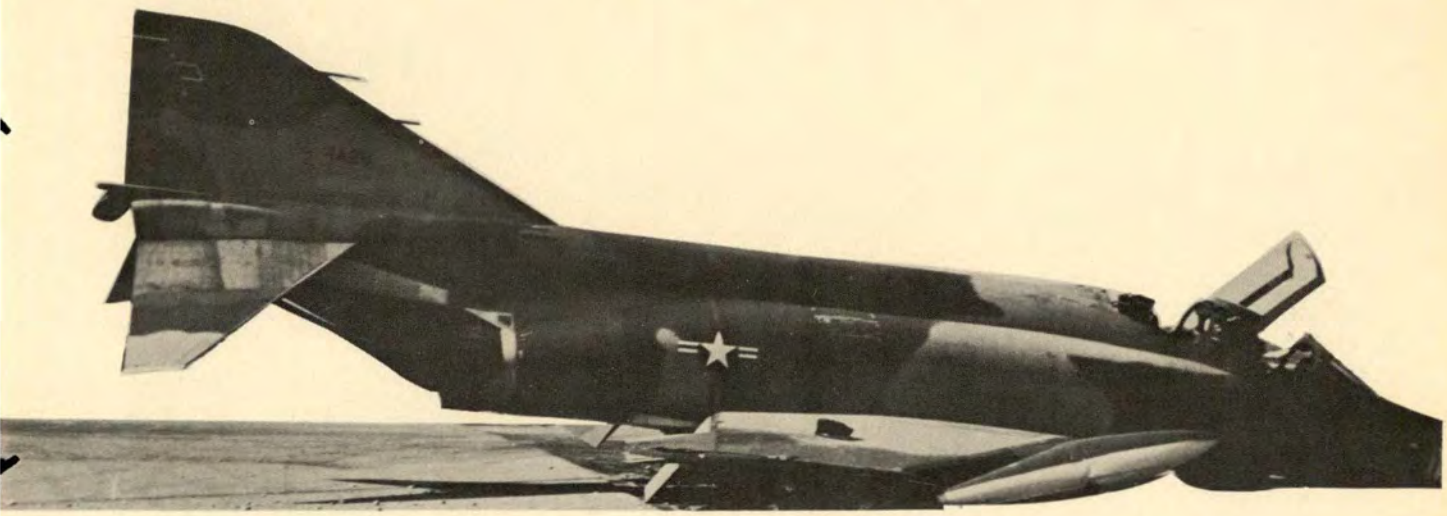
In the analysis we did last year we pointed out that, while pilot factor predominates in short landings, pilots get a lot of help from other things such as facilities and weather. Lack of overruns or soft dirt overruns, construction in progress, marginal or no lighting, lack of landing aids have contributed significantly. Weather has been a contributing factor in the form of poor visibility, turbulence, wind and wind shear, rain and downdrafts. Weather never appears as a primary cause, but it has been a frequent contributor in that it aggravates the pilot's problems during landing.

Now let's take a look at those six majors last year. One was a classic case of an IP not taking over in time and allowing a student to stall and land short. Maintenance was primary in one, in which complete electrical power was lost and the pilot couldn't quite make it to the runway.

The other four—all fighters—were pure pilot factor. One landed in the overrun at night and hit some unlighted obstructions on a construction job. Another pilot saw too late that he had a higher than normal sink rate, attempted to fly up to the runway with full mil power but hit a light stanchion 1400 feet short.

Then there was one in which Lead made a normal landing but

. . . LANDING!



Nr 2 touched down in the overrun and his stowed tailhook caught the BAK-12 cable. The hook and lower tail assembly were pulled off and the nose gear collapsed.

The last one was one of those things that leaves you wondering. The engine quit in the pattern so the pilot attempted a flameout landing. He was too high so he slipped to lose altitude, lost control and crashed.

When we compare 1970 with the previous five year history one interesting thing pops up: In 1970 there were no major accidents and only three minors involving transport aircraft. Our crystal ball is a little cloudy, so we can't tell you why, considering that during the previous five years there were something like 35-40 involving transports. However, there is an indicator. After an article in *Aerospace Safety* last year offering blueprints of a simple approach aid called the Poor Man's VASI we have received approximately 40 requests, all of which have been filled. Whether this device is being installed and used we don't know, but the number of requests indicates that someone has certainly been thinking about the landing problem.

Evidently someone has also been doing something about it. And that's the way we prevent accidents. Keep up the good work. ★

(A good reference for those who haven't seen it is the film "Landing Illusions—Short Landings," TF-6140, 1969, 10 minutes, color. ED.)

THE AERO CLUB TODAY

SQUADRON LEADER DONALD MELVIN (RAAF)/CAPT TERRY A. NELSON
Directorate of Aerospace Safety

Calendar year 1970 was the best year yet for Air Force aero clubs. We finished the year with 73 clubs in operation, serving a total of 10,550 members; we amassed more than 280,000 hours of flying (a record high) while achieving an accident rate of 8.2 per 100,000 hours (a record low). Comparing these statistics with those of general aviation as a whole, the aero clubs come off very well, indeed. In the same year, general aviation experienced an accident rate of 14.5.

The first quarter of 1971 looked even better. Membership climbed to 11,295, flying time rose to more than 61,000 hours (a record for first quarter, with winter weather problems) and the accident rate plummeted to 3.3 per 100,000 hours!

Now that we've cleverly patted ourselves on the back without even putting a shoulder out of joint, let's consider some of the less positive points.

• Any accidents at all are excessive.

• We come off well compared to general aviation, but, with the possible exception of first-year cropdusters and egrets who nest by jet airports, general aviation has the worst record around. Favorable comparison with general aviation is faint praise.

• Aero clubs have access to the largest supply of professional pilot expertise in the world, and should be able to offer their members the ultimate in flying safety. Alas, this is not always the case.

During the second quarter of 1971 the bottom fell out. In a short period of time two disastrous accidents resulted in the senseless loss of six lives and the destruction of two aircraft, prompting the Chief of Staff to order a no-notice inspection of a representative selection of aero clubs by inspection teams of the USAF Inspector General.

The results were disappointing. Despite the steadily improving accident picture and despite the favorable comparison with general aviation, we still have a long way to go. Some salient points culled from the inspection teams' findings serve to illustrate:

• **Most accidents occurred in the landing phase,** as expected; but investigation pointed clearly to case after case in which there was either a lack of proficiency on the part of students cleared solo, or insufficient supervision to ensure that proficiency was maintained. At six of the seven clubs inspected, instructor standardization, procedures and proficiency were markedly deficient: IPs were overdue annual checks; IPs were not using a standardized training curriculum (at some clubs a standard curriculum did not even exist); some IP checks were superficial—30 minutes in one case, 45 in another; one club had one instructor for 50 students; another club had 18 part-time instructors for 75 students, an impossible situation for instructor proficiency. Instructors were involved in both of the midair collisions in 1970, and an instructor and his student were killed when the IP commenced a

demonstration of stalls and slow flight only 800 feet above the terrain. Supervision of instructor pilots is an area requiring much attention.

• **Aircraft security was weak in most clubs.** Are your club's aircraft protected against unauthorized flight? Could an aircraft be stolen and crashed on the airfield during an attempted takeoff in the middle of the night? Could two teenagers forge a flight plan, get it approved, "borrow" an airplane and leave the country in it before crashing? Both these instances happened last year!

• **Many maintenance discrepancies were found.** Some inspections were not accomplished at all; others were improperly documented, making it impossible to determine when the next inspection was due. Many aircraft discrepancies were not documented, and many more remained uncorrected weeks after documentation. Spare parts were found stored in dirty and contaminated environments and stacked carelessly without protection. Some maintenance gear was stored outside, exposed to the elements, and it was impossible to determine the serviceability status of many items.

• **Management at most clubs needed improvement,** especially in the area of compliance with directives. The teams found many discrepancies and shortcomings in AFM 215-4 and AFR 215-2, and action has been initiated to correct this. Some Boards of Governors, however, were not following their own constitutions!

• **Safety surveys were not being conducted** at six-month intervals as required. When surveys were conducted, they were superficial and often did not identify significant problem areas. Some surveys, once completed, were not reviewed by

the base commander. At one base the club safety officer had attended only five safety meetings in 18 months.

• **Many unsafe practices were either condoned** or ignored. Flight manuals, checklists and flight planning documents were outdated. One base had two different checklists for the same aircraft.

Club flyers were at fault in 23 of 28 accidents since the beginning of 1970; instructors were involved in four; and materiel failure was charged for one. Specifically, aero club flyers:

• Hit a telephone pole during a practice forced landing, after being briefed to fly a minimum altitude of 500 feet AGL.

• Landed in a water-filled drainage ditch near the airfield, thinking it was a wet runway.

• Crashed after takeoff because improper pilot checks did not detect a carburetor heat malfunction.

• Became lost and low on fuel during a cross-country flight, even though the aircraft was equipped with adequate VHF navigation aids. The aircraft was wrecked during an attempted emergency landing in a field.

• On two occasions attempted flight in adverse weather, resulting in a total loss of six lives.

• Damaged numerous aircraft either in the landing phase or on rollout.

Who's responsible? Let's take a look . . .

One of the general findings of the inspection teams was that the quality of a club is directly proportional to the interest of the commander. If the commander takes a "fend for yourself" attitude, there's little doubt which direction the club will go. Aero clubs are, and should be, very low on the operational priority list; nonetheless, USAF considers them a vital part of recreational services, and there's much that can be done to help them at very little cost. Merely knowing that the commander's attitude toward the club is benign opens a great many doors.

The largest measure of responsibility for a club's operation falls in the lap of the membership. After all, it was club members who accepted aircraft with uncorrected deficiencies, disregarded checklists, tolerated dirty and lax maintenance procedures, accepted non-current flight planning publications, flew an aircraft with a dirty glass jar of oil rolling around loose in the baggage compartment and failed to insist on more active participation by the clubs' safety officers. In a typical club, a very small percentage of the membership takes the whole burden of club operation on their shoulders —the remainder free-load.

In summary, the efficient operation of an aero club is the responsibility of everyone connected with it, from the commander down to the newest member. Aero clubs will be a special interest item for no-notice inspection teams in the future, but this should not be the impetus for club improvement. The club belongs to the commander and the members —if each contributes, it will be a good and safe club. ★

watch those dents

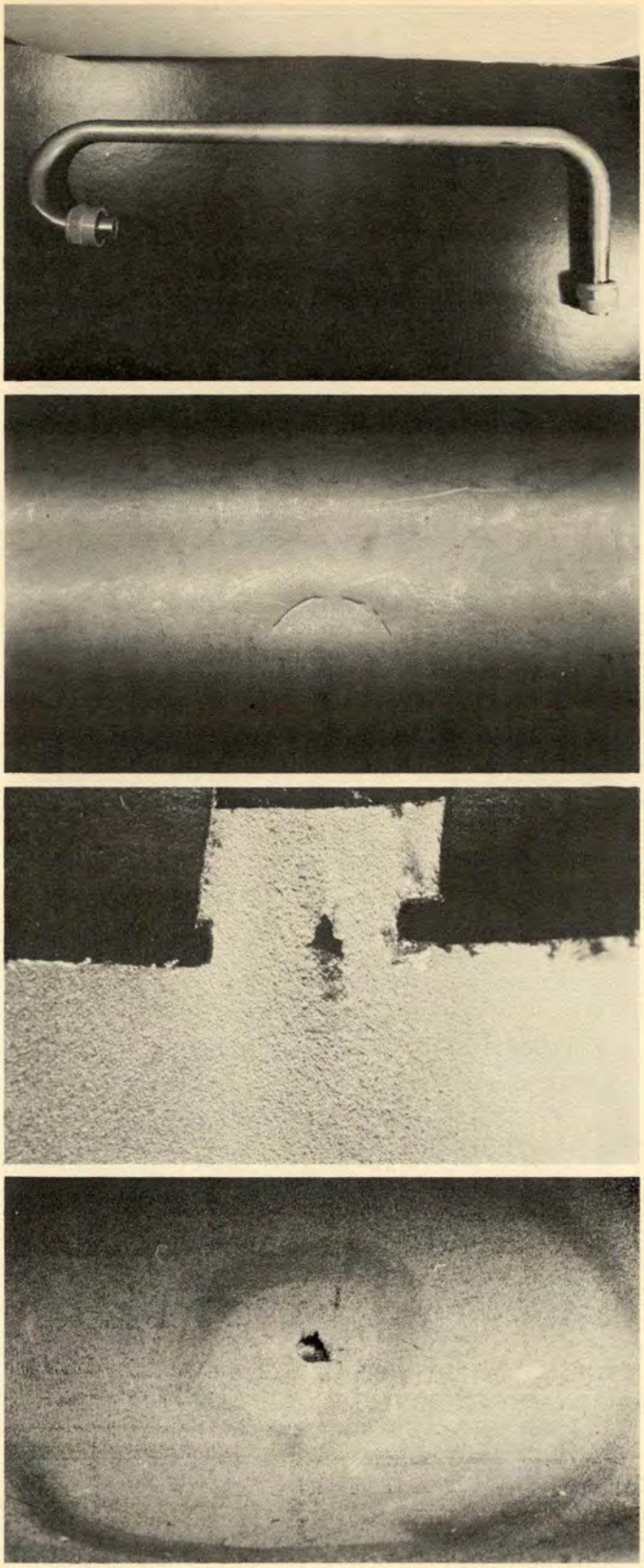
HARVIE L. GLENN/GARY O'NEAL
Engine IM Division
OCAMA, Tinker AFB, Okla.

Investigation of a J57 high pressure fuel tube removed from service because of fuel leakage from a small pin hole revealed that the hole was caused by cavitation erosion. In this case the erosion was attributed to a dent in the tube upstream from the hole.

Cavitation erosion is caused by relative motion between a metal surface and a liquid—in this case the inside wall of the tube and JP4. The cavitation is the result of voids (cavities) forming in the liquid then collapsing against the metal surface. In this failure the dent caused voids to form in the JP4 and then collapse downstream against the inner wall of the tube. Collapse of cavitation voids can produce impact pressures by implosion exceeding the yield strength of most metals.

When the voids collapse, the surface of the metal is subjected to repeated local plastic deformations that result in ultimate fracture and disintegration.

Maintenance activities should keep a sharp lookout for dents in high pressure fuel tubes exceeding TO limits. OCAMA (MMTTJB) is presently working to develop better methods (NDI) for inspecting fuel tubes and expects to have a procedure available by the end of 1971. ★



Top to bottom—High pressure fuel tube, dent in tube, cutaway showing hole and interior erosion of tube, exterior view of the hole.

REX RILEY'S
CROSS COUNTRY NOTES

Recently one of our crews had some difficulty while transiting a base and the aircraft commander took the trouble to have a conversation with the base commander. "If we had known who you were, we would have made sure that you got royal treatment," he was informed.

This worries me because the purpose of the Rex Transient Services program is to insure that all aircrews receive the very best transient service. That is why Rex travels incognito. He doesn't want "extra" or "special" attention. In fact, that would defeat the intent of the program.

* * *

We receive a lot of letters to Rex Riley, most of them having to do with the quality of transient services at Air Force bases. We can't print them all here but we are glad to get them and hope you will all continue to write. Here's one asking Rex to spread the word on a problem encountered by the 101st Fighter Group, Maine Air National Guard. They have a serious problem and we sincerely hope that by publicizing it here it will help prevent an accident.

"Since our transition to the F-101 aircraft we have been plagued with a drag chute problem on cross countries. More often than not somewhere along the way transient alert crews will service our aircraft with an F-4C drag chute. Usually these chutes are plainly marked or should be marked 'For F-4C Use Only.'

"TO 1401-3-42 specified after 25 deployments our chutes will be utilized by the F-4C only, primarily because of the importance of a good chute for F-101 pitch-up recovery. In addition to the safety of flight factor the unserviceable chutes cause an excessive loss of manhours and funds for new chutes.

"I hope the TO requirements can be brought to the attention of all parachute riggers and transient maintenance personnel."

The drag chute is an important piece of equipment, especially to the folks flying the F-101, so let's make sure they get the right chute every time. Thanks.

Rex

THE REX RILEY *Transient Services Award*

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.
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, Co
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, Cali
BARKSDALE AFB	Shreveport, La.
KIRTLAND AFB	Albuquerque, N.M.
BUCKLEY ANG BASE	Aurora, Colo.

NUCLEAR SAFETY AID STATION

UNDERSTANDING OR DEFICIENCY?

The goal of nuclear security is to prevent unauthorized entry.

Permanent security facilities make the job of controlling entry relatively easy. Security fences, lighting, closed gates, fixed entry control points, etc., all announce the nature of the area and the risks involved in attempting unauthorized entry. The very permanence of the area almost rules out the chance of some unknowing person accidentally bumbling into it.

Frequently, however, nuclear weapons undergoing logistic movement are secured in temporary restricted areas. The temporary nature of the areas means that the location is not well known to the majority of base personnel, and the physical security facilities are usually not easily identifiable. In effect, the area is established around the resource, rather than the resource being placed in the established permanent area. AFM 207-10, paragraph 2-5, recognizes this fact and establishes specific requirements for such situations.

The following may help us understand why an increasing number of Dull Sword reports involve weapons in logistic transport status—and also point toward a cure. In every instance, the cause of the deficiency was identified as a breakdown in procedures or a failure to communicate, a misunderstanding between the host base Security Police and the logistic aircraft crew which resulted in a Dull Sword. It was the "temporary" relationship between people which was at fault, *not* the temporary nature of the holding facility.

The most frequent deficiency was premature removal of the ropes and stanchions forming the Close-In security area (no-lone zone). The Security Police thought their job was finished and the aircraft was ready to leave; the aircraft commander, who wasn't ready to leave, considered the weapon insecure when the tangible signs of the protected area vanished.

The aircrew must make crystal clear who it wants to have access to the aircraft, when access is permitted, how persons authorized access will be identified, and any special instructions. Only the aircrew knows for sure when the aircraft will depart and ground security will no longer be required.

If the host base has complied with AFM 207-10, only a purposeful attempt to penetrate or a breakdown in communication can cause a Dull Sword deficiency. In a temporary situation we are probably not going to achieve familiarity, but we must achieve *understanding*—or we'll achieve a deficiency. More to the point, we'll be degrading the security and safety of our aircraft and cargo.

HAVE A PROBLEM? REPORT IT!

Your problems will be solved only if the people responsible for the solution are aware they exist. That seems perfectly obvious, yet some people apparently prefer to live with a problem rather than report it. In the case of a 4000 pound capacity Baker forklift, a problem existed for seven years before someone brought it to our attention.

The problem is that when handling certain nuclear bombs mounted on a bolster, the bolster comes into contact with the forklift front tires if the forklift tines are fully inserted into the lift slots on the bolster. A spacer is being designed to solve the problem. Seven years ago was the right time for this to have been corrected. If only someone had reported it! Do you have an unreported problem? See AFR 127-4, Attachment 3, and TO 00-35D-54. ★

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

I am an Avionics Quality Control Inspector, primarily inspecting C-130E model aircraft. There has been considerable controversy regarding which electrical connectors on the aircraft require safety wire.

The only directives I have found with reference to the problem are TO 1-1A-14, para 16-6 and 16-7, and TO 1C-130B-2-8, para A1-17.

The 1C-130B-2-8 identifies aircraft by year and tail numbers which require all electrical connectors, which cannot be reached for inspection in flight, to be safety wired, while other affected year and tail numbers require all electrical connectors which are normally inaccessible for periodic maintenance inspection, except Bayonet-Type Coaxial connectors, to be safety-wired.

My questions are:

(1) Why the inconsistency between certain year and tail numbered aircraft as opposed to others?

(2) What is actually meant by periodic maintenance inspection? Does it mean the actual time scheduled periodic maintenance inspection or the periodic check that maintenance people are required to do every so often?

One example of the controversy we have faced here is the RT-289/APN-59 which is located in the NLG wheel well. This RT unit is accessible during ground maintenance or inspection but not accessible during flight. Does the connector (cannon plug) require safety wire?

TSgt Felton McFarland
Dyess AFB, Texas

Dear Mac

After looking over tech order 1C-130B-2-8 I agree, there could be quite a controversy over which electrical connectors should be safety wired.

The technical services representative at Robins AFB says that the inconsistency between certain year and tail numbered aircraft is due to engineering design and configurations; different series aircraft have different type equipment installed. The term periodic maintenance and inspection in TO 1-1A-14 means the day-to-day maintenance, such as that performed by the flightline specialists.

The technical Services Representative also stated that the RT-289/APN-59 located in the nose wheel well should be safety wired.

To be correct when installing or inspecting the various types of equipment, the specific tech order for that equipment will be your guide. Always do it in accordance with the tech order for the specific equipment involved and you can't go wrong. Toots

TECH

briefs for maintenance techs

TOPICS

right the first time

Why not do it right the first time? After the pilot of an F-84 experienced difficulty in obtaining aft stick movement on final approach, the ground crew found that during a recent periodic inspection the dock crew had failed to tighten and safety the horizontal stabilizer actuator control valve adjusting bolt.

The bolt had worked out of adjustment after 16 hours of operation. There was no indication of a supervisory inspection after the work was accomplished.

Again, let's ask why not do it right the first time? Let's do it IAW the aircraft technical order and inspect it IAW 00-20-5.

plug goof

Just after takeoff the front engine oil pressure on an O-2 dropped to 10 psi and the pilot immediately returned to base with the prop feathered. The ground crew found the oil dilution connector plug missing, along with all the oil, which accounted for the low pressure reading.

The connector plug was found in the engine compartment. It had no hole drilled for safety wiring and apparently vibrated out during takeoff.

A ramp check of other O-2s revealed four additional connector plugs without drilled safety holes. All are now drilled and safety wired IAW the TO.

wrong tubing

When complete hydraulic failure occured on landing roll, the C-124 was stopped on the runway by the use of reverse pitch and air brakes.

Investigation revealed that the brake control valve pressure line was constructed from **aluminum** instead of **stainless steel.** The flared end of the aluminum tubing straightened out under pressure thus causing loss of hydraulic fluid. A ramp check revealed that one other aircraft had an aluminum line installed in place of the stainless steel as required by tech data.

tissue in the fuel

FOD takes all shapes and forms. In this case, a Kimwipe tissue found its way into a C-130 fuel cell during TCTO. The Kimwipe was overlooked by the inspector; the cell was closed, serviced and the aircraft released for flight.

Eleven days later the Nr 4 engine flamed out in flight and the Kimwipe tissue was found in the engine fuel strainer. Bits of tissue turned up in other fuel strainers, indicating it had worked its way through the system during fuel crossfeed. This incident points up the necessity for performing a thorough FOD inspection after performing maintenance and before signing the forms.

don't assume– know!

Upon arrival at the F-4 to perform a jettison check and arm the external tanks, the load team chief noticed that the wing tanks were dearmed, the aircraft armanent placard was blank, and there was no entry in the forms.

Assuming that the aircraft was dearmed, the team proceeded with the jettison check IAW the checklist. When the emergency release button was pushed for a voltage check, the centerline tank jettisoned. Fortunately, there were no injuries, but the tank was damaged.

The cause of this incident rests with the load chief. He assumed that the complete system was dearmed. Don't assume anything. Make a positive check in accordance with the tech data.

Contributing cause was that the unknown individual who dearmed the wing tanks failed to make the

proper form entry. Proper form entries are mandatory for all maintenance according to 00-20-5.

rag fod

After the pilot made a precautionary landing in an open field for unusual transmission noise, a large shredded rag was found in the transmission oil cooler pulleys of a CH-3E. Both drive belts were broken, and several electrical wires in the transmission compartment severed. The rag which had been left in the compartment during maintenance was picked up by the belts in flight and injected into the pulleys. The mechanic, supervisor and preflight crew all failed to catch this FOD, but the belts didn't.

wrong washer

The phase inspection was complete on the VT-29 except for an engine run-up and operational check. After a normal start and warm-up, the crew chief noticed excessive voltage drain during a prop feathering check and pulled the feathering button when it failed to pop out normally.

Continued on Page 24

JPA– a new tool

The development of new manuals by Air Force Systems Command's Human Resources Laboratory at Brooks AFB, Texas, may result in fewer flightline maintenance errors.

At the heart of this development is a system of new technical publications known as the Job Performance Aids (JPA), pocket-sized, job-oriented manuals which provide all of the relevant information for a given job but no more. Information is presented, by both illustrations and narration, in the exact chronological order in which each step of a job is to be performed. JPA manuals are supplemented by JPA troubleshooting guides that enable a technician to identify quickly and accurately a faulty part or subassembly.

Air Force depends on specialized and extensive training of its maintenance technicians to cope with the complexity of modern aircraft. With the advent of JPAs, however, relatively inexperienced technicians can perform highly complex maintenance tasks on an error free basis at speeds approaching that expected only from the most highly trained technicians.

So far, the guides have been produced for the UH-1 and CH-47 helicopters and the C-123K aircraft. Main objectives of the program are to reduce training time, reduce maintenance errors and increase work output with present crews.

The JPA system was recently tested for a period of four months at Charleston AFB, SC, on a fleet of 40 C-141A aircraft. Results of this test revealed that:

- Use of JPA manuals virtually eliminates maintenance errors for apprentice level technicians.
- Time required to train a productive technician can be reduced by 25 percent.
- JPA troubleshooting manuals enable **all** levels of technicians to reduce troubleshooting errors by 92 percent and reduce production time for troubleshooting by 11 percent.

Air Force is now reviewing and analyzing the results of this test with a view toward expanding the use of JPA to other aircraft and missile systems.

TECH

briefs for maintenance techs

TOPICS

The fire guard signaled to cut the engine when he saw smoke coming from the left wheel well. The engine was immediately shut down.

The maintenance crew found a steel washer installed between the feathering motor terminal post and housing causing a direct short which burned the entire wiring to the DC bus.

The steel washer had been installed instead of a phenolic washer during the motor replacement. This error cost the maintenance crew 40 additional manhours to repair.

overheated cannon plug

The F-104 pilot experienced a rapid decompression during deceleration from mach 2 on a functional check flight.

After the pilot made a safe but speedy return to base, the maintenance crew found both forward and aft coupling assembling quick-disconnects loose on the bleed air shutoff valve allowing 17th stage air to leak onto the shutoff valve cannon plug.

This extreme heat had melted the solder causing the valve to fail to the closed position.

Maintenance bought this incident; fortunately it didn't result in an accident.

one that didn't happen

During TCTO compliance, egress personnel attempted to raise the ejection seat handles on the front seat of an F-100F in order to accomplish some sheet metal work. Max travel on the handles was about one and one-half inches. Closer inspection revealed that the inertia reel cable leading to the left handgrip had been misrouted behind the stress plate, restricting handgrip travel. **Had the need arisen, the pilot would not have been able to reach the ejection seat trigger!**

It just goes to show—failure to use tech data can kill somebody!

no chute

In GCA pattern the F-100 pilot noted his oil pressure had dropped to 35 psi. He declared an emergency and made a full stop landing. Touchdown was good at 145 KIAS on the first 500 feet of runway. The nose wheel was lowered, flaps raised and drag chute handle pulled, but the drag chute did not deploy. He made several more attempts to deploy the chute without success. With an extremely wet runway, braking action was almost nil, so the pilot lowered the tail hook, turned off antiskid and locked both brakes. Barrier engagement was estimated at 65-70 knots. Both main tires blew.

The message said the reason for the low oil pressure was still being investigated; however, the drag chute failure was due to improper installation: (1) Maintenance installed it wrong. (2) Pilot failed to check the installation on preflight.

work cards

After waiting an excessive period of time for the gear to extend with hydraulic pressure remaining at 800 psi, the pilot elected to use the blowdown system.

The problem was traced to a gear door up pressure line that was chafing on a bolt in the wheel well. The continued chafing had worn a small hole in the line which resulted in subsequent loss of fluid.

Postflight work cards require inspection of this area for hydraulic leaks, loose items, chafing, etc. Had the work cards been properly accomplished the chafed line should have been found prior to failure. As supervisors we must continually stress the importance of using work cards during inspection.

only finger tight

Just after takeoff, fuel began streaming from the T-41 engine

marking on jet engines

Periodically engine maintenance personnel should be reminded that utilizing improper marking pencils could cause adverse effects on jet engines. So that everyone will be aware of the correct type equipment to be used in making temporary markings on hot section parts, the following is printed for general information.

When it is necessary to mark any hot section part during disassembly, inspection, repair, assembly or storage, only the following marking materials shall be used:

- **Chalk**
- **Dykem red, yellow or black**
- **Ink (Justrite slick-black; Marco S-1141; March stencil ink**
- **Soapstone**

CAUTION

Do not use grease pencils or any marking material that contains lead, copper, carbon, zinc or similar material. Use of these materials may result in a loss of fatigue strength, because they will introduce intergranular attack and/or carburization (carbon impregnation) when exposed to engine operating temperatures. If an engine part has been inadvertently marked with an unauthorized material, all traces of the material must be removed.

(US Navy CROSSFEED)

cowling. An immediate landing was made on the runway.

Investigation revealed that the hose connecting the fuel pump to the metering unit was loose. This hose had been removed for a fuel pressure check during prior maintenance. When the line was replaced it was only finger tightened.

for want of a nut

During a UH-IF functional check flight a high pitched whine followed by complete loss of tail rotor control dictated an immediate landing. Postflight revealed that the tail rotor drive shaft had separated at the coupling immediately aft of the 42° box.

The four nuts that attach the coupling to the 42° box had been left off during maintenance!

a chain of weak links

The engine in a T-41 froze after a few minutes of flight and the pilot had to put down in a wheat field.

Would you believe?

1. During a scheduled oil change the tank was not reserviced.

2. The maintenance supervisor missed it.

3. The pilot was observed checking the oil on preflight. The indication he may have seen could have been residual oil which remained on the dip stick.

ingestion indigestion

The A-7 armament crewmember had just removed the pylon and weapons safety pins. As he was crossing under the aircraft in front of the nose gear to stow the pins in the compartment on the left side, the MAU-12 safety pin was caught by the intake vortex and jerked from his hand. Result: ingestion into the engine necessitating an engine change.

undesired HH-43 flight

The HH-43 crew had responded to a selective response (ground run only) alert. As the APU was disconnected and the rotor brake released, the collective pitch control came up. The pilot was unable to overcome the up force and the helicopter lifted approximately 50 feet above the ground, then crashed on its right side.

The cause was traced to a missing engine fuel control overspeed governor drive shaft. The shaft had been left out during unauthorized maintenance by an untrained mechanic assigned to the unit. ★

Ops topics

A MATTER OF LIFE AND BREATH

The jet fighter was being ferried to the west coast. After about one hour of flight, the pilot recognized hypoxia symptoms, including visual blurring and inability to hold a steady altitude and course. A check of the regulator disclosed no abnormalities, except that the quantity gage had not decreased appreciably from the preflight reading. The pilot selected 100 percent and checked his hose connections and mask, finding them to be okay. His breathing continued normally, but his hypoxia symptoms did not clear up. He then selected "test" position and, after a short time, his hypoxia symptoms disappeared and the quantity gage showed a decrease.

The pilot elected to continue on to his destination, some 40 minutes away and pressed on *at FL 240* —both actual and cabin altitude—using the "test" position every few minutes to dispel gross hypoxia symptoms.

An EUMR resulted in a complete functional test of the regulator. The test showed that the regulator had been improperly adjusted when installed and was not delivering sufficient oxygen.

The flight surgeon estimated that the pilot had been without sufficient oxygen for three-five minutes when the symptoms first appeared—and that just happens to be the time of useful consciousness at FL 240. As the flight continued, with intermittent use of "test" position to dispel the symptoms, there was a continual risk of losing consciousness or losing effective functioning.

We can't know for sure how close this pilot came to unconsciousness, but we suspect he wasn't far away —and this is exactly the sort of low priority pressing that keeps our Get-there-itis accidents in the spotlight. We've said it before and we'll say it again: If you suspect hypoxia, *descend* as soon as possible to below 10,000 feet; consider using your bailout bottle (which provides 10-12 minutes of oxygen); *land* as soon as practicable and get yourself and your airplane taken care of.

YOU CAN'T GET THERE FROM HERE

One of the more embarrassing things that can happen in an emergency is having the crash rescue vehicle crash. One unit recently had one of its vehicles damaged to the tune of $23,000 when the vehicle, responding to an aircraft crash, took off down an unserviceable road. More important, the vehicle never reached the scene of the accident!

This instance underlines the need for frequent surveys and up-dating of Crash Grid maps, as required by AF Manuals 92-1 and 127-1. If Grid maps aren't kept up to date, crash rescue vehicles, especially some of the newer, bigger models, might not be there when we need them the most.

AERO CLUB MISHAPS

• An AF pilot was taking a busman's holiday, shooting touch-and-go landings in the Aero Club's Cherokee 140. After ballooning the aircraft in the flare, the pilot lowered the nose too quickly and caused the propeller to strike the runway. The aircraft became airborne again, and a second nose-down control input resulted in the propeller again contacting the runway. The nose wheel strut failed at this point, and the aircraft slid to a halt.

The pilot had been checked out previously in the Cherokee 180, but this was his first flight in the 140. It is the policy of this club—and of several others that we know of—that currency in the 180 carries automatic currency in the 140. It was the opinion of the investigator that at least a one-time checkout should be required for aircraft with dissimilar trim controls and less power available—especially when pilot experience in light aircraft is limited, as in this case. We share that opinion.

• A private pilot departed his home station on a cross-country flight in the club's Cherokee 140. After landing at destination and closing out his flight plan with Flight Service, he took off again without filing a flight plan. The wreckage—the pilot miraculously still alive—was found five days later in a heavily wooded area near a friend's ranch house.

We wonder how many times, since Orville and Wilbur's day, a pilot has crashed in a friend's back yard. And how many times rescue has been late—sometimes too late—simply because the pilot didn't take the trouble to file a flight plan!

HABIT PATTERN TRANSFER

One of the problems attendant to transitioning from fixed-wing aircraft to helicopters was illustrated recently. An IP and his pilot student were on a transition training mission in the HH-43B. At 500 feet AGL the IP requested that the student initiate a simulated engine failure. The student entered autorotation, called out the procedures, checked his power instruments and turned the helicopter toward the taxiway and into the wind. All was normal until about 10 feet AGL, when the student unconsciously applied aft cyclic (roundout) and rotated the nose for landing similar to the roundout in a fixed-wing aircraft.

The landing was firm, but not hard. However, examination after landing disclosed considerable damage to the tail assembly.

One recurring problem in the IP business is staying ahead of the student. Helicopter IPs should certainly keep in mind the tendency on the part of fixed-wing pilots to revert to fixed-wing techniques in the landing phase.

NO, NO!
I SAID "CHEER UP!"

After landing, the IP, making the landing from the right seat, called for "flaps up" to the flight mechanic and lowered the nose. The landing gear horn started to blow, the red landing gear light came on and, as the nose of the aircraft settled to the runway surface, both propellers contacted the runway. After about 2000 feet of slide, the aircraft came to a stop and the crew and passengers exited over the flaps, which were still down. Noticing that the flaps were still down, the flight mechanic returned to the cockpit to check the position of the handles. Sure enough—flaps down, gear up.

Bad luck plagued the flight mech, for he shouldn't have been able to make that particular mistake if the aircraft gear safety system had worked properly. Inspection showed that the landing gear safety up switch on the right main gear was badly corroded, probably allowing the safety lock solenoid in the gear handle to be retracted whenever the battery was on, making it possible for the gear handle to be raised even with the gear on the ground.

Bad luck plagued the IP, too. He fell and broke his leg getting out of the airplane.

FLIP CHANGES

Positive Control Areas: These areas within the continental United States have been realigned. Aircrew attention is directed to the Flight Planning Document Section II, page 76, North and South America for complete information. Future changes in the positive control area are anticipated and will be noted in this article as they occur.

VOLMET: Effective July 1971, VOLMET data was deleted from Section III, FLIP Planning and is now available in each FLIP Supplement (except United States) under appropriate ACC/FICs and individual aerodromes. All aircrews will now have VOLMET data more available to them while flying.

TIGHT SQUEEZE

The two-ship flight went beautifully—up until takeoff.

Lead took the active and lined up on the right-hand side of the runway, Two close behind and tucked in good and tight. Run-up was normal, all instruments checked good, and Lead turned to his left, got an "okay" signal from his wingman and gave the "GO" signal with a firm nod of his head.

Unfortunately, Lead's brakes didn't release. Two's did, though. CRUNCH!

And on a 150-foot-wide runway . . . if it's possible, someone will find a way.

ALTERNATE FUEL

A. G. SMITH
Directorate of Aerospace Safety

The Enroute IFR Supplement lists several Naval Air Stations which have only JP-5 fuel available. USAF aircraft using these facilities will be refueled with JP-5 which is a suitable alternate for most USAF jet aircraft. However, *there are precautions which must be observed.*

The flight manual for each aircraft lists the approved alternate fuel and the applicable operating limitations. Two of the more important items to remember are that

Ops topics

FUEL *CONT'D*

JP-5 does *not* contain an anti-icing additive and that it has a higher freezing point. The absence of anti-icing additive requires special emphasis on draining water from the fuel tanks and the use of fuel heaters on aircraft so equipped. The higher freezing point of JP-5, −51°F, may limit high altitude operations. Most flight manuals caution against flying at altitudes where the outside air temperature is 10° above the fuel freezing point or colder.

JP-5 fuel has a higher specific gravity than JP-4 and some engines, such as the J79, have a specific gravity setting on both the main and afterburner fuel controls. A corresponding change in gravity setting is recommended when using JP-5. Because JP-5 is less volatile than JP-4, engine starting may be more difficult both on the ground and at altitude.

The applicable flight manuals are the governing criteria any time it is necessary to use alternate fuel. TO 42B1-1-14, *Fuels for USAF Aircraft,* is also an excellent reference on the use of alternate fuels.

WATT'S NEW?

In a sister service, the pilot of an A-6 was on night takeoff. On liftoff he actuated his trim switch and received a severe electrical shock—*enough so that he was unable to control the aircraft or release his grip on the throttles or stick.* The aircraft rolled right, the nose fell through the horizon about 300 feet AGL, and only the quick reaction of the Bombardier/Navigator, who knocked the pilot's hand away from the stick, allowed for recovery and saved the aircraft and crew from an imminent fatal crash.

The trim toggle switch cover had come off on take off, exposing the metal shaft which carries 115 VAC. The pilot was wearing Nomex flight gloves which were damp from 45 minutes in the pattern, and we suspect that the intensity of the electrical shock was increased by the pilot being grounded through touching the metal part of the throttles.

Pilots who have received minor shocks from sources of this nature should not underestimate the seriousness of the discrepancy. The degree of shock depends on what other metal objects the pilot may be touching, and that mild shock you felt today might be a fatal shock to someone else tomorrow. In this instance, the pilot was completely helpless—he could not control the aircraft, eject, or even let go of the controls.

Any pilot experiencing a shock, however mild, should ensure that the aircraft is written up and grounded (both ways) until the problem is corrected.

GARBAGE ON GUARD

According to FAA, a serious problem exists caused by non-emergency transmissions on 243.0 MHz, mostly from personal emergency locator "beepers" of the type associated with military parachutes. A survey of selected ATC facilities indicated that nearly 1000 false emergency transmissions had been received by these facilities from 1 January to 9 March 1971. Transmissions varied from short bursts to one transmission of 14 hours and 12 minutes.

One interesting note comes from a report made by a West Coast Naval Air Station: "During the month of December, the time of PRC/PRT (Beeper) signals totaled 3506 minutes. The seriousness of this problem now comes into focus. For this staggering period of time, guard channel was clobbered and any actual emergency would have been 'out of luck'."

The problem is getting worse instead of better, and only a concentrated effort by all concerned can resolve it. All installations handling "beepers" should review and evaluate their monitor and control programs. All personnel must take care to avoid an inadvertent triggering. Having a bona fide MAYDAY blocked out because of someone's carelessness is inexcusable.

NO PUSHEE, NO PULLEE

After takeoff from an outlying base, the O-2 pilot found he couldn't raise his gear. A flyby of the tower indicated that the gear was down and appeared normal, so he headed for home station where another aircraft could join on him and give the gear a closer inspection.

All cockpit indications were normal, but the chase plane pilot stated that the nose gear strut and scissors appeared to be over-extended. As precautions, the runway was foamed and crash equipment was called out.

On final approach, the pilot, hoping to minimize damage to the aircraft in the event of nose gear failure, attempted to feather the front engine. He pulled the front engine mixture control to idle/cutoff, and placed the *rear* engine prop control lever to feather. Its capability of flight severely hampered, the airplane settled smartly to the ground well short of the runway. The pilot was uninjured, but the aircraft was damaged beyond economical repair. ★

EXPLOSIVES SAFETY

HY BOSCH, Directorate of Aerospace Safety

"WHAT FOOLS THESE MORTALS BE"

It appears that the silly season is upon us. When a silly act occurs in conjunction with the handling of explosives, then it leaves the realm of the ridiculous and crosses over to the unforgivable.

For instance, at an aerial port this series of actions could have ended in disaster—in this case it was merely embarrassing. During a routine check of unaccompanied luggage, customs inspectors discovered a cache of explosives shipped by an officer returning from overseas. The contraband included demolition explosives, primer-detonators, small arms ammunition, and six tear gas grenades. This shipment had already jeopardized countless innocent lives through its unauthorized movement. Enter now on the scene the professional expert, an EOD technician charged with safely removing this material. Instead of packaging the items, he attempted to remove all six of the grenades in his arms. He was halfway out of the building when a swinging door jarred one grenade loose from his hold and it bounced off the floor. Only the tear gas grenade's protective container prevented a rather tearful ending to this circus act.

Another individual was instructing a class on the M49A1 trip flare. In picking up the flare he neglected to hold his hand over the spoon to check that the safety pin was installed. The pin fell out, the spoon flew off, and the flare ignited in his hand. All in all the instructor and his class shouldn't soon forget that demonstration.

Another instructor, this time an aircraft gunner, positioned himself in front of a 7.62mm weapon, removed the barrel safing pin, and rotated the barrels. Besides making himself an opportune target, he failed to insure all rounds had been removed from a previous mission. One round fired, catching him between the big toe and first toe. Lost time six weeks. Needless to say, he was removed from instructor status. Another case of "do as I say, not as I do."

EOD personnel burning 20mm target practice ammo in a pit failed to wait the required cooling down time before picking up unspent rounds. Result, one lost finger and fracture of two more.

An airman assigned to range clearance duties picked up what he thought was a burned out MK24 flare. He figured the weight of the flare was due to impacted earth imbedded in the flare. He thought wrong! The flare was live, the lanyard was pulled and his thigh was burned.

These incidents display that both the amateur and professional have no margin for error when it comes to handling explosives. ★

TO

It had really been a nice morning. The weather was clear and with no wind, the pilot figured on some good scores on the range. He had just pulled off the last dive bomb run when the instrument gages began to spoil things. The first indication of trouble was flashed by the oil pressure light which came on strong. It was supported by mild compressor stalls and a decrease in RPM. When both vibrations and the EGT increased, he elected to shut it down. The zoom off target had carried him to 2000 feet. Since no possibility existed for a dead stick, the pilot wisely activated the exit handle and successfully completed his unplanned maneuver.

It wasn't long until the accident investigators were on the scene, poking around the smoking hole to determine what had happened. Fortunately, enough of the pieces were still intact to enable them to determine the cause of the accident. A teardown of the engine and accessory case revealed a *SOAP sample bottle in the oil system.* The investigation team's first reaction was to begin a hunt for the individual responsible for this act. However, after much discussion another very significant point was brought out by one of the board. *Why would a maintenance troop drop the bottle into the filler neck and fail to tell someone about it?* Was he afraid of disciplinary action? Let's consider the possibilities in this case.

This accident was easily preventable. All that would have been necessary was for the individual responsible to go to his supervisor and admit that he had made a mistake. Yet the implications are that he was afraid to do so. No one will deny that our objective is to perform the mission—if possible with "Zero Defects." The most frequent ob-

ERR

stacle to our reaching this goal is people. That is, people are human and therefore subject to committing errors. If we fail to accept this, then accidents will continue to happen.

If Joe Airman, working on the flightline, has the feeling that every time he makes an error he is going to have his finger stuffed in the pencil sharpener, then the chances are that we will never know about his mistakes until we dig them out of a smoking hole.

We have to make sure that we impress upon everyone that occasional mistakes will happen. While we cannot condone errors, we must leave the door open so that individuals will feel free to come in and admit that they need help or that it just isn't possible to complete the task properly in the time allotted.

The key to the problem lies with the supervisor. If he is the type that paces the flightline with a big whip and snarls at everyone who commits an error, then he is setting up a situation conducive to an eventual accident. Or he might be an ops officer who gives all the pilots the impression that he won't accept any deviations in the schedule and, therefore, they might end up flying a bird that maybe isn't just right.

There are some people who work better under pressure but most psychologists agree that a relaxed atmosphere is the best way to realize maximum production. When an individual lives in constant fear of censure if he commits an error, you can bet your bottom dollar that you will never hear about any problem area unless you happen to stumble on it.

Fear of recrimination has probably cost us many a pilot. A commander who has a policy that heads will roll if you bash an airplane has perhaps caused a delay in the ejection sequence when there was no hope of salvaging the situation. It is a welcome feeling when the boss says "people are my most important resource and if something happens that you think dictates leaving the bird, get out and live to fly another day."

The point that must be clearly understood is that, while we don't condone mistakes, once one has been made, let's clear it up and prevent the chain of events that leads to an accident. No one is perfect, so we must realize that, as long as we perform at a job, someday, somehow we will make a mistake. What we have to establish is a climate in which the individual can go to his supervisor and admit he erred. Then we cannot only correct that mistake, but we can take the measures necessary to insure that the same man will not commit the same error again.

Basically, what we have said here is that good supervision can prevent accidents. And that is the only kind of supervision we can afford. ★

mail call

T-38 GRAPH

Just received your May 1971 issue of *Aerospace Safety* magazine and was digesting every article when I turned to page 21 and saw the glaring error on the graph point for 1969. It appears the illustrator had a lot of extra "2s" and no "1s", or his graph line made a nosedive when it should have climbed.

Although I'm primarily responsible for Ground Safety, I enjoy reading your magazine and get good, useful information from it.

By the way, since it takes so long for us up here at Thule, Greenland, to receive your magazine, maybe TOOTS could deliver the next issue personally. I know a lot of guys who would leap up in the air and kick their heels together . . . in a safe manner, of course.

MSgt Ralph E. Newman
4683 Air Base Group
Thule AB, Greenland

Sorry about two things, Ralph: The mistake on the graph—the 2.6 should read 1.6; and TOOTS isn't cleared for magazine delivery. Thanks for writing.

SONDRESTROM TRANSIENT SERVICES

Every transient aircraft commander who comes through Sondrestrom is asked to fill out an evaluation form upon entering Base Operations. Every morning the Base Operations Officer evaluates each form or, if the need arises, he evaluates and takes necessary action immediately.

Our Transient Alert and Base Ops Dispatchers are composed entirely of Danish personnel and a prouder people you will never find, especially when it comes to providing good service to transient aircraft.

I wish you would have Rex Riley make a trip up here someday because I am sure these people would earn the Transient Services Award.

TSgt Ronald J. Goodboe
4684 Air Base Group
APO New York 09121

You are to be commended, Sergeant for taking such an interest in the troops who provide the transient services. We'll try to see that Rex visits you in the near future.

BROKEN NOZZLES

I'm writing in reference to the article, "Would You Use This Nozzle," May 71 *Aerospace Safety*. The author makes the statement that "good maintenance practices would have replaced all of the broken handles." In this case I believe that good maintenance practices are not the factor here and the implication shouldn't be made. The fact is that the daily operator's inspection, utilizing the AFTO Form 371, would have and should have dictated what should have been done.

Personally, I've seen quite a few refueling operations and, in many cases, the vehicle operator would pull the hose off the reel and throw the nozzle to the ground.

Please don't imply that the maintenance was primarily at fault. Vehicle Maintenance personnel pull inspection on refueling equipment at 90 day intervals. A lot can happen in 90 days.

Capt Joseph N. Cupurdija
4900 Air Base Group
Kirtland AFB, New Mexico

☆ U. S. GOVERNMENT PRINTING OFFICE 1971 431-467/12

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.

Captain THOMAS A. GIBBS

USAF Air Demonstration Squadron (Thunderbirds), Nellis AFB, Nevada

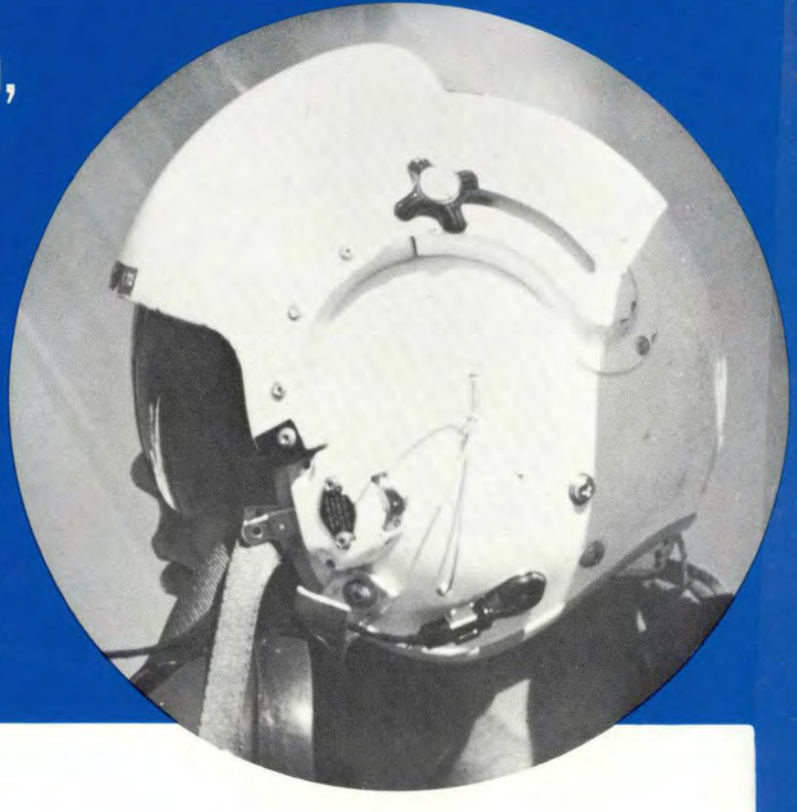
Captain Gibbs was flying slot position in an F-4E during a low altitude Thunderbird training maneuver when his aircraft and that of the right wingman collided. Captain Gibbs' aircraft immediately began severe oscillations; however, by smoothly blending back pressure and right aileron, he was able to stop the oscillations and climb to a safe ejection altitude. Visual inspection revealed the rudder completely missing and major damage to the right horizontal and vertical stabilizers. By using almost full right aileron to keep the wings level, he continued to climb to 18,000 feet, slowed the aircraft to 250 knots, and performed a controllability check. As he further slowed to 180 knots, more severe, unpredictable control inputs and vibrations were encountered because of the horizontal stabilizer damage.

Captain Gibbs approached the bailout area with his F-4 under marginal control, but decided to continue his flight in an effort to determine minimum controllability speed. At 170 knots, full right aileron was required and maximum vibration occurred. He decided to attempt a landing at 180 knots with an approach-end barrier engagement. Once established on final approach, Captain Gibbs had considerable difficulty remaining lined up with the runway due to the vertical stabilizer being bent to the left. However, by holding about 12 degrees right bank, he continued his approach, landed and successfully engaged the barrier.

Captain Gibbs' superb airmanship, combined with his calm, logical approach to a serious emergency, saved a valuable aircraft. WELL DONE! ★

Get-home-itis

a disease,
generally of short duration,
from which the subject
either quickly recovers
or to which he
may succumb.



SYMPTOMS:

Determination (often of the pigheaded type) to press on, regardless of weather, condition of the aircraft, his own condition. Subject develops great capacity for rationalization.

REMEDY:

Liberal dose of good judgment. Intelligent treatment by boss, wife, girl friend has been known to work wonders.