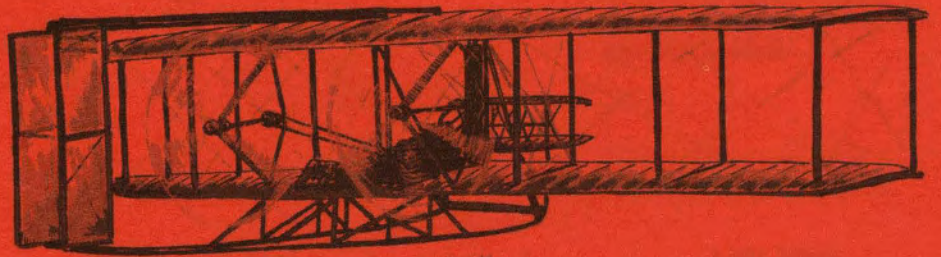


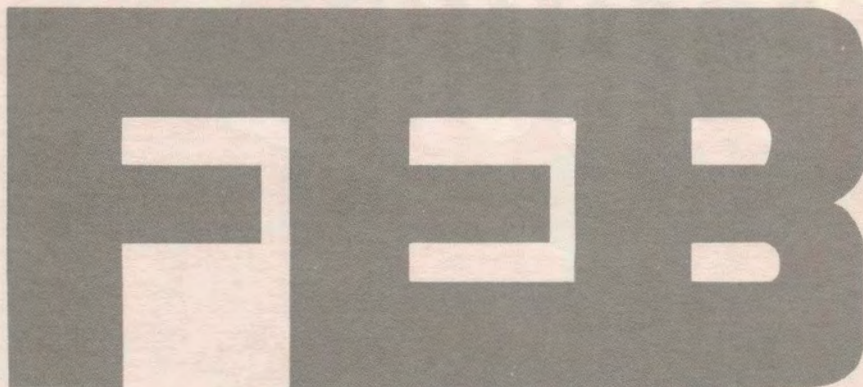
TAC ATTACK

Tac Attack

FEBRUARY 1979



Brecht



READINESS IS OUR PROFESSION



TACTICAL AIR COMMAND

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TACRP 127-1

Material in this magazine is nondirective in nature. All suggestions and recommendations are intended to remain within the scope of existing directives. Articles published in this magazine represent the opinions of the authors and do not necessarily reflect the position of Tactical Air Command or the USAF. Information used to brief accidents and incidents does not identify the persons, places, or units involved and may not be construed as incriminating under Article 31 of the Uniform Code of Military Justice. Written permission must be obtained from HQ TAC before material may be republished by other than Department of Defense organizations.

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THE FINAL LINK

Last December marked the 75th anniversary of powered flight. The F-16 is but our latest accomplishment in aircraft design---a quantum step from the days of Kitty Hawk. Unfortunately, December also closed out the worst year for destroyed aircraft in Tactical Air Command since 1969. In 1978, we destroyed 34 aircraft---in just over 500,000 hours flying time. TAC-gained units added another 18 aircraft to the destroyed column. By contrast, in 1970, we destroyed 33 aircraft, but flew almost 300,000 hours more flying time.

From the time of the first powered flight, we have used our ingenuity and technology to improve airframes, engines, flight controls, avionics and all other aircraft components. Advancements have also been made training our flight and support personnel. We barely pass each month without a new concept in simulator design, training devices, or tactics. These improvements have allowed us to do our job better, faster, and safer.

These advances--sophistication in training and hardware, the advancing level of education of nearly all of our personnel--might lead us to

Angle of Attack

assume that we've gone as far as we can to provide an optimum balance between combat effectiveness and safe operations. 1978 proves that we're a long way from reaching that goal.

Our Safety Investigation Boards continue to identify causes for mishaps which are under our control---improper design---lack of quality control---poor supervision---inadequate training---disregard for established directives---the list goes on.

The common thread among all these causes is that they all involve people---the individual---you and I and our co-workers. We must concentrate on people. If we are the workers, we must concentrate on our own responsibilities to do the job right. We can't take shortcuts; we can't let any pressure prevent us from doing the job correctly. We as the supervisors must insure we lead and direct by example. There is no peacetime mission that requires or justifies a disregard for established tech data and procedures. We can't allow the way we lead to give any other impression.

We are the final link. It is up to us to make 1979 the best year in this decade. If we don't succeed, our loss rate will continue and the readiness of TAC will suffer. It's our choice. ➤

Richard K. Ely

RICHARD K. ELY, Colonel, USAF
Chief of Safety

THE F-16 EMERGENCY POWER UNIT



Capt Roy A. Hodges, HQ TAC/SMO-16
F-16 Aircraft Maintenance Officer
Langley AFB VA

Capt James F. Dugan, 12AF/RT
Aircraft Maintenance Conversion
Project Officer
12AF Ready Team, Bergstrom AFB TX

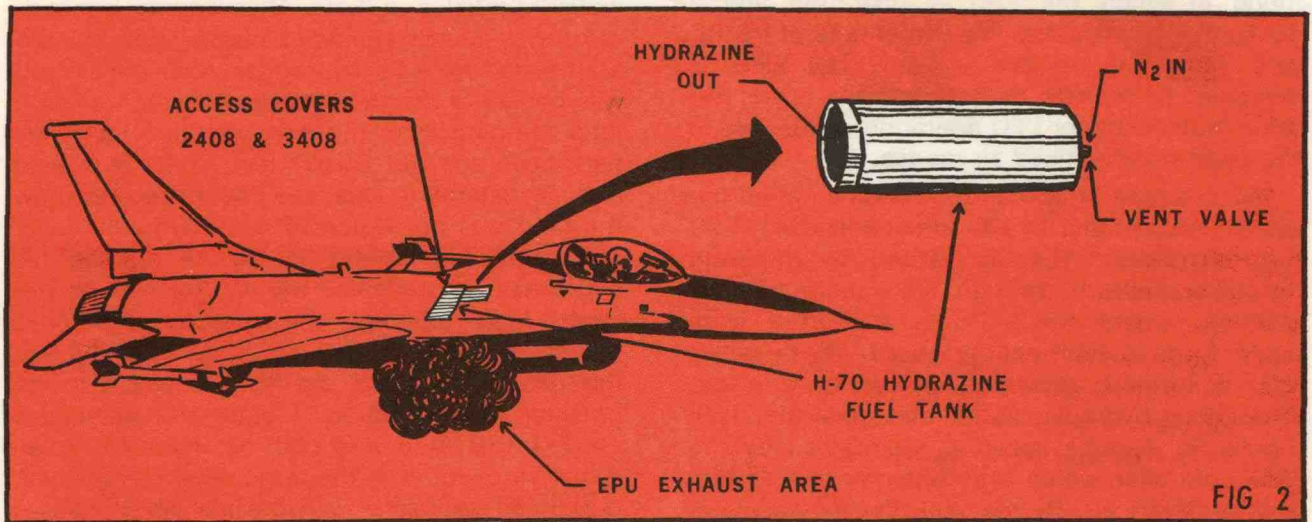
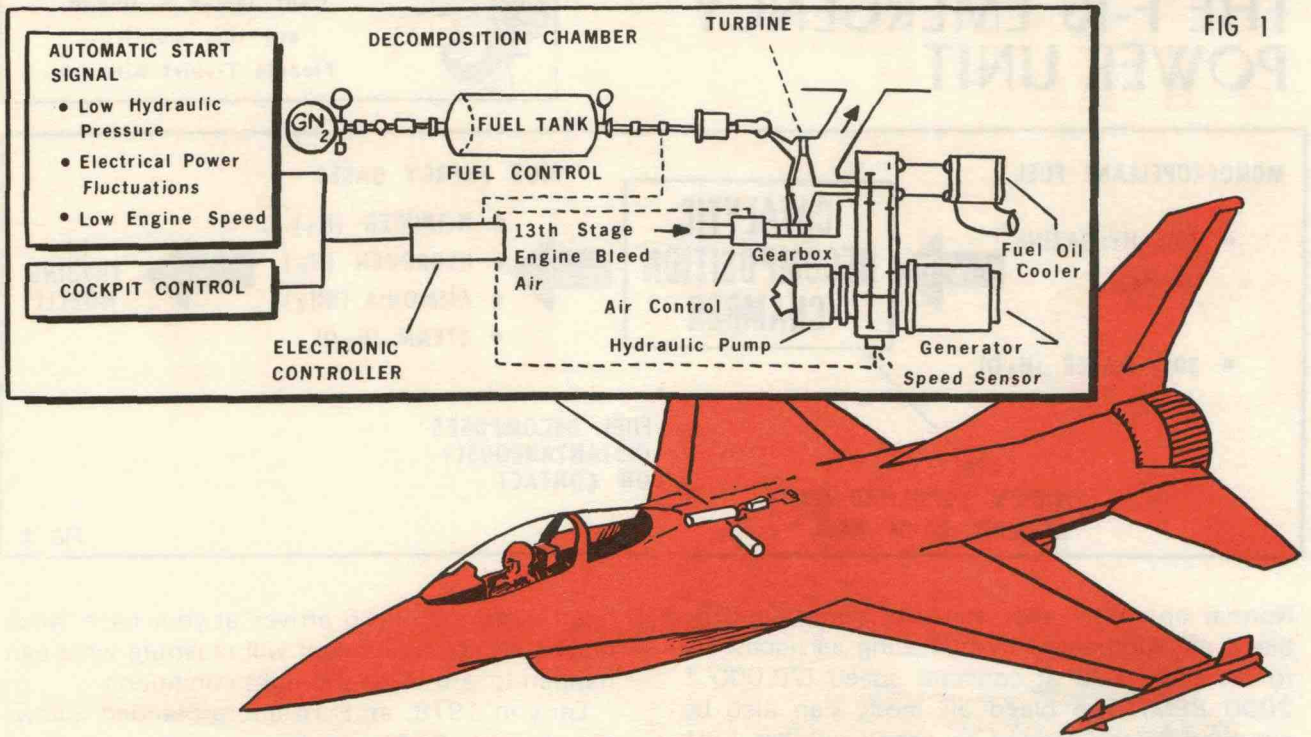
In last month's edition of **TAC ATTACK** you were introduced to hydrazine (N_2H_4) and its physical characteristics and chemical properties. You may now be wondering why this toxic propellant must be used in the flight line environment on an aircraft that will be deployed worldwide in large numbers.

To answer this question, let's break this article into two parts: First, we'll consider what the F-16 Emergency Power Unit (EPU) was designed

to do and secondly, we'll cover what you need to know before an F-16 stops by your base. In this discussion we will refer to the fluid used in the F-16 system (70% hydrazine and 30% water) as "H-70." It is not the same as the neat (100%) hydrazine used in missile programs, but the chemical properties and handling precautions are basically the same.

Figure 1 is a schematic of the F-16 Emergency Power System. Note that the EPU and H-70 fuel tank are located on the right top side of the aircraft, just below and behind the canopy. Also, take a look at the danger areas indicated in Figure 2.

The F-16 EPU was designed to provide emergency electrical and hydraulic power in the event of primary power system or engine failure. In the F-16's "fly-by-wire" flight control system the familiar mechanical linkages between the side stick controller (control stick) and the flight control surfaces are eliminated. This leaves the pilot no way to maintain aircraft control without



immediate emergency electrical power. The conventional Ram Air Turbine (RAT), used on other aircraft to provide emergency power, does not spin up rapidly enough or operate efficiently enough at all airspeeds, aircraft attitudes, and altitudes to meet performance requirements for the F-16.

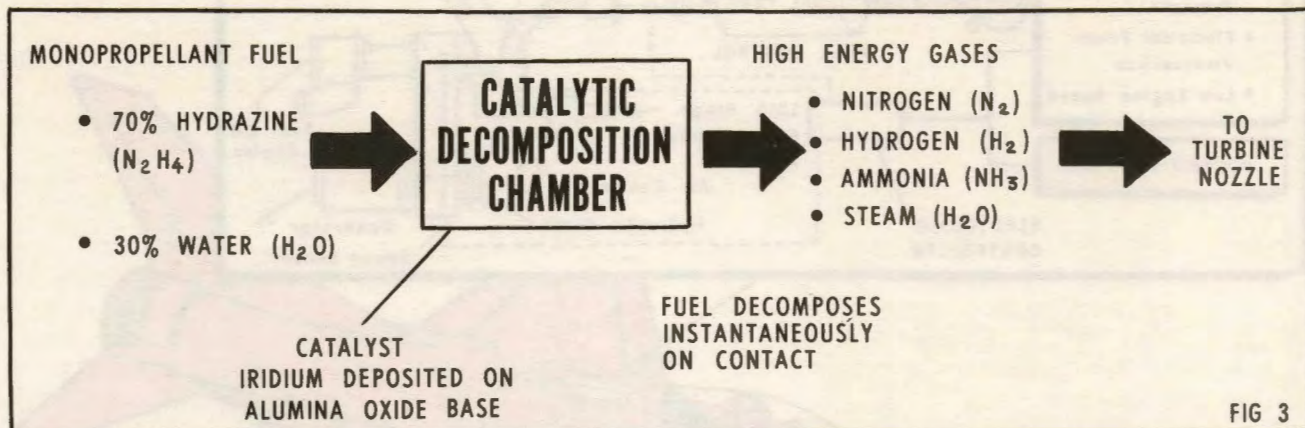
The F-16 EPU gives the pilot excellent flight control and landing stability under emergency conditions. The unit develops about 55 shaft

horsepower within 2-3 seconds to drive a 23 GPM hydraulic pump and a 5 KVA generator. The system activates when hydraulic pressure falls below 1000 psi or when the main generator disconnects. The EPU operates in any one of three modes depending upon availability of engine bleed air: (1) Monopropellant (hydrazine) alone; (2) Bleed air alone; and (3) Augment (bleed air augmented by hydrazine). EPU start-up is accomplished in the monopropellant mode.

THE F-16 EMERGENCY POWER UNIT



Capt Roy A. Hodges and
Capt James F. Dugan
are this month's
Fleagle T-shirt winners



Normal operation after start-up is sustained by bleed air augmented by hydrazine as necessary to drive the EPU at constant speed (70,000 \pm 2000 RPM). The bleed air mode can also be operated on the ground to check out the EPU. Lights on the cockpit control panel indicate the mode in which the EPU is operating and a cockpit gage indicates the percentage of hydrazine remaining in the system. The EPU is designed to provide monopropellant power for ten minutes. Longer EPU operation is possible in the augment and bleed air modes.

The principle of operation is simple. When the system is activated by the EPU controller, H-70 monopropellant fuel is forced by gaseous nitrogen pressure through an iridium catalyst chamber where the H-70 is converted from liquid form to high-energy gases. These gases spin a turbine, providing power to turn the emergency hydraulic pump and generator (see Figure 3). Turbine speed is maintained by the EPU controller which intermittently injects fuel and/or bleed air. By the way, the exhaust vent for these gases (on the lower inboard side of the right strake) is an F-16 danger area (see Figure 2) which may produce up to 1600°F temperatures near the aircraft surface. Avoid this danger area.

Now that you know how the EPU operates, you may be wondering, "What does all this mean to me?" Though most of you won't work with the F-16 in the immediate future, it is still important to understand the precautions. This information can prevent some problems if you "read and

heed" before an F-16 arrives at your base. Now, maybe an actual incident will illustrate what can happen to you given the right conditions.

Early in 1978, an F-16 aircraft landed following a test flight which required intentional engine shutdown and airstart. The EPU had worked perfectly in flight. After landing, the end-of-runway check appeared normal and the aircraft taxied back to the hangar. After the aircraft was parked, a maintenance technician noticed a fluid dripping from the belly of the aircraft. He performed the old trusty "feel, smell and taste test" to determine what the liquid was. He knew the fluid was not water, JP-4, or hydraulic fluid, but could not identify it. So he notified his supervisor and repeated the test for him. As you might have guessed, the unknown fluid was hydrazine. Fortunately, no one was injured, though the individual did have to report to the hospital for evaluation. I hope this eliminates any fear that "one drop kills" or "if you can smell it, it's all over." It is the large dose or repeated, prolonged exposure to hydrazine which causes the damage to your bod. Nevertheless, contact with hydrazine should be avoided. All contacts, no matter how small, should be reported and medical evaluation obtained immediately.

The incident we described was caused by a damaged o-ring in the hydrazine tank quick disconnect which allowed hydrazine to spray the EPU compartment during the test flight. As a result of this failure, a number of improvements have been made in aircraft design to prevent leak migration into adjacent compartments.

You should understand that, while initial estimates cite an expected 4 to 10 EPU firings per wing per month, the probability of a hydrazine leak is remote. Safeguards make leaks unlikely if the system hasn't functioned in the hydrazine mode. But, don't become complacent. Watch for and be suspicious of fluid leaks. When the H-70 tank is pressurized following operation of the EPU, the pilot must make the end-of-runway crew aware of it before they approach the aircraft. So, don't get caught off guard.

A base which has F-16's will use procedures similar to the following in responding to a leak aboard the aircraft:

a. The agency identifying the leak will notify job control. They will immediately notify the fuel systems maintenance shop, the shop responsible for the system. Then, if necessary, base disaster preparedness, bioenvironmental engineering, safety, and other support agencies will respond.

b. If possible, the aircraft will be moved to a designated, isolated location to limit exposure to personnel or preclude environmental hazard.

c. All personnel approaching the aircraft will wear approved protective clothing, including self-contained breathing apparatus.

d. Action agencies will contain the spill, stop the leak and decontaminate the aircraft using approved procedures.

So, what should you know when an F-16 visits your base?

First, realize that H-70 leaks or spills present medical, environmental and logistics support problems. So, if an F-16 lands with the EPU operating, here's an initial shot of what you should do at your base:

a. Notify the command post, job control, and end-of-runway crew.

b. Park the aircraft in an isolated area away from traffic and buildings.

c. Clear all nonessential personnel from the area.

d. Ask the pilot to assist in safing the weapon system and remain available for further support as required.

e. If a leak is discovered, notify the bioenvironmental engineer and disaster preparedness office. Clean up actions should be performed IAW AFOSH Std 161-13.

f. If anyone experiences direct skin contact, remove clothing and flush exposed skin with clean water for 15 minutes. Seek medical assistance. If exposed to elevated levels of H-70

vapor, seek medical assistance.

g. Contact the F-16's home base for repair, servicing and turnaround support or for other assistance/information.

Hopefully, by the time you get to the aircraft recovery and isolation stage, you will have contacted the F-16 home base command post for further instructions. This call will also alert home base to put together a team of specialists to support aircraft repair operations. Remember, EPU system maintenance requires proper tech data, support and servicing equipment, and thorough training.

For your reference, the following technical orders, audio-visual programs, and safety publications will provide the detail you need for your local action. AFOSH Standard 161-13 is the primary reference for hydrazine safety; it should be available by the time you read this article. Two audio-visual aids have been prepared for Air Force use and can be ordered now for your base film library. They are: TS-1188A, "F-16 Hydrazine Hazards," a 16mm film designed for general audiences (should be excellent for Commander's Calls) and TS-1188B, "F-16 Hydrazine Hazards--Emergency Spill Procedures," a 35mm slide/tape presentation for use by agencies involved in spill control. ➔

T.O. 00-105E-9 provides fire fighting and crash recovery information. Training programs and other films may soon be generated to train transient alert personnel Air Force-wide. With these aids you should be able to handle the emergency actions required to stop a leak or clean up a spill.

The important thing to remember is that the F-16 has a hydrazine EPU on board and when an F-16 arrives, the H-70 fuel must be treated with respect. So, be ready for the Air Force's newest fighter--and hydrazine.



WEAPONS WORDS

DID YOU KNOW?

By Capt Fred Higaki
HQ TAC/SEW

● The primary reason for requiring fire extinguishers on vehicles carrying explosives or at explosives storage sites is to stop a fire from getting to the explosives material. In other words, it is simply "first-aid" fire fighting equipment. Once the fire reaches the explosives, you've done all you can and it's time to get out of Dodge. The base fire department is trained to fight fires involving explosives and will hopefully arrive on the scene before the explosives are engulfed in flames. One other point, make sure the extinguishers you select are suitable for the potential fire hazard. On a motor vehicle, the hazard is usually electrical or gasoline/oil. In



most storage areas, the hazard is normally grass fires or fires in dunnage/packing material.

● Occupational Safety and Health Act (OSHA) Standard 1926.900, General Provisions, Subpart U-Blasting and the Use of Explosives, contains a restriction on the use of mobile radio transmitters within 100 feet of electric blasting caps that are not in original shipping containers.



However, AFR 127-100, Chapter 6, is more definitive. The distance between exposed electro-explosive devices (EED) and the radio transmitter may be reduced to less than 100 feet depending on the transmitter frequency and radiated power. The reduced distance may be calculated by using the nomograph on page 6-15, AFR 127-100. You can use the nomograph in lieu of guidelines set in the OSHA Standards because AFOSH Standards or other Air Force guidance takes precedence. However, in the absence of either AFOSH Standards or other Air Force guidance, applicable OSHA Standards will be used.

- The reason for having grounding points in the Arm/Dearm area is for munition loading/unloading or certain types of aircraft maintenance that may be required in that area. Aircraft do not need to be grounded for normal arm/dearm operations.

- Air Force Explosive Ordnance Disposal (EOD) personnel are trained at the Naval Ordnance School in Indian Head, Maryland. This is a Joint DOD ordnance school managed by the Navy and staffed by all branches of the armed services. DOD personnel receive initial training of over 20 weeks and must attend refresher courses every three to four years to keep current on changes in the munitions environment. EOD units are responsible for safing and disposing any potentially hazardous explosives. They can take care of items ranging from old war souvenirs to modern, sophisticated weapons. Moreover, they are familiar with explosives of both US and foreign origin. The improvised explosive (homemade bomb) is the most hazardous to EOD personnel because the devices come in all sizes, shapes, and types of explosives. However, EOD personnel train extensively to handle all types of explosives. So, if you have an explosive item that you know is unsafe, or even have the slightest doubt, clear the area and call the experts. EOD can handle the problem.

- The Air Force has a Nonnuclear Munitions Safety Board (NNMSB) to review and establish design safety criteria, standards, and requirements for nonnuclear munitions being developed by the Air Force or procured from other sources. It also evaluates how well new or modified munitions meet the limits of safety criteria. The board is made up of technically qualified safety personnel, with members from every command that has a direct interest in verifying the safety of nonnuclear munitions, explo-



sive devices and their support equipment. The board normally meets four times a year to determine how well new, or modified munitions, meet the limits of safety criteria, standards, and requirements. This evaluation is based on a comparison of data obtained from engineering, development and operational testing.

Whenever a new munition is slated to come on board, a Technical Munitions Safety Study (TMSS) is established. This is a detailed safety analysis of a nonnuclear munition and is used to document safety engineering findings and recommendations. After complete testing, evaluation, and analysis of data, the report is forwarded to the Director of Aerospace Safety for coordination and submission to the Air Staff.

For any further information on the Nonnuclear Munitions Safety Board, its purpose, composition and responsibilities, consult AFR 127-16.



TAC PROFESSIONALS

Each month we honor TAC's Aircrew of Distinction for a feat of outstanding airmanship. Too often we overlook the other aircrews who were nominated for this award and but for the keen competition would have won the award also. Here are some of the most noteworthy accomplishments of the runners-up...



Capt Lee Whitaker
353 TFS/ 354 TFW
Myrtle Beach AFB, SC

On 18 January 1978 Capt Whitaker was flying number four in a flight of four A-7s on a live close air support mission and fire power demonstration.

Two BLU-27 delivery passes were completed and normal recoveries were accomplished. He then climbed to 6000 feet and commenced a high angle strafe pass. He initiated a 4 1/2 G recovery, and as the nose of his aircraft rose slightly above the horizon, the right wing dipped, and the aircraft yawed and rolled to the left. Capt Whitaker immediately released back stick pressure and attempted to level the wings, but the aircraft then started a violent wing rock with severe pitch transients. The stick was moving laterally with such force that he was physically unable to control its movements, so he used both hands to dampen the control

inputs and to guide the aircraft into a general upward vector. Gyration were of such intensity that he was thrown violently around the cockpit, and the sharp pitch oscillations caused his shoulder harness to lock and the G meter to peg at both the positive and negative limits.

At approximately 6000 feet, the gyrations lessened slightly, an emergency was declared, and the climb was continued so that a controllability check might be made. Wing rock continued with the aircraft control augmentation system in either the engaged or disengaged position, and he found that it increased in severity as the angle of bank was increased. Capt Whitaker carefully configured the A-7D for landing and successfully guided the aircraft to a straight-in full-stop landing.

The superior airmanship, prompt reaction to a grave inflight emergency, and professional competence displayed by Captain Whitaker resulted in the saving of a valuable tactical fighter and averted possible injury or loss of life.

• • •

Capt Deane T. Gordon
76 TFS/ 23 TFW
England AFB, LA

On 27 December 1977, Capt Gordon was leading a four-ship weapons delivery flight to Claiborne Range, Louisiana. On recovery from his second 30-degree rocket pass, he experienced an irregular, loud banging as the throttle was advanced through 80 percent. Capt

Gordon zoomed the aircraft, using his 400 KIAS to gain altitude, while he simultaneously retarded the throttle to idle. Faced with a compressor stall at a power setting which would not allow level flight with his aircraft configuration, he elected to select manual fuel. As the throttle was advanced through 78 percent, the compressor stall reoccurred.

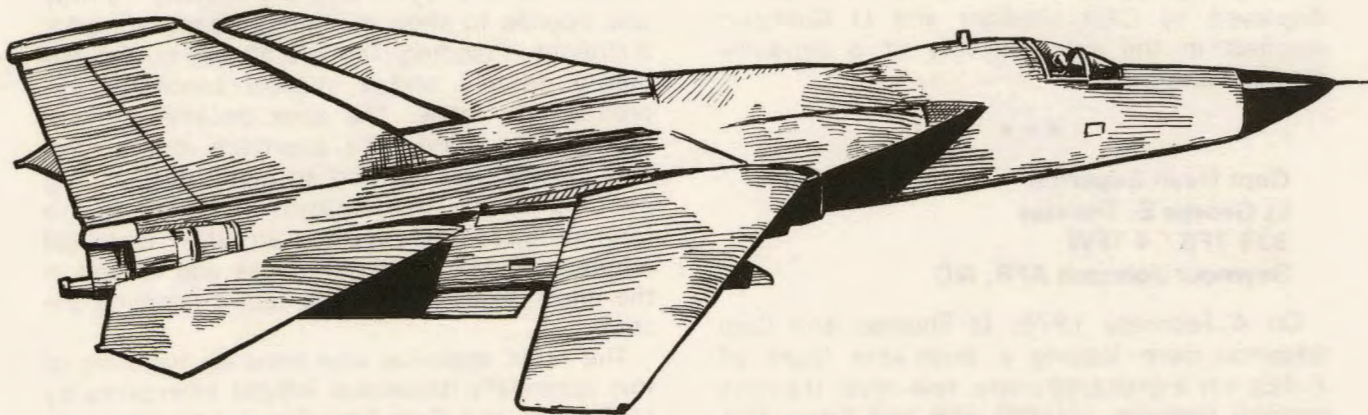
Capt Gordon began a turn toward England AFB, 10 NM away. He reselected normal fuel and set the power just short of the stall condition. His zoom had carried him to approximately 4500 feet AGL, but he was now in a controlled descent. He elected not to jettison his stores due to the populated areas along his flight path. He maneuvered the descending aircraft to a 3000 foot base leg for a precautionary landing approach. When landing was assured, the aircraft was configured for a cable engagement. Capt Gordon touched down in the first 1000 feet of the runway and performed a successful engagement. Investigation conducted by Oklahoma Air Logistic Center revealed extensive damage in the engine compressor section due to internal vane failure.

The superior airmanship, prompt reaction to a grave inflight emergency, and professional competence demonstrated by Capt Gordon resulted in the successful recovery of a valuable tactical fighter.

• • •
Capt Gary A. Voellger
Lt Richard P. Cashman
523 TFS/ 27 TFW
Cannon AFB, NM

On 15 November 1977, Capt Gary A. Voellger, an F-111D Instructor Pilot, and 2/Lt Richard P. Cashman, a student Weapons Systems Officer, averted the loss of their disabled F-111D over a populated area and successfully landed at Kirtland AFB, Albuquerque, New Mexico.

The mission was scheduled as a night low-level syllabus training sortie. Shortly after entering the low-level route and while flying in auto terrain following flight, the right primary hydraulic caution light illuminated. An immediate climb to altitude was initiated and checklist procedures were accomplished. An emergency was declared with Albuquerque Center, and the aircraft was cleared direct to Cannon AFB. At level-off, the wings were slowly moved forward to prepare for landing. At 20-degree wingsweep, the left primary hydraulic caution light began to flicker and minor pitch transients were encountered. Further forward movement of the wings was terminated; and as a result of the pitch transients, the aircrew elected to proceed to the nearest suitable emergency airfield, Kirtland AFB (Albuquerque). Shortly after turning toward Albuquerque, the left primary hydraulic



TAC Professionals

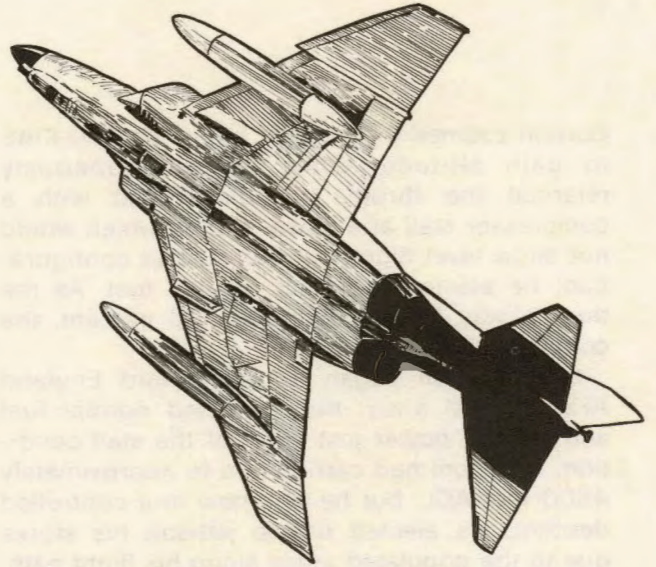
caution light came on steady and the primary hydraulic pressure dropped to zero psi. Approximately three minutes later, moderate pitch transients were again encountered. As power was reduced the left and right utility hydraulic caution lamps flickered and utility pressure fluctuated between 3000 and 1000 psi. Moderate pitch transients were again encountered, and the control stick pulsated back and forth. Power was immediately reapplied, and a turn away from populated areas was initiated in anticipation of ejection. Keeping flight control inputs to a minimum and utilizing trim to the greatest extent, the aircrew continued the approach into Albuquerque.

Each time power was reduced below 90 percent or demands put on the utility hydraulic system, the utility hydraulic lights would flicker and pitch transients would occur. In an attempt to slow the aircraft for descent and configuration, Capt Voellger elected to place the right engine at 93-95 percent and reduce the left engine to idle. Following gear down and locked indication, a left 10-degree bank turn to final was started. Approximately 20 degrees from rollout heading, pitch and stick transients were again encountered with additional utility hydraulic pressure fluctuations. With complete hydraulic failure and loss of control imminent, the aircrew seriously considered the possibility of ejection. After four or five cycles, the transients ceased as abruptly as they had started and Capt Voellger was able to roll the aircraft out on a four-mile final approximately 1000 feet AGL. The approach was continued to an uneventful landing and rollout. The superior airmanship displayed by Capt Voellger and Lt Cashman resulted in the safe recovery of a seriously disabled aircraft.

•••

Capt Dean Edgerton
Lt George E. Thomas
335 TFS/ 4 TFW
Seymour Johnson AFB, NC

On 4 February 1978, Lt Thomas and Capt Edgerton were leading a three-ship flight of F-4Es on a cross-country, low-level training mission between MacDill AFB and Eglin AFB. During easy maneuvering at 500 feet AGL, 420 knots ground speed, the control stick suddenly



froze in a slightly nose up pitch condition. Lt Thomas selected military power and initiated a climb, using rudder and aileron for control, while accomplishing all checklist procedures for flight control malfunction. The aircraft was leveled at a safe ejection altitude of 10,000 feet by reducing power and an emergency was declared with Eglin Approach Control. Eliminating fault in all the hydraulic and stability systems, the aircrew began searching for possible foreign objects in the area inside the boot at the base of both sticks. Finding nothing and determining that the aircraft could not be landed without pitch control, Lt Thomas attempted to forcefully free the stick. After several attempts, the stick abruptly broke free and near normal pitch control was regained. The aircraft was headed toward Eglin and the inactive runway was opened to allow minimum maneuvering for a straight-in landing. The aircraft was configured before descent and a shallow controlled approach was made. The stick became jammed momentarily during the approach, but control was rapidly regained and an uneventful landing accomplished. Investigation revealed that a foreign object in the form of an AIM-7 umbilical connection disk had come loose and lodged in the pitch control bell crank cables jamming the stick.

The rapid appraisal and accurate handling of this potentially disastrous inflight emergency by Lt Thomas and Capt Edgerton prevented possible aircrew injury and loss of a valuable combat aircraft.

AIRCREW of DISTINCTION



Captain Frederick L. Ashler
355th TFW
Davis-Monthan AFB, AZ



On 26 October 1978, Captain Frederick L. Ashler was returning from PDM in an A-7D. Approximately eight miles from Davis-Monthan on TACAN final approach his aircraft suddenly lost thrust---over a densely populated area of Tucson, Arizona. He selected an alternate fuel control and moved the throttle to try and correct the engine stagnation with no results. Capt Ashler immediately raised the landing gear and selected an intermediate flap setting to extend his glide distance. By this time engine RPM had decreased below that necessary to maintain altitude and the engine temperature rose above 1000 degrees. He selected the emergency flight control system and while flying at minimum control airspeed realized he would be unable to clear the populated area of Tucson.

Disregarding his own personal safety, he remained with the airplane well below the recommended minimum ejection altitude to maneuver and prevent its impact in an area with great potential for high loss of life. Capt Ashler sighted an athletic field and aimed the aircraft to impact in that area. At approximately 200' AGL, with total loss of lateral control, Captain Ashler ejected, the aircraft landing in a street adjacent to the field.

Captain Ashler's disregard for his own personal safety while continuing to fly a crippled aircraft below safe ejection altitude prevented a greater tragedy and minimized loss of life, injury and property damage. His selfless performance and exemplary airmanship qualify his as the TAC Aircrew of Distinction.

WRITING FOR TAC ATTACK

By Capt Pete Abler
Editor



Well, I'm here to tell you that you've got a chance to prove it. TAC ATTACK relies mainly on you, the fliers, maintainers, and support personnel to produce much of each magazine.

After all, this is your magazine. Only you can tell the full story of how TAC's programs and

How many times have to yourself, "This turk

weapons systems are working -- the problems and the solutions. TAC ATTACK is an important communications medium in getting your ideas to others within the command and the tactical aviation community. Enough philosophy -- let's talk about writing an article for the magazine.

SUBJECTS

TAC ATTACK is the command safety magazine, and we definitely lean in that direction -- but not exclusively. Any article on how we can improve our operation is bound to have additional safety benefits, etc. Some potential subjects include:

Maintenance, operations, safety practices that save time, lives, money, and materiel.

Personal flight experiences with a lesson are a real favorite.

Research and development projects/results.

Recent activities -- successful deployments -- how you did it and how other units can do the same job -- or even better.

Humorous articles -- with a teaching point.

All mishaps have morals, or is it the other way around? At any rate, have a clear-cut "bottom line" for your article. If it's hidden deep amongst your similes, metaphors, etc., we might not find it. Better to tell the reader right off so he knows where you're coming from. Now, how about the writing side of the story?

First, state the purpose of "bottom line" for your article or story. Secondly, determine how you want to tell your story -- the steps you will take to develop your article. This will give you your major divisions. Next, outline each separate division within the article including the material you will use to support your ideas and voila -- your outline is finished. The real key to the outline is to keep your objective/subject in mind. If material doesn't support your subject -- throw it out. It will probably only detract from the article or confuse the reader. Once the outline is complete to your satisfaction (you'll probably revise it a few times), all that's left is to add the verbs, adjectives, and adverbs sprinkled with humor, etc., and you have an article to rival Hemingway's best -- even his worst wasn't too bad.

flares were stored in wooden crates weighing 1,500 pounds each and stacked two high in the munitions storage igloo. The forklift was too large to fit through the igloo door so a pallet jack was used to move the crates to the door. With the forklift outside the igloo and the double stack inside, the top crate was raised and the bottom crate was moved to the side. The middle runner of the lifted crate broke during lowering and the crate shifted forward. The handler in the igloo tried to stabilize the load but it fell and knocked him to the concrete floor, pinning his head and upper body. The crate on the forklift was not strapped. The load was not stable. The forklift did not have extenders. The forks reached only halfway under the load.

To say that we are extremely concerned with the safety of munitions personnel (all personnel, for that matter) would be an understatement. But, we can only make so many rules. The safety folks can only make so many rules. For us in the business of working with explosives ordnance, the "rules" seem to go on and on. The real idea behind "Safety Training" and "Accident Prevention Programs" is to make people aware of specific, known hazards and motivate people to use common-sense approaches to their work and play.

Want to make a lot of money? Come up with a way to motivate all personnel in such a way that they won't make mistakes. Invent a system that will prevent people from hurting themselves and destroying equipment, while still allowing us to perform our mission. Find a method for making people pay attention ... to what they're doing and what situations exist around them. Use an AF Form 1000. If you can stop accidents, we guarantee you'll make a lot of money. Thousands of people are trying to find the answer. They make up rules people won't follow ... They change equipment to make it harder for people to break ... They invent protective clothing/equipment that people won't use ... They give briefings people won't listen to ... They print posters people won't think about ... They write articles like this that supervisors won't talk about. They keep trying to do the impossible: Make people be careful. What are YOU doing?

TAC MUNITIONS INFORMATION LETTER, 15 SEP 78

SAFETY EQUIPMENT BOARDS

Many Air Force activities need to maintain emergency equipment or tools, first-aid kits,

etc., in a convenient, accessible place. Numerous methods are used to secure the equipment to large boards, but in some cases the methods used require excessive removal time in an emergency.

To provide for easy equipment storage and removal, Sgt Larry Jensen of the 67th AMS, Bergstrom AFB, TX, devised a method to use hook and pile (Velcro) tape. The advantage of using the Velcro tape is that it permits quick removal of the item in an emergency. The photograph shows the methods of attachment to the board. Anyone interested in using this quick removal process can obtain the tape under the following stock numbers:

Hook Tape NSN 8315-00-926-4931

Pile Tape NSN 8315-00-926-4930



The tape can be used for many objects as the photo shows. Simply attach a length of each type tape to the board with glue and nails and then secure the object. One caution, this tape will wear out with repeated use. Also, don't try to secure excessively heavy objects--the chances of them breaking loose outweigh (no pun intended) the advantages of quick access.

TAC TIPS

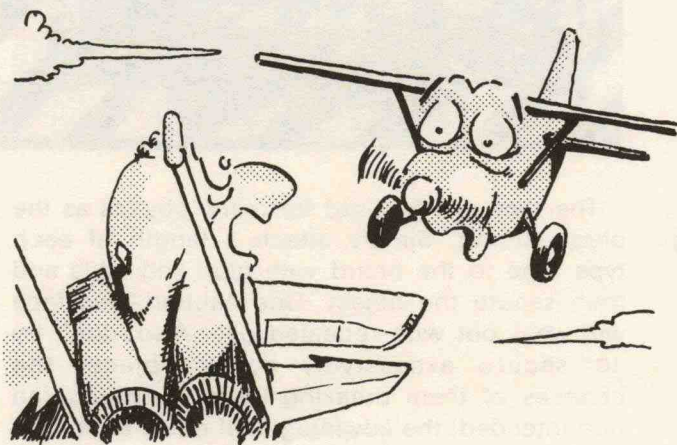
DISCONTENT IS THE FIRST STEP IN THE
PROGRESS OF A MAN OR A NATION.

WILDE

SEE AND AVOID

Not too long ago, 2 F-15s recovering at a strange field had a minor midair collision while maneuvering to avoid a light aircraft. Luckily the pilots saw the civilian plane in time to take evasive action or the incident could easily have been a major bash. The investigation turned up the fact that aircrews might not fully understand the responsibilities of air traffic control facilities.

In this case, a traffic advisory on the bug-smasher was issued by the controller as an additional service. The light aircraft was VFR, altitude unknown, and was not under the terminal facility's control. There is no requirement to further pursue the convergence of radar targets unless there is a known conflict. The controller was busy and did not give any more advisories, and the aircrew failed to ask for more information.



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

All aircrewmembers must recognize this situation and question ATC for information and/or vectors necessary to insure separation after a traffic advisory. Operating under the present ATC environment, this is the only practical method of preventing similar situations in the future.

When was the last time you ignored a traffic advisory assuming you were clear of the other aircraft 'cause the controller never mentioned it again?

CHANNELIZED ATTENTION

The F-5E pilot was flying a VFR overhead landing pattern with approximately 4-5000' spacing behind an F-4. The F-5 had 500 pounds of fuel on board---the pilot had previously declared minimum fuel. While in the flare, the F-5 encountered wake turbulence and the pilot was forced to add power to maintain control.

The aircraft ballooned slightly and the touchdown was firm, delaying getting the nose back up for aerobraking. The pilot decided not to aerobrake because if he had brought the nose back up he would have lost sight of the F-4 he was rapidly overtaking---but he also failed to deploy the drag chute.

As the F-5 closed within 1500' of the F-4, the Tiger pilot came down on the binders. Both wheels locked up--followed by both tires blowing. The aircraft came to a stop on the runway, the pilot shutdown the engines and egressed.

The concern caused by being minimum fuel may have caused the pilot to fly too short a pattern and end up too close to the F-4. A little more spacing, even though fuel was tight, would definitely have helped. Concern for one bad situation can push you into one which is worse.

NEAR MISS--THIS TIME

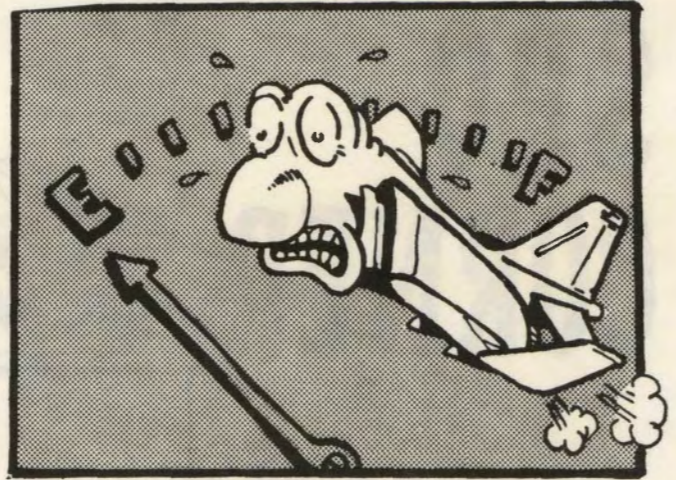
The F-4 pilot was on a TACAN approach to his home field. Shortly after breaking out of the clouds, the pilot sighted a Cessna in his one o'clock position---2-300' away on a collision course. The F-4 pushed over and missed the bugsmasher by 100'.

Investigation revealed several things. First, the F-4 altimeter system had a "massive" leak which could have placed the F-4 lower than the indicated altitude. Secondly, the Cessna was actually 200' above his traffic pattern altitude at a nearby civilian field. The most important thing which came about from this incident was the realization that there was still a potential conflict between military aircraft at the base and civil traffic at the local municipal airport. The air-space folks were under the impression that they had taken care of all potential conflicts.

Have you noticed any tight spots around your airdrome that you never bothered to mention? There's no time like the present to bring them up.

OH WHERE OH WHERE HAS MY JP-4 GONE ?

The RF-4 was on a low level pilot upgrade sortie. The mission went as briefed except the last target was aborted due to fuel considerations. There was sufficient fuel for RTB and the aircraft arrived on GCA final with 2500# of fuel. On short final, the aircraft entered a light rain shower and flew too low for a safe approach. The crew could not see the runway so they went missed approach---with 2000# of fuel remaining. The pilot declared "minimum fuel" and requested a minimum fuel pattern.



The sector controller as working 5 aircraft, one of which was an emergency--so guess who got the short end of the stick? (Remember minimum fuel implies that you can land in normal traffic sequence) The Photo Phantom received an unusually long pattern to get spacing behind the emergency aircraft. At 12NM of downwind, the pilot told RAPCON if they did not turn final they would be emergency fuel. The aircraft turned final with 1000# of fuel remaining. The rain removal was turned on and a normal PAR flown. Fuel on short final was 600# and touchdown was normal. After 6,000' of roll, both engines quit running---indicated fuel was 320#.

Now figure out how long it takes to roll 6,000' and you'll know how close we came to another smokin' hole. There's at least one more aircrew in the Air Force who realized that "minimum fuel" doesn't guarantee you a thing. If you want traffic priority and really need it, there's only one thing to do---declare an emergency. Don't try to be a nice guy and not rock the boat. If you have a problem---let someone know about it. The right people can't help if you don't let them.

Hey! pass it along... nine others are waiting.



SPO CORNER



DO YOU KNOW HOW YOUR EXCEEDANCE COUNTER COUNTS ?

**By Maj Skip Weyrauch
HQ TAC/SEF**

Comments from the flightline indicate some reluctance to trust the reliability of the F-15 exceedance counters. Jocks and wrench benders alike can benefit from the following information. For those who are in a hurry (or don't care), the bottom line is -- when you pull to 5 Gs, only the 4.5 G exceedance counter will advance one unit; the 3 G counter will remain unchanged.

For you whiz-bangs who care to look up the technical data, refer to T.O. 1F-15A-2-17, page 6-1. There you can learn about how your seismic masses flex their silicon beams which vary the piezoresistor signal through the wheatstone bridge and thereby activate the a-cromotor output to the quantizer circuit which advances the appropriate discrete counter (whew!).

About all the rest of us need to know is that behind door 6R of all F-15A/B aircraft, there is an exceedance counter with seven windows. The accelerometer measures the aircraft vertical-axis acceleration force and counts occasions when the force exceeds -2 G, -1 G, 0 G, +3 G, +4.5 G,

+ 6 G, or +7.5 G.

The exceedance counter set counts electronically and records only the highest reading. In other words, if you pull 6.5 Gs, only the 6 G counter will trip. The +3 G and +4.5 G counter will remain the same. Do not expect all counters to trip as you go up and down the "G" loads scale.

NOTE: Reading the exceedance counter will not tell you if the "G" excursion was symmetrical, unsymmetrical, or what the gross weight was during the excursion. These are very important factors in computing "over-G" and the aircraft damage index in the aircraft structural integrity program.

WRENCH WRENCHES A-10

**By Maj Gerry Felix
HQ TAC/SEF**

We recently had an A-10 flight control FOD incident that deserves attention. The pilot, jinking away after his first dry strafe pass, noted a restriction in aft-stick movement. During the subsequent controllability check, the stick froze in pitch control. Switching to manual reversion, the pilot could move the stick but pressures required were excessive. Reverting back to normal

yielded the same pressures. Prior to landing, the pilot braced his feet on the rudder pedals and gave a healthy pull. The stick broke free, and the landing was uneventful.

The investigation revealed a wrench in the gun bay. Scratches and gouges confirmed that the wrench was lodged in the pitch control bellcrank assembly. If a wrench can get hung up in this assembly, it's reasonable to assume that anything flopping around in that gun bay is a hazard.

We've had several previous gun jams in the A-10 resulting in FOD in the gun bay. Should this happen to you, think twice about how you are going to fly the aircraft until mission completion. Personally, I would keep that hummer at 1 G with gentle turns until I got it on the ground.

HOW'S YOUR SHIMMY ?

By Maj Skip Weyrauch
HQ TAC/SEF

This is not a reference to the fine art of belly dancing but a discussion of the F-15 phenomenon of nose wheel shimmy. Either you've experienced "the shimmy," or you're one of the lucky few who have that experience ahead of you -- in either case, read on because we have some information that may help you properly diagnose your "shimmy."

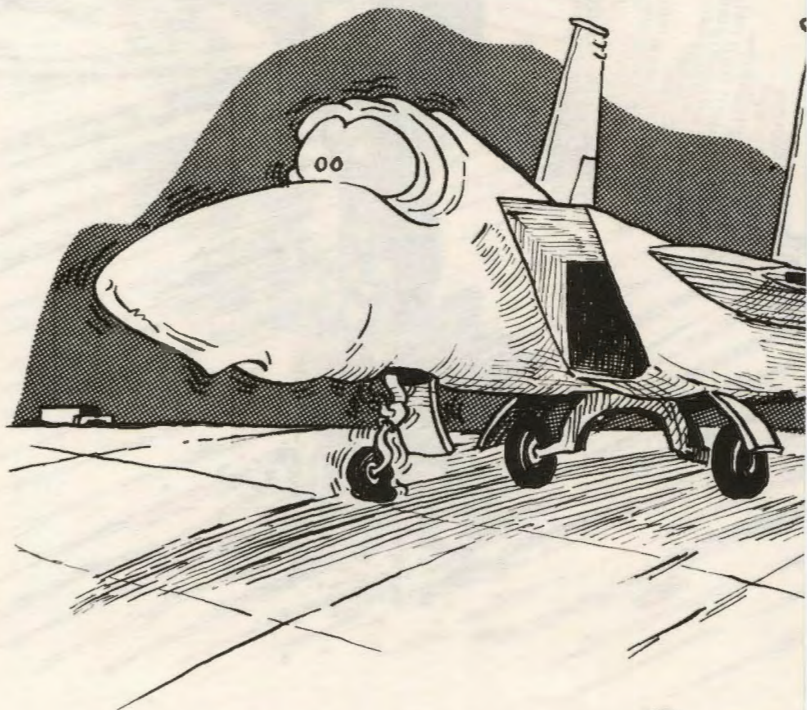
First of all, a little explanation of why nose gear shimmy exists in the first place. Inside the nose gear strut, there are four plates that support the inner rail so it can move up and down. These plates are appropriately called wear plates; and as the wear increases, the amount of nose gear shimmy also increases. The rate of wear depends upon the finish of the rail; the type of material in the wear plates (two versions are in the field); environmental conditions inside the strut; operating hours; and, of course, operator techniques. (Since MCAIR insists there is no need to baby the nose gear, it is not a question of right or wrong but just different operator techniques.)

Shimmy will first be noticed as the aircraft accelerates through the higher speeds just prior to nose wheel liftoff -- about 120 KIAS. Probably only the jocks with senses tuned for a shimmy will be able to identify it at these early "development stages." The shimmy will begin appearing at lower and lower speeds during subsequent flights; possibly starting as low as 60 KIAS, if

allowed to continue unchecked. A bad case of shimmy can cause severe vibration of the instrument panel and may cause pilots to abort at high speeds because they think their Eagle is giving a dying gasp!

Fortunately, even in its worse case, nose strut shimmy is not likely to progress into divergent vibrations; which means it won't drive you off the runway in an ever-increasing fishtail maneuver.

Hopefully, we can catch shimmy in its early stages and eliminate unnecessary high speed aborts which place a maximum amount of stress on the nose gear strut and tire. Differentiating between shimmy and other nose gear problems facilitates proper corrective action by maintenance. A shimmy will cease as soon as the nose gear liftoff is achieved. If your nose gear vibration sounds more like a rumble, and continues to wind down after liftoff, then the problem is a nosewheel--out of round, out of balance, or an inadequate nose gear axle preload. In either case, write it up thoroughly and get it fixed. Afterwards you can rendezvous at the local pub and watch the belly dancers do their own shimmy. (Note: A polishing rework of the finish on the struts is being accomplished by the contractor. Previous struts will be reworked on an attrition basis.)



AFTER THE FALL



By Major Ken Krause
HQ TAC/SEP

Few events in the aviation community spur as much interest and as many questions as an aircraft accident. And, because of the nature of the beast---unrecoverable or destroyed parts and often fatalities---answers seldom come easy. The emotions and concerns of all associated with the unit, crew, or weapons system come into sharper focus; and any probing into "the circumstances surrounding" meets with a strange mixture of the desire to know all about what happened, and the desire to forget the whole thing. As with most other situations which present extreme alternatives, the desirable and acceptable modus operandi lies somewhere in between. With the preceding in mind, I shall attempt to explain, and perhaps clarify, the purposes of, and relationships between a few of the actions taken following an accident.

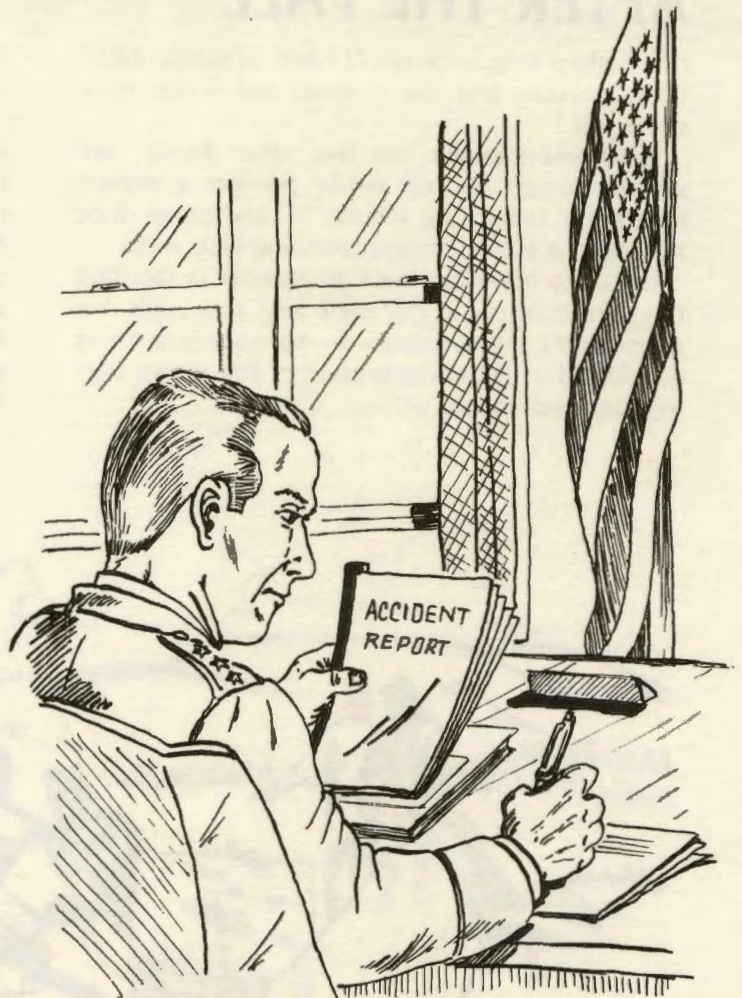
First comes the invariable definition of terms. I will be using mishap and accident (small "m" and "a") interchangeably and in this article will be talking about the biggies--DOD Class As. The investigation by the Safety Investigation Board (SIB) refers to the safety investigation directed by AFR 127-4. An Aircraft Accident Investigation (AAI) refers to the investigation directed by AFR 110-14---previously known as the "collateral." These are two of the actions I will be discussing. The third is the Commander's Accident Assessment Briefing provided for in TAC Supplement 1, AFR 127-4.

MISHAP INVESTIGATION

"Air Force mishaps are investigated to find their causes and take preventive actions." Seems pretty simple doesn't it? Well for those of you who have served on SIBs, you know how difficult and agonizing it can be. For those of you who haven't, but have a mind's eye picture of a bunch of guys sitting around trying to figure out how to hang it on the aircrew, let me reassure you. For every person who may try to criticize the aircrew actions, there are 50 guys like you and me in the reporting and reviewing process who will insist that every allegation is substantiated to the highest degree possible. Every criticism of maintenance is scrutinized similarly. I say "to the highest degree possible" because, again, it is the nature of the beast that conclusive proof---based on fact---is often impossible to come by. When all you have to go on is molten metal that has seeped between the rocks, who can say what all the switch positions were or what all the gauges read; let alone what the crew was doing or thinking in those last few minutes?

The investigators often have to put all their collective knowledge of, and experience with, airplanes, humans, psychology, regulations, and the mission to come up with their best shot. And there are several folks around who will question, probe, and press them to make sure it is the best shot. Let me name a few of these folks.

The first person in the chain who takes a hack at the SIB's effort is the Investigating Commander. For those mishaps occurring to units under a numbered air force, that person will be the numbered air force commander. For direct



reporting units, it will be either a center commander or COMTAC. The Investigating Commander is the convening authority for the board and is responsible for insuring all factors are thoroughly investigated and the report "meets the requirements of the Air Force mishap prevention program." By regulation, before the report is released, he must determine whether or not the SIB adequately investigated the mishap and the findings and recommendations were drawn according to specific criteria.

Each finding is a statement of an event or condition, based upon the weight of the evidence -- not conclusive proof -- which leads to the mishap. The first finding is the first event or condition in the accident sequence. Each subsequent finding is listed in chronological order and must be logically connected to the one preceding it. The findings are carried through until all damage or injury has occurred. The CAUSE tag on a finding implies that had the event not occurred or that condition not existed,

AFTER THE FALL

the mishap sequence could have, or would have, been broken, and the mishap would not have occurred.

Recommendations, on the other hand, "are actions which should either prevent a similar mishap or reduce its effects." Every cause does not require a recommendation and vice versa.

Once the Investigating Commander is satisfied the investigation is complete and thorough, his subsequent concurrence or nonconcurrence is addressed in his endorsement of the report during review process.

failure or tech order deficiency or AFCS for a communications problem.

The Investigating Major Commander has final responsibility for the adequacy of the investigation and for developing the command position on concurrence or nonconcurrence with the findings, causes, and recommendations. Let me assure you again that this process is taken seriously by everyone involved to find out what happened, or why, and what can be done to prevent recurrence or mitigate the effects of recurrence.



Before the final report is released, any voting member of the SIB may submit a minority report if that member disagrees with the board majority. Likewise, anyone who was identified by the board as causing the mishap is given a chance to submit a rebuttal which becomes an attachment to the formal report.

When the formal report is released, it then enters the chain of command for review. Everyone, from the squadron to the Air Force Inspection and Safety Center at Norton AFB, picks it apart and hacks on it. Also, the MAJCOMS hack on the portions of the report which have to do with them---AFLC, for instance, for materiel

Accident prevention (safety) is the sole purpose of the report, and privileged information contained in the SIB report may not be used as a basis for punitive actions (court-martial, Article 15, UCMJ) nor in adverse administrative proceedings (Flying Evaluation Boards, discharge actions, line of duty determinations, etc.). Let's face it, if we did use information in the report for punishment, the whole program would come to a screeching halt. Commanders know it, and the safety folks know it. Damage to the flight safety program would be significant. You don't want that and neither do I. Portions of the investigation report must be releasable to

the public under the Freedom of Information Act. These would include such things as aircrew records, aircraft records, unstaged photos (ones which could have been taken by anyone walking through the wreckage), voice transcriptions, etc. Not included are privileged documents such as testimony, witness statements, analyses done by private manufacturers, staged photographs, etc. That all clear? The matter now comes to:

AIRCRAFT ACCIDENT INVESTIGATIONS

Aircraft Accident Investigations under AFR 110-14 (formerly called "collaterals") are designed to preserve all available evidence for use in claims, litigation, disciplinary actions, administrative proceedings and may be used for all purposes except safety or accident prevention.

Aircraft Accident Investigations must be conducted whenever a fatal or permanently disabling injury occurs to any person (including military, civilians, and government civilian employees) as a result of an accident. If there is no death or permanently disabling injury, an investigation must also be conducted unless it can be reasonably determined that claims against the government will not exceed \$50,000 for private property damages and that litigation will not be instituted against the government or a government contractor (either present or former). Even when litigation or a claim is not considered likely, and investigation may nevertheless be directed by the appointing authority or higher headquarters.

Witnesses testify under oath before the Investigating Officer or Board, are not offered confidentiality, and may only refuse to testify (under Article 31, UCMJ or the 5th Amendment) if their testimony would tend to incriminate themselves. Witnesses do not testify before the AAI until they have completed their testimony before the SIB, and have been released.

After the Aircraft Accident Investigation is completed, the report is reviewed by all affected staff agencies, who provide the appointing authority with comments and recommendations regarding disciplinary actions or administrative actions. The Investigating Officer or Board is concerned only with factual matters and therefore does not state opinions nor draw conclusions. The comments and recommendations of other staff agencies do not become a part of the AAI report, and are not released even though the report itself is released in its entirety.

COMMANDER'S ASSESSMENT BRIEFING

This action is provided for in TAC Supplement to AFR 127-4. This briefing results from no formal investigation but is, as the name implies, the unit commander's personal assessment of the mishap -- what happened, why, and what the unit commander is doing to prevent recurrence. Since this briefing to the NAF and TAC commanders may be given days or weeks before either of the aforementioned investigations is completed, these questions often arise, "Why so soon? Why not wait until the investigations are completed and resist the temptation to jump to conclusions?"

The answers to these questions become fairly evident when the alternative is considered, and the implication of that alternative is pondered. The alternative would be to do nothing until the investigations are finished. The implication is that the unit commander wouldn't have a good idea about what happened; why, or what he should be doing about it. By briefing the commanders and staffs at NAF, TAC, and/or NGB, quite often problems areas and effective fixes are identified and formulated early. Whether or not the problems and fixes have anything to do with the final board determinations, we still make money preventing mishaps -- that's the name of the game.

RELATIONSHIPS

By now, the relationships of these three actions should be coming into focus. The Commander's Assessment Briefing is a "best guess" by the unit commander to get the NAF/TAC/ANG commanders and staffs in tune with the mishap and start the ball rolling on fixes to readily identifiable problem areas. The Mishap Investigation Report is a formalized, detailed, product which identifies, as well as possible, all causes of the mishap and assigns action on the recommendations to fix all identified problems -- all with an eye toward preventing recurrence or mitigating effects. The Aircraft Accident Investigation protects the government, crews, and supervisors in the event of litigation or claims against them by preserving evidence in a form which can be used for most any purpose.

If your steely eyes were not overgrossed 17 paragraphs ago, you should have a better understanding, in thumbnail, of the major actions taken in response to an aircraft accident; how they each serve a definite purpose, and what the relationship is between them. ➔

chock talk

...incidents and incidentals with a maintenance slant.

JUMPING THE CHOCKS

By Harold Poehlmann
Fairchild Republic Co

Recent mishaps involving aircraft "jumping the chocks" is evidence that we may not be utilizing the USAF #42D6594 standard wheel chocks properly. In fact, the correct procedures may not be widely known. If you believe the rope handles are primarily for convenience of pulling them free of the tire and dragging them around the ramp, I direct your attention to Figure 1. As you can see, when the chocks are positioned and in-

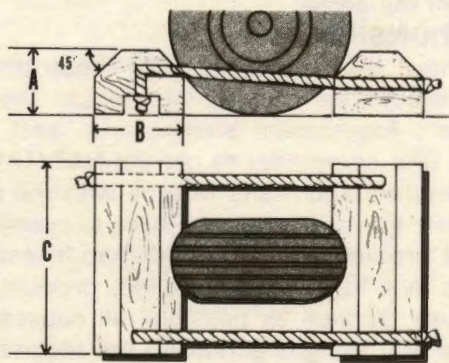


Figure 1

terconnected as shown, the main cause of "jumping the chocks" (the chocks not firmly seated under the wheels) can be avoided. "Jumping the chocks" is a misnomer. In most instances, the chock displaces sideways and kicks out of position, particularly when being used under conditions of running engines. It goes without saying that the Aircraft Maintenance Handbook restrictions on the maximum power allowed when restrained only by chocks must be followed closely.

This safe "RPM" limit has been established by testing and is only valid when the correct size (dash number) chock is used and positioned and interconnected as illustrated. Don't underestimate the chock security that is obtainable when the interconnecting system is used. Notice again in Figure 2 that there are six different size chocks listed ... consult the chart to be certain the chocks you are using agree with your aircraft's maintenance instructions. Do not substitute, especially for engine run purposes.

A good substitute for a medical coronary susceptibility test is to run up an aircraft while de-

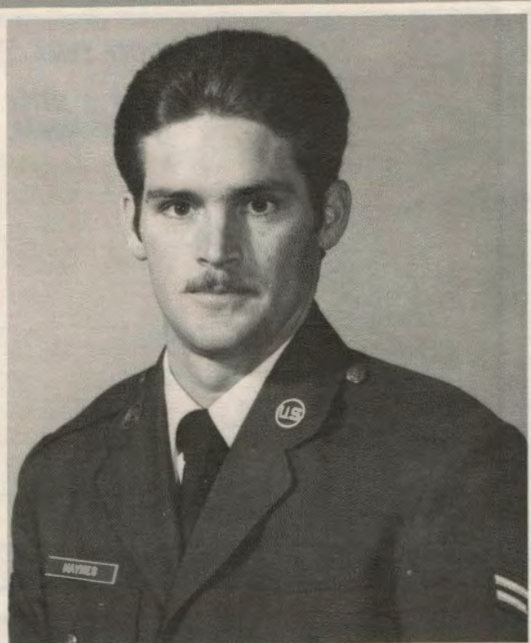
PART NO.	A HEIGHT	B WIDTH	C LENGTH	ROPE LENGTH
-1	6	8	20	92
-2	4	6	14	60
-3	6	8	56	44
-4	6	8	36	92
-8	2	4	16	60
-10	4	6	24	60

Figure 2

voting your attention to recording engine instruments, and suddenly you feel an odd vibration. Thinking it is your assistant banging on the fuselage to get your attention, you pay no attention until you realize the vibration is not your buddy but the aircraft "taxiing" across the ramp. My experience had a happy ending because luckily we towed the aircraft to an uninhabited ramp location before the engine run. Any mishap you may be unfortunate enough to have could be "unreportable" if you request that the aircraft be towed to the proper runup area. It is interesting to note that maintenance instructions usually neglect to mention that you "should" be holding the brakes when you are accomplishing all limited power engine runs The chocks are a secondary safety item. Remember, if parking brakes are installed and required to be set, they can have a habit of releasing when you least expect it. So don't trust them.

SAFETY AWARDS

individual safety award



**A1C John C. Haynes
834th EMS/1st SOW
Eglin AF Aux Fld #9, FL**

Airman First Class John C. Haynes, 834th Equipment Maintenance Squadron, Eglin AF Auxiliary Field #9, Florida is the winner of the Individual Safety Award for February 1979. Airman Haynes instituted several improvements in wash rack procedures at his unit. He suggested the use of creepers with spark resistant casters which increased productivity by 10% and reduced man-hours by 24 hours per month. He also recognized a gun blast residue problem and adopted cleaning procedures which alleviated this corrosion. His wash rack safety program has resulted in 729 days of accident-free operations.



**A1C Refugio Salas
9th AMU/49th TFW
Holloman AFB, NM**

crew chief safety award

Airman First Class Refugio Salas, 9th Aircraft Maintenance Unit, 49th Tactical Fighter Wing, Holloman Air Force Base, New Mexico, is the winner of the Crew Chief Safety Award for February 1979. Airman Salas was one of the first crew chiefs from the 9th AMU to participate in quick turn exercises. He was able to perform in any of the 3 crew chief positions based on observation only. His can-do attitude and personal pride have been an inspiration to his co-workers. Additionally, Airman Salas' displayed an exceptional level of safety consciousness.

FLEAGLE

