

Tac Attack

TAC ATTACK

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TAC

READINESS IS OUR PROFESSION



TACTICAL AIR COMMAND
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VICE COMMANDER

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Angle of Attack

THE BIG PICTURE

We know our jobs, the chain of command, and our mission. But we sometimes get sidetracked, and our priorities run amuck. Therefore, every once in a while it pays to pause and take a long hard look at where we're headed, especially in accident prevention. Our review should include communication, supervision, and directives.

Communication. No unit, large or small, can afford a communication breakdown. Failure to get the proper message to people accounts for a number of our problems in accident prevention—as well as other areas. No one can do their job well without knowing exactly what's required of them.

Supervision. The unit commander is still the number one safety officer, but all supervisors must be involved. The success of any operation depends on all supervisors insuring their people perform the mission safely and effectively. The

key is proper utilization of people and resources.

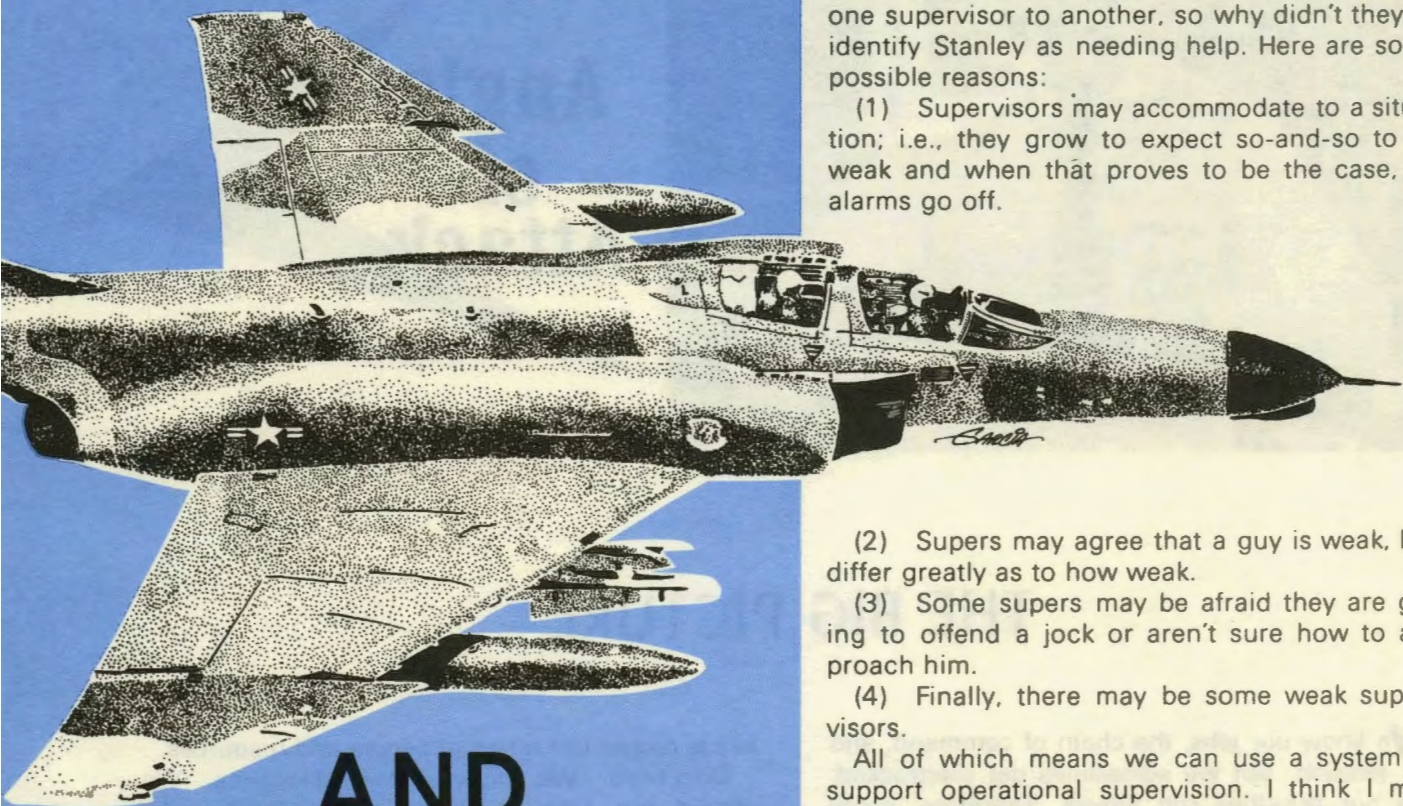
Directives. We must follow directives. We should not take shortcuts and rationalize by blaming a shortage of people, material, or time. Sometimes it takes just as long to bend or circumnavigate a regulation or tech order as it takes to do the job right. Of course, if the manuals and tech orders are outdated or wrong, we must initiate action to change them.

Efficient and effective use of all our available resources is mandatory. If a shortage does exist or workload exceeds capability, then we must establish priorities. Accident prevention is one of the building blocks for our program. ➤

Richard K. Ely

RICHARD K. ELY, Colonel, USAF
Chief of Safety

THE MISSION...



AND THE MAN

By Lt Col Jim Bustle
23 TFW/SE

He flew on the wing of an attached Old Head one day; and when they came down, Graybeard took him aside and said, "Son, you've gotta fly better than that to stay in TAC." A few weeks later, Stanley Stonehands was number two with Graybeard as number four in the same flight. After landing, they debriefed and Graybeard visited the ops officer where he asked, "Are you guys really watching Stanley?" He got some consoling words and backed off. After another flight with Stanley, Graybeard went to the squadron commander and bleated, "He's going to kill himself or somebody else if you don't do something."

Now, say you're the ops officer or squadron commander--what are you going to do? Oh, I know the squadron bosses can't go off the charts each time somebody says, "... gonna kill himself..." but judgements as to individual pilot qualifications shouldn't vary greatly from one supervisor to another, so why didn't they all identify Stanley as needing help. Here are some possible reasons:

(1) Supervisors may accommodate to a situation; i.e., they grow to expect so-and-so to be weak and when that proves to be the case, no alarms go off.

(2) Supers may agree that a guy is weak, but differ greatly as to how weak.

(3) Some supers may be afraid they are going to offend a jock or aren't sure how to approach him.

(4) Finally, there may be some weak supervisors.

All of which means we can use a system to support operational supervision. I think I may have found one.

Designing a different method was frustrating at first, because even good ops supervisors have forever been relying on intuition modified by experience and supported by more than a little luck. The trick was to bottle up that intuition (or judgement, or grasp, or whatever it should be called) and make it available to those who don't have it.

And you can't do that. Still, there had to be a way to arrive at those same or similar judgements without waiting for wrinkles and creating another monster. Obviously, risk appraisal had to be a part of it (compliments to Maj Reid, TAC ATTACK, Aug 79), but we really needed a more direct method to manage the risk (and I hope that distinction is not too subtle).

Now don't stop reading. I don't claim all of this is brand new. Most of the time, things purporting to be new and different in safety are not so, while the subject here is not new, I think the methodology is.

First, to define the problem, I started out looking for a way to eliminate all aircraft bashes. I only got a headache. Let's face it: You'll never do away with the freak accident, and it's hard to prevent the ones that evolve from willful violations. Further, materiel failure crashes are pretty much beyond us ops types, so my own focus slowly narrowed to the middle (perhaps 80%) of the command controlled (c/c) spectrum as the most fertile field for this endeavor.

With the task defined that way, suddenly things didn't look too tough. The Old Buzzard knows mission complexity is a killer, and the level of complexity is determined by events and conditions. He also knows the only thing which can mitigate mission complexity is pilot capability. So, if we're to do it safely, this equation has to prevail:

$$\text{Pilot Capability} \geq \text{Mission Demands}$$

We've always known that, but we haven't tried to quantify that equation in any mathematical sense. That's really all we're doing here; i.e., striking a balance between the load a pilot must carry and his own capability limits.

A matrix such as that in Figure 1 can give us half the equation. This chart, of course, is for

the A-7. The weights are arbitrary and will vary according to who is making it up. That's OK, as long as I use my chart while you use yours, etc. Remember, this is just a tool; if you're going to use it, shape it to fit your hand.

OK, with the various weights and ranges decided upon, we merely pick a given mission and run across the matrix, adding up the applicable figures (including the variable weights we assign on the spot), and we end up with a "complexity index." (Hang on! I'm getting there!)

On the A-7 matrix in Figure 1, the most complex and demanding mission we would reasonably schedule runs to, perhaps, 75. Even that one should not be insurmountable for the strong jock . . . and there, indeed, is the key: The pilot. How do we rate him? Try this logic:

- (1) Mission complexity is offset by pilot ability;
 - (2) The able and proficient pilot can handle anything reasonable;
 - (3) The most demanding mission shouldn't exceed about 75 (in the A-7 example here);
 - (4) Therefore, the strongest pilot index = 75.
- (What do you mean, "inductive reasoning," son?)

Having decided that, it's all downhill. We break it out by simply asking what factors (and their relative merits) are important in the pilot's

MISSION EVALUATION																								
Mission	EVENTS													CONDITIONS										
	T/O & Ldg	Air Refuel	Wpns Del	Pop-ups	Airborne Intercept	Low Level					with Heli (SAR)	With C&C Ship (SAR)	Threat Response (0-10)	Weather	Night	Multiple Act (0-10)	Strange Range	Multiple Passes	Terrain (0-10)	Uncontrolled Range	Plan Time (0-10)	Complexity (0-10)	Intangibles (0-10)	TOTAL
						> 300' AGL	100' AGL < 25NM	100' AGL 25-50NM	100' AGL > 50NM	Live Ordnance with FAC														
SAR	2	1	3	4	3	1	3	4	6	2	1	2	2	3	X	3	3	3						
SAT	2	1	3	4	2	1	3	4	6	2	1			3	3	3	3	3						
WD	2	1	3	4	2	1	3	4	6	2				3	3	2	2		X					
DACT	2	1	3	4	2	1	3	4	6					2	X		X	X						
ACM	2	1	2	3	2									2	X		X	X		X				
BFM	2	1	2	3										1	X		X	X		X				
INSTR	2	1												1	1		X	X		X				
TRANS	3													X	1		X	X		X				

Figure 1

THE MISSION...AND THE MAN

makeup. Again, dealer's choice, but here are mine (see Figure 2):

Ability = 20 points (average = 10)

Experience = 20 Points (15 for ftr time, 5 for UE)

Proficiency = 20 points (av = 10)

Discipline = 15 points (av = 10)

Fatigue = -10 to zero

Yes, the weights are arbitrary. If you make up your own mission matrix weights, make up your own pilot eval weights, too, but base it on one central precept: The strongest pilot can handle about anything you can reasonably throw at him. There are a couple of other "must do's"--

(1) Assign the ability value without regard for rank or experience. The strongest pilot may be the 4,000-hour 1st colonel with a 13, or he may be the 1300-hour captain with a 15, followed by a 2500-hour major with a 12, followed by a 1st with a 9. So be it. Use your best estimate unhampered by a pre-existent image of what things should be like.

(2) "Discipline" is used in its very inclusive definition. It is discipline, judgement, restraint, forbearance, and behavior and on-duty and off-duty and . . . how does the guy think? Our average pilot is very disciplined; i.e., a 10. Some are true by-the-book taskmasters, on and off duty, for themselves as well as others; make them a 15. Some are great guys with good hands . . . and a cavalier disregard for restrictions; maybe they get an 8. Then the guy with lots of deep, personal problems: These distractive influences may make him a 5. The flake is a zero. The question mark is likewise a zero.

(3) Experience is simple: 1 point per hundred hours of fighter time up to a max of 15. Same for UE time but only to a max of 5 points. (Yep, my thing here is for fighters.)

(4) Proficiency means across-the-board. Is he proficient in every event he's going to attempt on a given flight? And don't satisfy yourself with merely how often he has flown in the past month. The question was and is, "How proficient is he?" Not, "How proficient should he be?" And, oh yes, -You can run out everything else in advance, but proficiency and fatigue are real-time assessments.

(5) Fatigue is a minus value. Fully rested, he's a zero. If he triple-bangs, don't kid yourself that he's as sharp on the third go. And don't retreat into the convenient refuge of "I scheduled him for 12 hours of crew rest." If you don't know, OK, but if you're sure he was

AIRCREW EVALUATION							
PILOT	(20) Ability	(15) Discipline	Exper		(20) Prof	(-10 to 0) Fatigue	Total
			FTR (15)	UE (5)			
Able	6	5	3	3			16
Baker	14	15	7	3			39
Charlie	12	10	3	2			27
Dan	13	10	3	3			29
Edsel	10	10	10	3			33
Flint	12	10	4	4			30
George	7	5	2	2			18

Figure 2

swingin' until o'dark-thirty, a minus 8 may be in order.

Now by simple addition, you have the other half of the equation and can eliminate command control accidents, right? Hardly. But when you compare the mission index with the pilot index, you'll feel a lot better if the latter is higher. And, in the long run, we will save an air 'chine or three.

No, it's not a big chore at all, Mr Commander/Ops Officer. In fact, I think you'll be surprised at how simple it really is. It will take some thought to make an inclusive mission matrix for your weapons system, but you owe it to yourself anyway. You'll quickly see which of your profiles are straight vanilla and which ones are more sporty, but you may be intrigued at how great a difference there is.

As to pilots, the evals are similarly easy, and whether he uses this system or some other one, the ops officer has to make these judgements if he's to earn his pay.

The big question: Does this change the human pilot into a nonhuman number? No way. It makes things even more human, because the pilot index must be reviewed for changes every so often. Each time you pick up another hundred hours, demonstrate good judgement, or show soft hands, your stock goes up. That ain't no bad deal. The completed pilot evaluation sheets should not be shown around, of course, but the blank forms certainly may be. Nothing wrong with letting people know which areas are considered important. And let's be honest: We pretty well know where we stand in comparison to other pilots anyway. It may not be where we'd like, and we may tell our wives something else, but if you look around and have to say to yourself, "There are six jocks in this outfit that are better than me," you're probably right.

MISSION INDEXES			
MISSION	LOW	AVERAGE	HIGH
SAR	7	42	88
SAT	11	25	85
WD	7	17	56
DACT	10	16	54
ACM	8	16	37
BFM	4	4	24
INSTR	4	5	22
TRANS	3	3	18
PILOT INDEXES			
LOW	AVERAGE		HIGH
14	30		45
(PROFICIENCY NOT INCLUDED)			

Figure 3

The supervisor's worries, of course, are going to be with sticky missions and the less-able pilots. Such has it ever been, and we've always tried to judge these things, but more with a WAG than a system. When you make your pilot evaluations, you'll probably have only a few that fall out as worries; the rest will be up toward average or above. Fine! Also, not many of your missions are going to have complexity indexes toward maximum. Again, fine! It means you can put your supervisory talent where it's most needed. Figure 3 indicates that the "average" pilot (basic index of 30 which increases with a proficiency factor added) should be equal to all but a few of the more complex missions (shaded areas). Even a "20" with average proficiency can handle most of them.

So you do the mission evaluation and pilot evaluation tricks and find you can't always assure that pilot indexes are higher than mission indexes; what now? I'll opt for some careful averaging. If the mission index is 40 and one or more of the pilot indexes is/are 20 or thereabouts, I want a "50" as Flight Lead and maybe a "45" backing him up. I am absolutely persuaded that you have to honor the averages in the long run or lose some aircraft.

You might also get turned off if you do all the above and still lose an aircraft flown by an experienced and proficient IP. Don't. This process won't prevent every accident, remember? It won't cause one either, so you're not going to lose a penny by trying it.

Now, does the super ops officer or commander need this system? Probably not, if (1) he's been in the saddle long enough to know all his people, (2) he has the needed experience and judgement, and (3) he knows when to call a

spade a flippin' shovel. The really super ops type already has his own system to do just what we're talking about here; i.e., matching man and mission.

If you're still with me, here's the big finish. After sketching out the above system, I ran in some real-life mishaps and found the expected:

(1) The complexity of the missions on which TAC has had c/c accidents has continually increased over the last seven years.

(2) Missions flown while deployed almost invariably total up to a higher complexity index than is the case on local sorties.

(3) The average pilot index was 30 (40 with average proficiency allowed) but the mission complexity index is above that in five cases (see shaded area of figure 3).

It boils down to this: Fighter airplanes are inanimate aluminum contraptions that can be spit out at 30-40 a month, once the line gets rolling, but they cost megabucks. Pilots, on the other hand, are 175-pound servolinear mechanisms cheaply produced by completely unskilled labor, but the process takes 24 years! We need both, so we've got to find a way--a better way--of preserving what we have. This could be a start. It won't be the whole curative, of course. If we really want to get hot on saving aircraft, I think there are three other essential steps:

First, we have to continue to push for top quality inputs to our fighters. Secondly, we train the fighter crews. We must do the best possible job at the training units if we want to have good operational units. Lastly, we have to pick commanders that love their guys enough to bust 'em out of fighters if they don't have the hands for it. It's tough, but not as heart-wrenching as memorial services.

I hope you'll try Step 1 (making up your own mission evaluation material) because then you'll go on to Step 2 (pilot evaluations). After that, Mr Commander/Ops Officer/other supervisor, the obvious: Check pilots against daily missions (use spot-check or weak-link practices if you wish) and make sure you're comfortable with the match-ups. If not, lighten the load or send a stronger horse.

None of this should be startling to the thinking supervisors out there. To those who might take their jobs a bit too lightly--remember the responsibilities you have and the tragedy which can result from sending the wrong man on a tough mission.

chock talk

Chock Talk

*...incidents and incidentals
with a maintenance slant.*

...incidents and incidentals with a maintenance slant.

FOD GATE

In this incident, an aircraft was at a deployed location and during the second flight of the day experienced a compressor stall. The aircraft recovered uneventfully, and the left engine was

inspected. A small crack on the first stage IGV was found and suspected FOD was also reported. The engine was removed and shipped to home station.

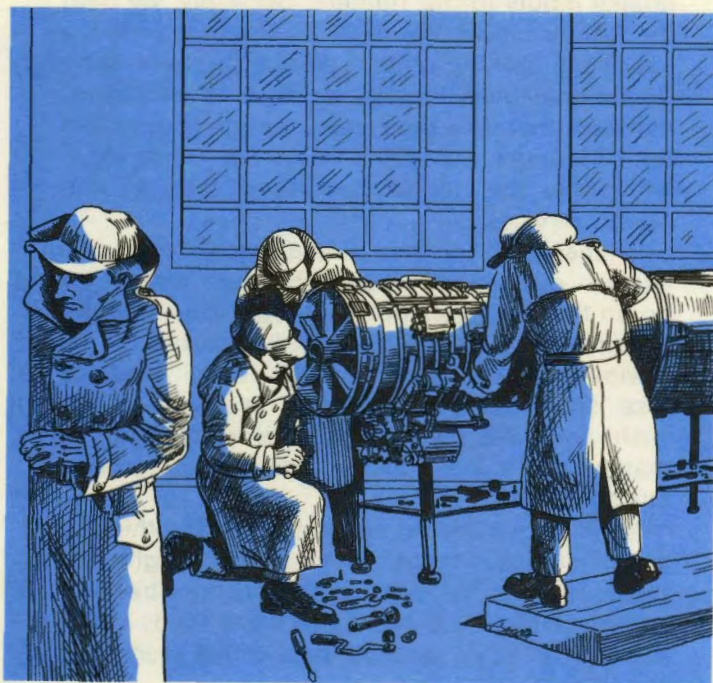
On return to home station the engine case was opened. It turned out that there wasn't a crack on the IGV first stage, but FOD was noted on 50 stators and 35 compressor blades. Of even greater interest was the discovery of blending on the first and second stage compressor blades. The quality of the blending was poor and did not meet T.O. specifications. Blue dye had been applied to the outer face of the blended blades and an unsuccessful attempt had been made to reach and dye the top of a sixth stage blade—this blade had not been blended and was well beyond T.O. damage limits.

The initial FOD was discovered—but never reported. An initial attempt was made to repair the damage—a poor attempt. Then for an unknown reason the repairs were stopped. The engine had a new compressor section when it was last installed in the aircraft and had not been removed since (according to the records). The aircraft flew one sortie at the deployed location when a missing rivet was discovered. The IGVs were opened and the blue dyed blades were observed indicating the FOD had been discovered and probably worked at home station. No other FOD was noted, but after 7.2 additional hours, the engine compressor stalled. The increased damage was found after the compressor stall.

Upon the aircraft's return to home station a further investigation was conducted. The FOD impressions indicated the foreign object was a rivet. An intake inspection confirmed the missing rivet was a BT-100. Three other loose rivets were also found. The loose rivets, and the missing rivet, had been circled in red, indicating someone had identified them as loose.

No 781 entry was ever made about the loose rivets. The sheet metal shop didn't have any record of their personnel inspecting the rivets in this aircraft. Nor could the folks be found who first found the FOD or those who did the unauthorized blending.

We really can't afford to operate this way. We need to know when something's wrong with an aircraft, and we need to fix it the right way—all the time. The next time you're tempted to let something slide—don't. It's just not worth it.



T.O. BLUES

By Maj Gary Porter
HQ TAC/SEF

Two egress specialists in another command were removing the ejection seat from an F-15. The T.O. called for raising the seat to the full up position, which they did. When attempting to remove the MK-86 firing pin assembly, they found that it came in contact with a zero delay bracket. Excessive force was required to remove the assembly from the seat and a pip pin became separated from the rear safety lock. The end result was inadvertent firing of the MK-86 initiator.

The T.O. was the major culprit. But how long had it been that way? Surely someone had noticed before that with the seat full up, the firing pin assembly did not align with a cut-out designed for its removal. Yet no AFTO 22 had been submitted to change the wording or procedure. Are there any other T.O. procedures that don't quite reflect reality? Do you have to slightly "modify" any procedures to make them work? T.O.'s in the final analysis are only as accurate as we, the users, make them. Discrepancies should be promptly reported by AFTO 22 so changes can be made.

JAMMED THROTTLES

Contrary to popular belief, the F-4 starter breech cap is not designed to jam the throttles. But it will jam'em anyway if it starts floating around the engine bay.

The mission in the Phantom was going fine until the takeoff leg. When the pilot tried to retard the throttles out of afterburner, the right throttle stayed in full afterburner. The climbout was continued, and the engine was eventually shut down with the engine master switch. Aircraft gross weight was reduced, and the pilot accomplished a single engine landing. About 6,000 ft after touchdown, the right engine cartridge breech cap was observed to fall out of the aux air door.

The crew chief admitted he had not physically checked the breech cap prior to launch. He had been an F-4 crew chief for one and a half years but was not aware that prior to each launch the starter cap should be physically checked to ensure that no start cartridge is installed and the

cap is locked. The aircrew also neglected to physically check the security of the cap.

As many times as the breech cap has caused us problems, we should have caught on by now that we need to check and recheck the caps before somebody's throttles get jammed to the point that the airplane can't be recovered . . .

NO TRIM

The O-2 departed on an instrument training mission. At level-off the pilot noted excessive forward pressure was required to maintain level flight. The normal trim system wouldn't relieve the pressure and neither would the alternate system. The pilot performed a controllability check and landed the aircraft.



Maintenance inspection found the elevator trim drive link arm disconnected. Maintenance records showed TCTO IL-10A-690 for installation of an Emergency Locator Transmitter had been performed a few days previously, and the aircraft had not flown since. There weren't any 781 entries indicating the drive link had been disconnected, but it must have been done during the TCTO installation.

If ya' take it apart, you ought to remember to put it back together.

COMMON SENSE..

basic to flying

Common sense.. basic to flying

By Lt Col Paul Kimminau
355 TTW/DOV

A discussion with the guys that work in this office caused me to write this article. The discussion started when I returned from a meeting with the DO in which I received direction to write a letter/FCIF which directed the pilots to remove/replace the ejection seat and canopy jettison safety pins before/after they fly. When I assigned the job of writing it to a SEFE in the office, he responded with a question. "Boss, why are we writing a letter telling the pilots something they should already know. It's common sense that the pilot should take those pins out and put them back! Do we have to write everything down for the pilots? Are today's pilots unable to think for themselves?"

Well, that last comment "Are today's pilots unable to think for themselves?" really hit home and IS the reason for this article.

Let me set a scenario for you. A flight of four air-to-air folks has been out on a training mission. It has not gone well and the flight lead is a bit unhappy. During debriefing the matter of a "Knock-it-off" call by #2 comes up. Flight Lead: "Hey, Bill. Why that knock-it-off during that second engagement?" Bill (#2): "Well, sir, #3 had called he was engaged. I had last seen him over at left 9 o'clock so with his call I looked back over there and saw two aircraft. I tried to pick you up and found out I had lost sight of you. Sir, I just felt it best to get it straightened out." Lead: "Doggone it, Bill, that's

weak. Here you are flying fighters and still losing sight of your leader. Let's have no more of that . . ."

The debriefing goes on, but what has just occurred is extremely important. Did the flight lead think about what he just did? He made #2 feel that he had made a "bad" knock-it-off call. Question: How many "bad" knock-it-off calls have ever been made? Answer: NONE!! That's right--NONE, because if anyone--repeat--anyone ever feels it necessary to use that call, some confusion EXISTS; and it is correct to stop at that point and get it squared away. An experienced wingman would probably let this flight lead's remarks roll off his back, but the new troop might just take him too seriously and hesitate to make a radio call the next time one is needed.

Remarks such as the one made by our fictitious flight leader can cause our folks to stop thinking for themselves--and that's just the opposite of what we really need. It is my contention that flying safely is a state of mind. We always need concern for readiness, PFT production to replace pilot losses, maintenance capability versus requirements, and a myriad of other items. We can integrate all these concerns with a safe approach to flying as long as we don't turn off our thinking processes.

In the past few years, TAC has experienced a number of similar accidents. The units and the



type aircraft aren't really important--what is important are the similar errors or mistakes made by the supervisors and aircrews--mistakes and errors we didn't correct the first time around. When we lose an aircraft in a new or different situation, it means our initial prevention efforts didn't work. When we lose a second aircraft because of the same mistakes, it's a disgrace. We aren't thinking of how to prevent similar mishaps and applying the conclusions to our flying operations.

All too often we trap ourselves in the "all pilots have been briefed" syndrome. Do the safety officers and supervisors really examine the mishap reports and relate the causes and findings to their own operations? If they do, they fall in the thinking category. If you glance over other units' mishaps and go back to a "business as usual" mode, you really haven't learned anything. You're setting yourself and your crews up to make the same mistake. Give your troops the facts about our aircraft bashes, find out what they think--what they would/could have done differently. In the final analysis, the folks with their hands on the controls have the last word.

Another area where we may be guilty of not putting our priorities in order is in the rules. The very complexity of our operations demands a

certain level of rules, regulations, and procedures to assist aircrews in operating safely. When we go beyond that level we are encouraging the aircrews to relax their thinking. We can't restrict judgement to the point aircrews feel their decisions have already been made for them. Our very attempts to increase the level of safety may actually result in a decrease if we lull a crewmember into feeling he doesn't have to think.

Now to take the line jock to task. You too must realize flying safety is a state of mind, and you must continually think about that. You can accomplish so much realistic training and fly safe it boggles the mind. Low level at 100' AGL, multibogie engagements, DACT, etc, can all be accomplished safely. NONE can be accomplished safely (or otherwise) if you for one minute believe the rules and regulations make it safe. It is YOU who gets it done safely--you thinking about what you are doing. You should never consider the PFT line, UTE rate, or statistics of any kind when you're flying, you must only consider getting the mission accomplished properly and safely. When you weigh the alternative (generally a smoking hole) to RTB, there is really no alternative. Let's all start thinking.

TIPS

Tac tips

The less men think, the more they talk.

MONTESQIEU

PREVENTION VS REACTION

The real key to an effective safety program is mishap prevention. The emphasis is on that key word—prevention. All the things we do after a mishap are reactions. If we spent a bit more time in prevention, we could probably cut the time spent in reacting by a bunch.

Not too long ago at an Air Force base, the pilot assigned RSU duty loaded the AN-M8 Flare Pistol and placed it in its mount. As the day progressed, a local exercise began which required the tower controllers to use the RSU as an alternate control facility. The pilot remained adjacent to the RSU to continue his duties.

Since the RSU was originally designed for one individual, the two folks inside were a tad cramped. Also, the wall-mounted telephone had a clearance of approximately one inch between its receiver and the butt of the pistol. One of the controllers handled the radio while the other troop did the phone coordination.



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

About 35 minutes into their tour in the greenhouse, an explosion was heard, and the RSU filled with smoke. The tower guys immediately abandoned the unit. The RSU officer grabbed the fire extinguisher and used it to extinguish the burning flare. After the fire was out, the pistol was found on the floor of the RSU.

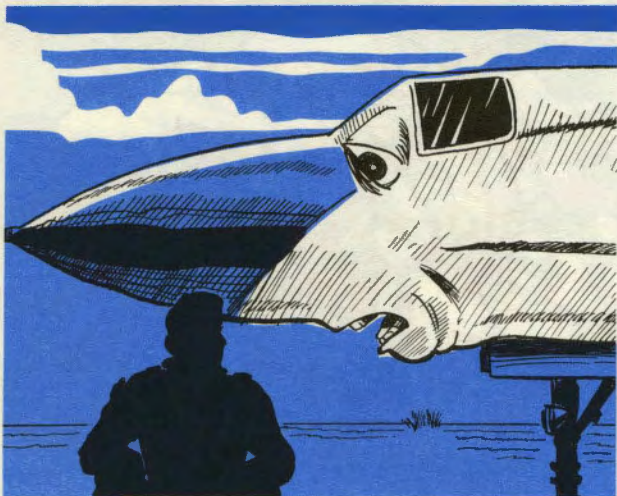
The M1 Pistol Mount was worn to such a degree that the mount latch on the pistol barrel would not snap into the slot of the mount. Thus the pistol could not be locked into place. The mount had been worn for a long time—all the RSU controllers knew it was worn—no one bothered to do anything about it.

Reaction to this incident included replacement of all defective pistol mounts, a new step to the RSU and safety checklists, and another "all pilots have been briefed." Wouldn't prevention have been easier?

WHEN YOUR AIRPLANE TALKS—LISTEN !

The Dart pilot was returning from a weekend cross country. The destination weather included an 8,000 ft ceiling and a wet runway from recent rainshowers. Final approach airspeed was computed to be 184 knots with 6,800 pounds fuel remaining. Touchdown was made 800 feet down the runway and the chute was deployed. At this point, the left main tire failed, slowly pulling the aircraft to the left. Eventually the aircraft ended up off the runway.

Investigation revealed a partially damaged master cylinder. TDR found the tube portion of the cap assembly which protects the spring cartridge and rod assembly was badly bent. This resulted in binding of the spring cartridge and rod in a partially actuated position. This could have caused pressure to reach the brakes—add a wet runway, a skid, and a bit of hydroplaning, and you have a blown tire.



Now for the kicker . . . The pilot noticed the aircraft pulling slightly left on the three previous landings. Before taking off on the last sortie, he had even discussed the abnormal tire wear patterns with transient alert! When you fly airplanes, you ought to at least listen when they try and tell you something's wrong.

THE EXTRA EDGE

By Capt Kenneth L. Hawkins
HQ TAC/DOXBL

During the last few years, fighter aircraft have become more maneuverable and fighter tactics have undergone significant changes. There has also been a considerable amount of discussion regarding the practicality of using helmet visors. Those of us in the life support community are concerned with providing you with the best protective equipment available, along with the ungarbled word about its use. Therefore, the purpose of this article is not to point fingers or cast stones, but rather provide you with accurate data by which to make an objective decision.

Many "zipper-suited sun gods" who fly our air-superiority fighters believe that visors restrict their vision by absorbing the light between their eye and the bandit, dilating their pupils, and decreasing depth of field. I intend to provide sufficient data to disprove this belief.

First, let's consider the optical quality of polycarbonate visors and pupil response. In the "fresh" or new state, they have good optical quality. In fact, unless you need prescription glasses, there is no measurable difference between the tinted visor and aircrew sunglasses.

Small surface scratches can, however, degrade the optical quality rapidly, primarily by increasing the amount of haze within the material. Increased haze causes a reduction in contrast, with a consequent reduction in visual acuity, evolving the "no tally, no clue" syndrome. It is the aircrew member's responsibility to properly care for his equipment and make a subjective decision as to when a new visor is required and inform life support personnel, so they can replace it. This is as important to flying as pre-flighting your aircraft.

The visor optical characteristic most responsible for pupil response is luminous transmittance—the amount of light that is able to pass through the visor. When the clear visor is in the down position, approximately 10% less light (15% less light for dark visors and sunglasses) is reaching the eye. Less light should result in an increase in pupil size. However, at light levels encountered during daylight flying (100 ft lamberts on an overcast day; 1,000 ft lamberts on a clear day) the pupils stabilize at the same size or diameter as they would without the visor. Consequently, there is no change in depth of field.

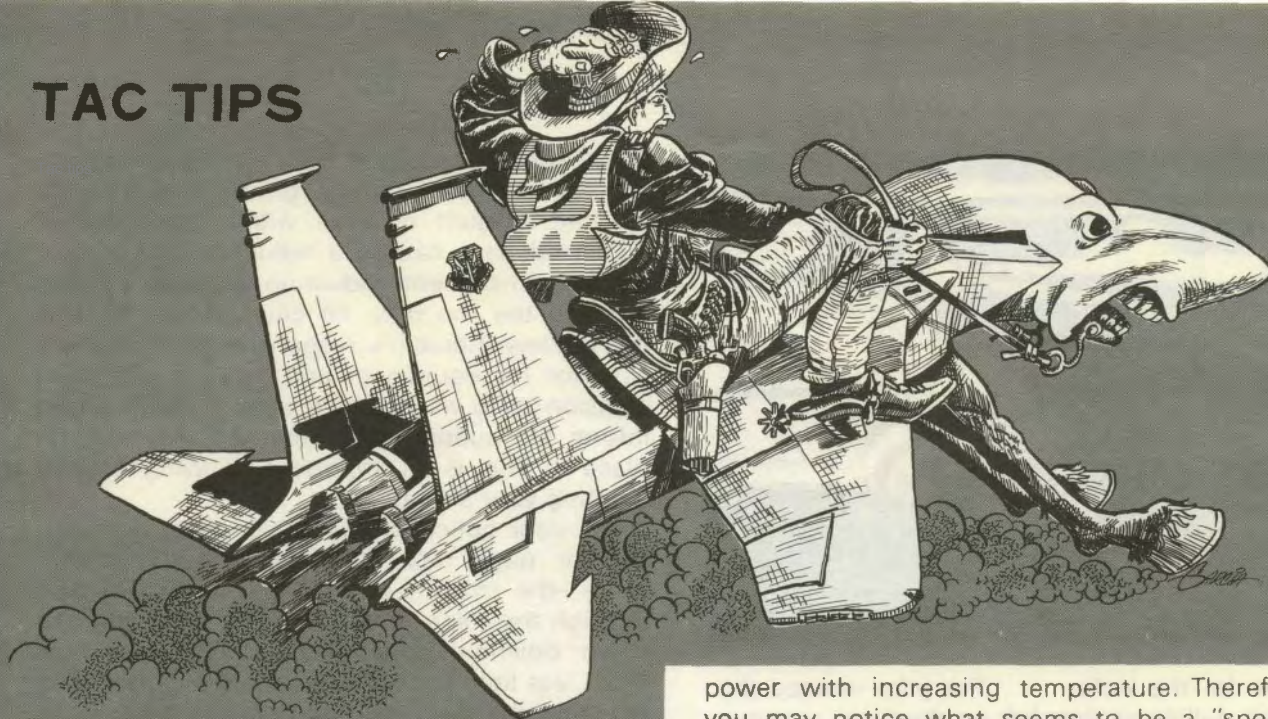
Eye fatigue is directly attributable to visor nonusage. Dark visors should always be worn as they enhance your vision while looking in the direction of the sun. Fatigue is a much greater cause of degraded vision than the reduced light transmitted through the visors.

Next, let's consider injury potential. In just the past six months, two accidents occurred where injury or aircraft damage probably could have been prevented had the aircrews used their visors. In one of the accidents, a two-place aircraft caught fire on the ground. Both crew members performed emergency ground egress. The front seater (visor up) sustained facial burns. The backseater (visor down) did not. In another accident, a midair, the pilot (with visor up) was blinded by the windblast and was unable to determine the damage to his aircraft or its attitude. He ejected.

It's as important to know and understand the capabilities and limitations of your personal equipment as it is to know those of your aircraft. Likewise, you must use them to your advantage through maximum performance. It can give you THE EXTRA EDGE.

Ophthalmological information provided by Majors Woessner and Goodson, USAF School of Aerospace Medicine, Brooks AFB, TX.

TAC TIPS



STOPPING THE F-15C/D WILD PONY

By Maj Gary Porter
HQ TAC/SEF

You cowboys (fighter pilots) lucky enough to have ridden the new F-15C/D Range Pony (for awhile at least this will only be riders from the EG and Double Z ranches) may have noticed a different "feel" while trying to stop your trusty steed. Don't be alarmed, it's not just you. There is a difference—and an explanation.

First, your F-15C/D is heavier. Besides carrying 2,000 lbs more oats internally you can strap sacks of oats underneath and along the sides and increase its gross weight to 63,000 lbs plus. The blacksmiths saw that it would take bigger and stronger horseshoes to stop an animal this heavy. Bendix, who makes the horseshoes, used a different forge technique to bond the shoe, producing a shoe which gives smoother, more consistent dynamic braking action (Whoa Boy!). You may find, however, that static hold capability (Easy There Boy!) varies somewhat from horse to horse and even from day to day on the same horse. Two other design changes include a change in stirrup geometry which produces a greater whoa with lighter stirrup pressure and torque limiting to prevent overstressing the legs on a RTO (Rejected Trot-Off).

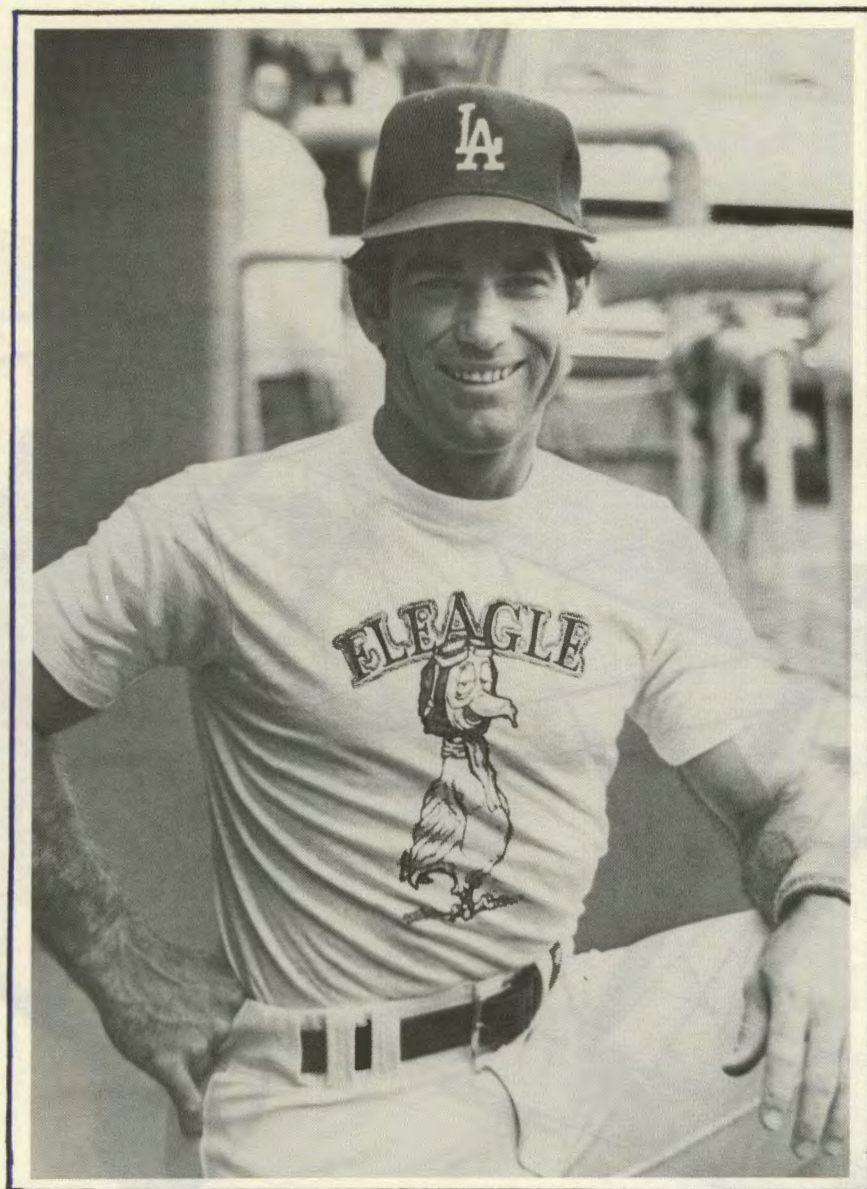
Carbon composite shoes (not an easy trick for your average blacksmith) gives greater whoa

power with increasing temperature. Therefore, you may notice what seems to be a "sponginess" in the stirrups or a reduction in whoa when first starting out on the trail. (Obvious sponginess is probably air in the system—the product of the wrong kind of oats—and a cause for return to the ranch.) After the ride, expect whoa action to be smooth and more effective as the shoes heat up. This smoothness may confuse your old "sense" of whoa response and prompt a tendency to increase your stirrup pressure. Don't do it. If the antiskid system is not working properly, you can still blow a hoof and end up in the tumbleweeds, despite torque limiting. An aside for you FCF cowboys: expect it to take more stirrup pressure to get the antiskid to cycle. All considered, the whoa system on the F-15C/D Range Superiority Pony should prove to be very reliable and effective. With proper care and feeding, and gentle but firm stirrup pressure, the Wild F-15C/D should remain the cowboy's dream, a trustworthy steed with which to ride the range.

A BIRD IN THE HAND...

May be worth two in the bush, but aren't worth much if they get inside your aircraft. Birds have been known to build nests in aircraft intakes and other areas offering shelter. The latest place they've found is inside the wings of an A-10, near the aileron cables. Supposedly, the birds can get in there through openings in the armament pylons. However they get in will be identified and fixed. In the meantime, best make sure you check your wings for chirping when you preflight.

ARE YOU GOING TO MAKE THE TEAM ?



**My friends at TAC ATTACK
are waiting to hear from you.**

Mr Garvey's appearance in TAC ATTACK is courtesy of
Steve Garvey and the Los Angeles Dodgers.

You'll never make it if you don't even show up for the tryouts. Most folks will never have an article printed in the world's finest safety publication—TAC ATTACK. Why? Because they won't even submit one. TAC ATTACK prints over 80% of the articles they receive. Not only that, if your article is the best one printed that month, you'll receive the highly-coveted Fleagle T-shirt. Now that's like being selected as the league MVP!

Why not try your hand at writing a story, fictional or true, or even a poem? Don't think a few paragraphs are enough though. TAC ATTACK is in the big leagues. You wouldn't go to bat in the All Star Game with a toothpick, so give your writing your best effort. As long as your story is related to safety, either in the air or on the ground, you've got a good chance of being in the lineup.

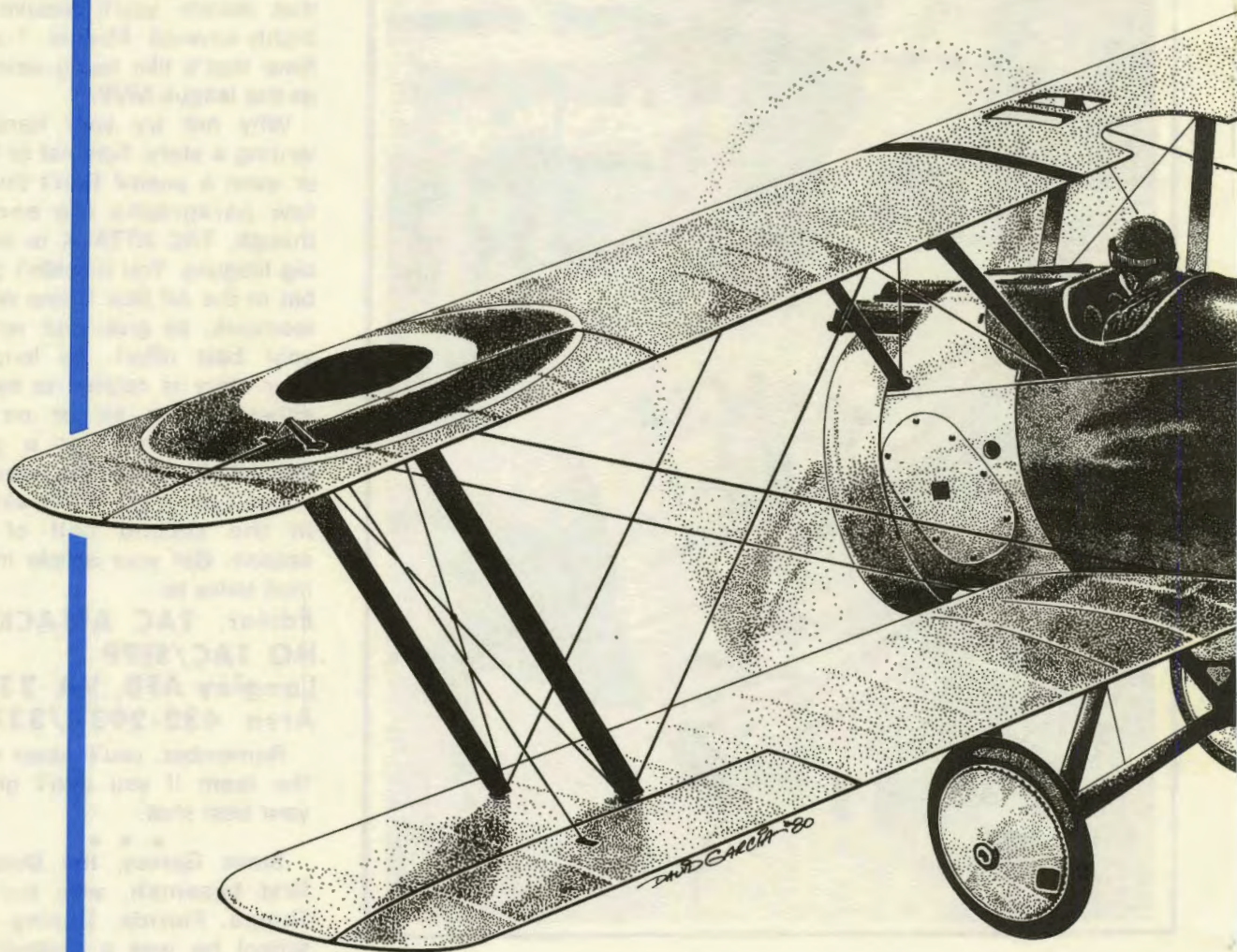
Don't put it off. We're already in the second half of the season. Get your article in the mail today to:

**Editor, TAC ATTACK
HQ TAC/SEPP
Langley AFB, VA 23665
Attn 432-2937/3373**

Remember, you'll never make the team if you don't give it your best shot.

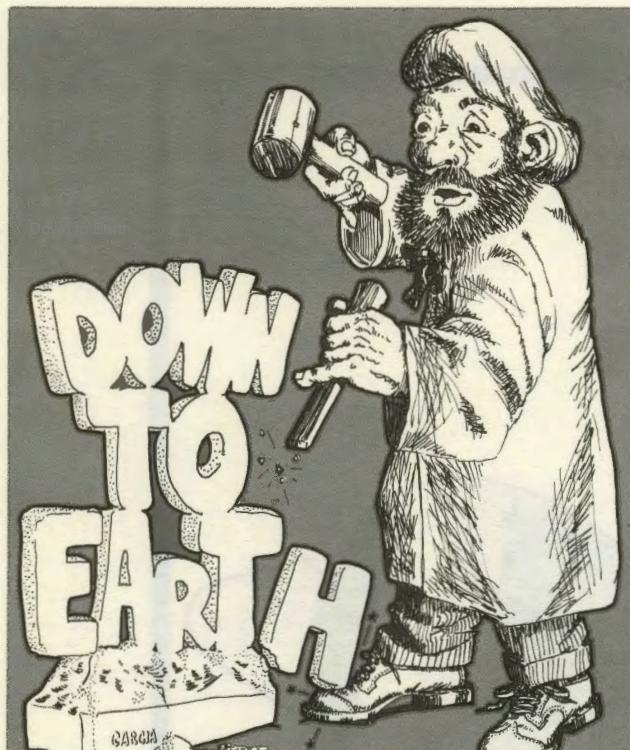
• • •
Steve Garvey, the Dodgers' first baseman, was born in Tampa, Florida. During high school he was a football and baseball star. He started playing pro ball in the minor leagues. At the end of the 1969 season, he moved from the Albuquerque AAA team to the Dodgers. Going into the 1980 season, Steve had played in 672 consecutive Dodger games as well as 962 of their last 971 games!

Sopwith F-1 Camel



[illegible]

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EPOXY

WHAT IS IT ?

By MSgt Dennis Harlow
HQ TAC/SEG

So your particular job calls for you to work with "epoxies." That means you'll be working with specially made chemicals used widely by the U.S. Air Force. Most epoxies are used as sealants and in fiberglass repair and fabrication. There are liquid, solid, and solution type epoxy resins. Resins alone are useless. The special chemical reaction and formulation doesn't occur until the resin is "cured" or hardened by other kinds of chemicals called, naturally enough, curing agents and/or hardeners. Think of it this way—you don't have fudge if you only have cocoa. And you don't have a useful epoxy product if you only have resin. The curing agent/hardener molecules react with the resin molecules and become a useful solid epoxy casting.

You can work with these materials safely if you treat them all with respect, if you don't try to

short cut, and if you give yourself a margin for natural error. Thousands of people have worked with these materials for over twenty years with very few problems because they've always used proper equipment and had adequate ventilation and have followed simple, careful procedures. However, ignore those procedures and epoxy and related materials can be hazardous.

Case 1. Sensitization. Sergeant Jones was an airframe repair technician working with epoxy resins and hardeners . . . only sometimes he got the curing agents on his fingers and skin . . . no problem for several years. Then he swelled up like a balloon. His skin erupted in blisters and



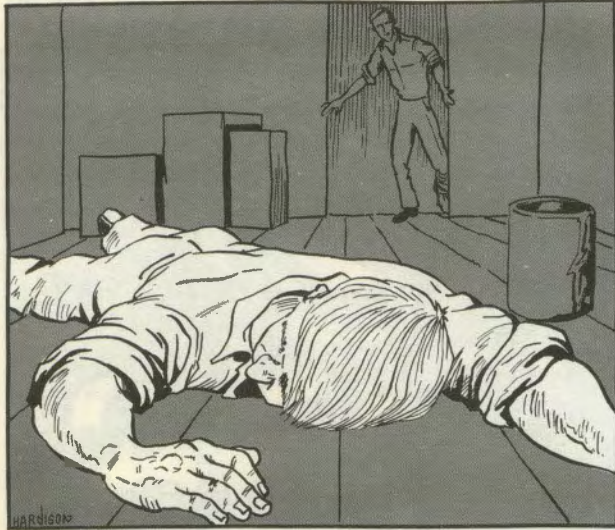
pustules. He looked like he'd slept in poison ivy. Now he's working away from these materials, but if he walks into a shop where there are open containers of curing agent, it happens all over again. Sergeant Jones is allergic to hardeners; he's "sensitized."

Case 2. Eye Injury. Airman Smith was in a hurry. He had a small container of liquid hardener up on a shelf. He reached for it and it tipped, spilling over his unprotected face and eyes. His co-worker had him at an eye wash in 30 seconds. Today he's OK. He could have been blind.



Case 3. Unconsciousness. Mr Brown was working in a small enclosed area, without proper ventilation, and with open supplies of resin and solvent. All at once, he keeled over cold. Fortunately, his buddy walked by right after and pulled him out. He successfully recuperated.

There's more. But you get the idea. Things that can happen if you don't work with care are sensitization, eye damage, unconsciousness or



even death. Following are some pointers on how to keep it from happening to you.

1. Treat every product or raw material with respect, and know how to protect yourself.

2. Keep a clean work area and stay clean in your person and your clothes.

3. Protect your eyes. Wear safety glasses with side shields or chemical goggles. Check with your bioenvironmental health folks for the proper type for your job.

4. Use adequate ventilation. Use approved respirators or masks.

5. Keep all possible sources of ignition (cigarettes, lighters, open electrical heaters, or motors) away from the area of open solvents, resins, and curing agents.

6. Keep contaminated hands, gloves, cloths away from eyes and mouth.

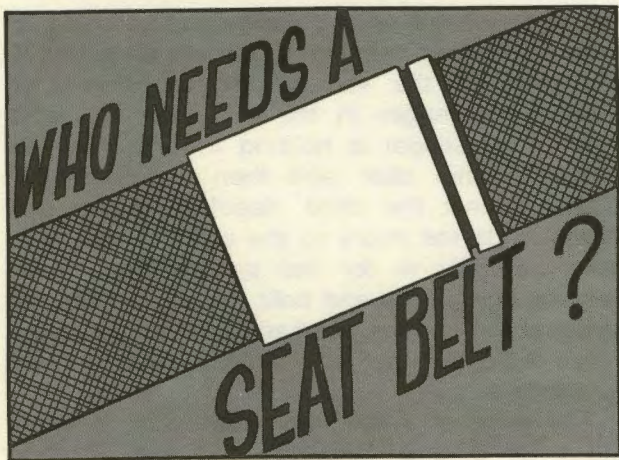
7. Read and follow safety warnings on product package labels.

8. Keep all containers of flammable liquids covered.

9. Check your co-workers as well as yourself on these safety procedures. Your mistakes can hurt them; their's can hurt you.

10. Finally, know where the nearest eye wash, shower, sink with water, and fire extinguishing equipment are located.

A final word. Treat all epoxy products like they are the worst ones around. That'll give you a margin of safety.



MSgt Alfred B. Huff
5 FIS/SEG

A recent automobile fatality from the 5 FIS, Minot AFB, ND, prompted me to look into the effects seat belt use (none were used) would have had on the injuries. In this accident, the auto hit a railroad bridge abutment at 50 MPH. The

right front seat passenger was killed; the driver and rear seat occupant were critically injured.

Consider the following—if seat belts had been used—

1. The right front seat occupant would have had a 60% chance of walking away from the accident with only cuts and bruises. The remaining 40% would require hospitalization with only a slim chance of being killed.

2. The driver would have had a 70% chance of walking away from this one. As a matter of fact, the only thing which saved his life was the collapsible steering column. Even though he received severe chest wounds from the steering wheel, an older type wheel would have killed him.

3. The rear seat passenger was lying down and suffered a broken neck during the collision. If he had been sitting upright with his seat belt fastened, he would have had a 99% chance of walking away. The other 1% would have received relatively minor facial injuries from the back of the front seat.

DOWN TO EARTH



Automobile infant restraints

**By TSgt Ellis Mann
HQ TAC/SEG**

As a child back in the year—let's forget how long ago—I had a very limited sense of the hazards involved in riding in a motor vehicle. We had a 1952 Packard; and if you've never seen a '52 Packard, they were about a half a block long and made out of real metal. If war had been declared, the Packard could have been used as a replacement for a tank. Being a half way intelligent young man, I could not imagine that anything could hit our car hard enough to hurt me. I felt like I was in a world all my own with a deflector shield all around me. Have any of you ever felt that way while you are riding in your car?

Now being a few years older and having bumped around in the traffic safety field for a dozen or so years, I have changed my mind somewhat. It doesn't take too many serious mishaps to change your outlook on life. After investigating so many mishaps, you develop a built-in coldness to the mishaps and the fatalities and injuries associated in each. There is one type of mishap I don't think I'll ever be able to adjust to, no matter how many occur. Those are mishaps involving children injured or killed in motor vehicle operations. There is just something about seeing a young child at the start of his or her life having it snuffed out in a vehicle mishap.

I believe the severity of a lot of these mishaps could be reduced if children were properly restrained within the vehicle. Consider this—you are driving down the highway at 55 MPH and something runs out in front of you. Your first action is to slam on the brakes. That is fine for the vehicle. With luck, you will stop prior to making contact with whatever violated your right-of-way. Now let's consider a child in the same vehicle, the car slows as brakes are applied, but an unrestrained body continues to move forward at



the same speed until it contacts something to stop its forward momentum. All too often this is the dash of the vehicle, the windshield, or another passenger in the car. Even worse is when a passenger is holding a child. First the child hits the dash and then the passenger slams against the child. Needless to say this compounds the injury to the child. So the next step naturally is for the passenger to wear restraining devices and hold the child. Can you imagine the injuries two hands can cause as the force of 55 MPH pulls the child out of your arms or hands.

The state of Washington conducted a study from 1970 thru 1977 on the use of child restraints. Their statistics showed that the use of child restraints could reduce the probability of a fatal mishap by 95% and that of serious injury by 78%.

Numerous types of child restraints are available through different dealers and range in price from \$15 to \$30. This is a small price to pay when you consider the returns received.

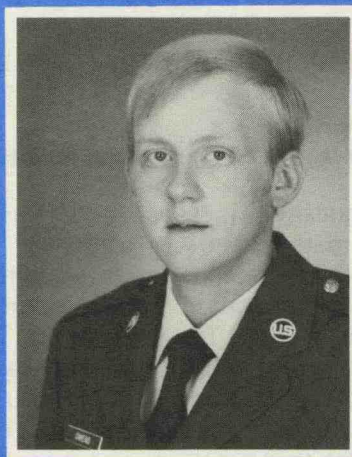


TAC

SAFETY AWARDS

INDIVIDUAL SAFETY AWARD

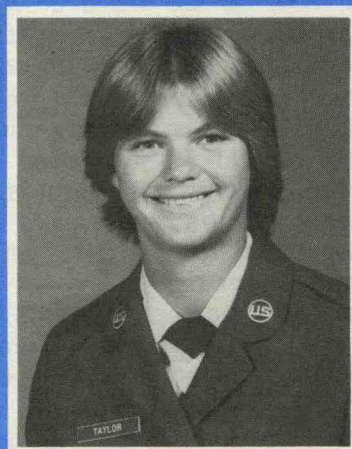
Senior Airman Arthur R. Owens, Jr., 58th Aircraft Generation Squadron, 58th Tactical Training Wing, Luke Air Force Base, Arizona, is the recipient of the Tactical Air Command Individual Safety Award for August 1980. Airman Owens has demonstrated a high level of technical knowledge and a genuine concern for safety in the performance of his duties. Recently, his identification of a serious defect in F-4C lateral series servo actuators resulted in the recall of over 200 actuators from field units. His dedication and conscientious troubleshooting have contributed significantly to the Tactical Air Command Mishap Prevention Program.



SrA Arthur R. Owens, Jr.

CREW CHIEF SAFETY AWARD

Airman First Class Candace L. Taylor, 31st Aircraft Generation Squadron, 31st Tactical Fighter Wing, Homestead Air Force Base, Florida, is the recipient of the Tactical Air Command Crew Chief Safety Award for August 1980. Airman Taylor has an outstanding record as a crew chief, demonstrating a high degree of safety awareness in all her duties. Recently, a potentially serious incident was averted by her initiative and quick response. Upon noticing a loose fiberglass fairing on the vertical stabilizer of a taxiing aircraft, she notified the proper personnel and had the aircraft return to the parking ramp. Her decisive action prevented further damage to the aircraft.



A1C Candace L. Taylor

WEAPONS WORDS

EXPLOSIVES SAFETY HISTORY

By John H. Kawka
Directorate of Aerospace Safety

The question is asked—"Why is a gun dangerous in the hands of a novice?" Because the danger is concealed. The fatal cartridge lies hidden in the chamber. Safe handling of firearms must be taught. The mechanics of unloading, cleaning, oiling, and reloading firearms must be learned from day one. But, more important than the mechanical steps is attitude. One must learn to assume that a gun is always loaded.

There are numerous examples of seeing danger and developing a safe attitude. For instance, how do we see a crowded freeway? Well, freeway traffic is somewhat like an auto race. All vehicles travel fast; all go in the same direction. There, the similarity ends. On the track, each vehicle is a racing car; each driver an expert who knows and sees the risk. The track is not overcrowded, and it is controlled to some extent. On the freeway, old cars compete with new ones, new drivers with old, giant freight trucks obstruct the view, lane changers, tailgaters, you name them—the hazards are myriad. We'd do well to assume that the freeway is a race track mated with an obstacle course. That would be a safe attitude.

For another example, let's consider a safety problem involving fighter aircraft. To a well trained munitions troop, this aircraft, loaded with munitions, is one thing. To a mechanic, an electrician, and other aircraft specialists, it's something else.

How would you describe this explosives-loaded aircraft? As a highly sophisticated weapons system, capable of inflicting great damage on an enemy? That's what a fighter aircraft is for—that's its capability. However, we in the explosives safety career field have another point of view.

This aircraft threatens no enemy. Strictly speaking—safely speaking—it's not an aircraft. When parked on base, it's a threat to all personnel and property within the kill and damage range of the munitions on the aircraft.

The handling of explosives-loaded aircraft during a simulated war plan timing exercise is a subject of deep Air Force concern. Especially at overcrowded bases the problem is critical; at times, explosives safety standards are severely compromised.

In certain cases, the scene is all too common, rows of fighter aircraft parked wing to wing, their guns, rockets and missiles aimed at other loaded aircraft, explosives storage facilities, and inhabited areas. Bombs, rockets, missiles, and cannon ammunition are brought to the flight line for the day's mission, which is a large amount of explosives in one unprotected location, jeopardizing aircraft, mission and men. In a combat or exercise environment, urgency sets the pace. Expediency dictates the method—get that aircraft loaded, move it out, make way for the next—the mission has top priority.

For maximum safety, aircraft loaded with explosives must be parked at specified distances from other aircraft, facilities, and inhabited areas. Each aircraft must be positioned with guns, rockets, and missiles aimed toward isolated territory.

Thereby hangs a dilemma. How can safe separation distances be maintained on an overcrowded flight line? How can safe procedures be observed when combat contingencies take first priority?

Obviously, under such conditions, conventional safety procedures—the mechanics of explosives safety—cannot always be followed to the letter. But safe attitudes can be established and maintained. The prime requirement is leadership.

The end result is that the burden falls on the commander. He must know the explosives safety standards in order to evaluate the risk of non-compliance and compromise. The commander, his staff, and all supervision down to the crew

chief level should keep one cardinal rule in mind: Expose the minimum number of men to the minimum amount of explosives for the minimum length of time.

This simple guideline encompasses all the explosives safety standards. It is supervision's safe attitude. Teach the men to see and comprehend the fact that these aircraft are considered as above-ground, unbarricaded magazines. So regarded, they are parked, loaded, towed, and taxied with much greater care.

Dedication to simulated war plan timing exercises is a great asset. The flame must be kept burning brightly, but it must not blind command personnel to any unsafe or unnecessary hazards. From all this the following questions turn up:

- Are explosives being stored on the flight line?

- Must all aircraft be parked wing to wing?

- Are dispersal and separation completely impossible?

Who can evaluate the cost of negligence? We know the dollar price of an aircraft. But, in the right place at the right time the value of a fighter aircraft goes beyond estimation. What's the worth of a fighting man? Is the mission served if he gives his life in a useless accident? Perhaps each of us should estimate the cost for himself. We may find some evaluation in the following accident which has taken the lives of more men in a single day than the loss in any other single day during the war.

TIME: Sunday morning, 16 May 1965

PLACE: Bien Hoa Air Base, Viet Nam

By 0800 hours, another combat day was in full swing. The first strike mission was already airborne. The second strike was ready for takeoff. The third mission was scheduled for engine start at 0825. That mission was delayed; grounded forever at 0823.

From the Headquarters area, eyewitnesses saw a black column of smoke shoot skyward beyond the trees. Immediately after came a gigantic blast of air and sound.

How do you stage a disaster? In Bien Hoa, they used 400,000 square feet of ramp space for the stage and covered it with explosives-loaded aircraft parked wing-tip to wing-tip—or the aircraft could be considered as row after row of above-ground, unbarricaded magazines. In addition, they stacked another aircraft load of 750-pound bombs between the aircraft.

A fuel dump containing 100,000 gallons of JP-4 was located adjacent to the ramp. Just off the apron they stacked 50,000 pounds of napalm beside 100,000 pounds of bombs. Here, they stacked 500,000 pounds of white phosphorous and bombs, a scant 500 feet from the fuel dump. But, no one saw it as a stage for a disaster.

Immediately after the initial blast, rescue teams went into action. While Explosives Ordnance Disposal personnel were neutralizing and removing bombs from the ramp, one bomb exploded, killing three Explosives Ordnance Disposal personnel.

How do you evaluate the cost of disaster? To the dollar cost, add futility . . . great endeavor made to no avail . . . and add the human sacrifice. Further, 15 aircraft were totally destroyed. Twenty incurred major damage. Twenty-six US Air Force airmen died. Three were critically injured and 74 others were hospitalized with injuries.

What triggered the Bien Hoa blast?

- Was it a badly deteriorated anti-withdrawal fuze?

- A faulty engine starter cartridge?

- Perhaps a 20mm cartridge was accidentally detonated?

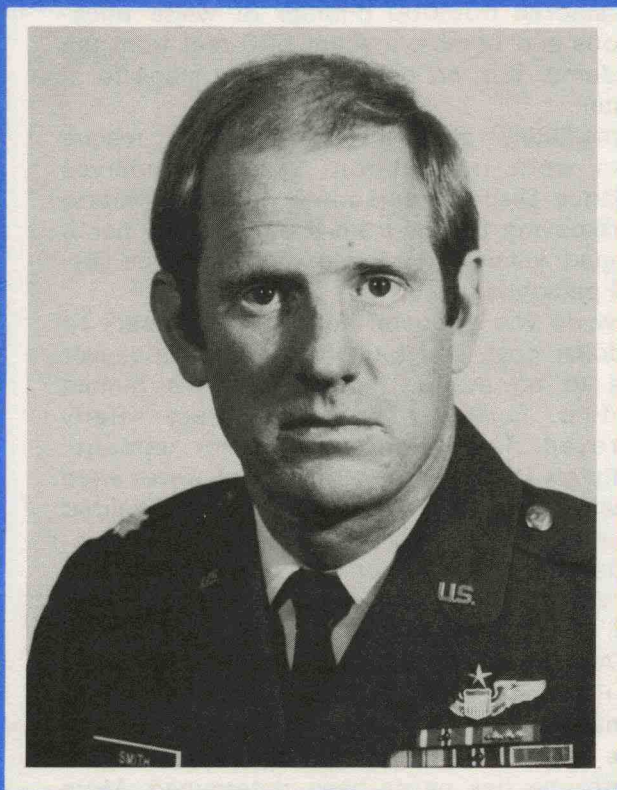
The incident that touched off the Bien Hoa catastrophe has never been determined. More important is the fact that the entire base was vulnerable. Vital combat resources and personnel were lost. One small incident is one too many in an unsafe environment.

That grim Sunday morning tragedy brought immediate changes. With all possible speed, steel revetments were erected to separate and protect the aircraft. Additional ramp space was laid. But the construction could not keep pace. As the build-up continued, overcrowding persisted with more men, more aircraft, and more explosives. Large areas still remain vulnerable to that one small incident.

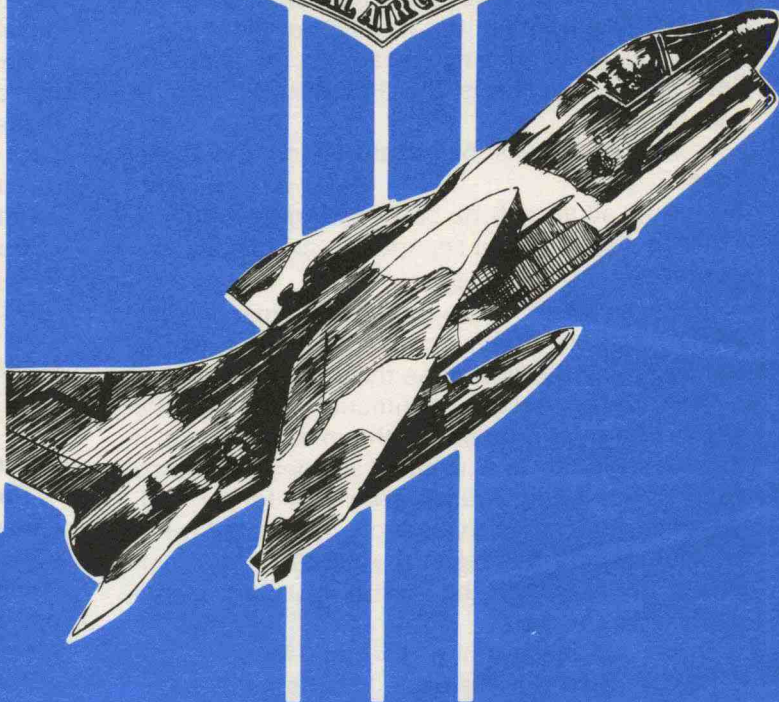
Stateside or overseas, explosives safety is a command responsibility. Don't overlook any possible compliance with authorized safety standards. Take the lead in establishing safe attitudes. We don't know what really happened at Bien Hoa . . . but, we do know that too many people were exposed for too long a time to too much explosive power . . . and no power on earth can reverse that . . . ➤

Reprinted from the May 1980 USAF SAFETY JOURNAL.

AIRCREW of DISTINCTION



Major John H. Smith
162 TFS/178 TFG (ANG)
Springfield MAP, OH



On 27 May 1980, while deployed to Hawaii with his unit, Major John H. Smith was flying as number two on a ground attack mission. During the return flight, while cruising at 500 feet and 300 knots, his A-7D collided with a large white sea bird.

The impact shattered the windscreen left quarter panel, which along with bird remains and other debris, struck him in the face shattering his visor, visor shell, and eyeglasses, and broke his nose. Although blinded, temporarily without communications, and separated from his leader, he maintained enough composure to control his

aircraft. Partial sight returned in his right eye, and he was hesitant to attempt clearing his left eye because of glass fragments.

With help from Air Traffic Control personnel and a chase aircraft, Major Smith flew 65 miles over water to Naval Air Station, Barbers Point, and successfully landed his aircraft. His superior airmanship and prompt reaction to this inflight emergency prevented further injury and possible loss of life.

This achievement qualifies him for the Tactical Air Command Aircrew of Distinction.

WHO'S DR. SAM ?

"You're grounded. I'm sorry, but your medical condition is serious enough to keep you out of the cockpit, maybe permanently." The flight surgeon spoke with a sensitive, yet firm voice.

The pilot was stunned. Yes, he was having some medical problems, but not to fly again? He suddenly felt empty, alone.

He sat down, leaned forward with his face in his hands and tried to come to grips with the idea that he might never fly again.

"Can't we do something, doc?" he asked.

The physician offered the pilot a glimmer of hope.

"Yes, there is something we can do, if you are willing. We can send you to Brooks AFB, Texas, for an intensive medical evaluation at the USAF School of Aerospace Medicine."

Thus begins another TDY to USAFSAM for a hapless pilot for three days of medical tests in hopes that he will be returned to status. Because of the intensive medical examination that this pilot will undergo and his limited stay at the USAF School of Aerospace Medicine, he will probably not have the time to tour the school.

The mission of USAFSAM is divided into three distinct functions, each of which touches the lives of fighter aircraft personnel everywhere. A commitment to this mission by the personnel at USAFSAM is proudly displayed on its logo "Volanti Subvenimus," meaning "We serve those who fly."

First, the fighter aircrewman is served directly by the school by personal medical evaluation in hopes of getting the grounded aircrew member back into the cockpit. Incidentally, the majority of all grounded aircrewmen have been allowed to fly again because of their TDY to the USAF School of Aerospace Medicine. Hence, the fighter pilot in this scenario has an excellent chance to be returned to flying status. The school's medical evaluation function is served by a large staff of Air Force physicians with specialties in clinical flight medicine. The technical staff, diagnostic methods, and equipment are the most advanced in the world.

Professional medical education is another function of SAM given worldwide critical acclaim. Here is where US Air Force physicians, as

well as physicians from other services and countries, are taught the specialty of aerospace medicine. In addition to this 6-12-week course, a unique three-year Residency in Aerospace Medicine (RAM) is offered to selected flight surgeons.

Where do flight nurses come from? The USAF School of Aerospace Medicine, of course. An intensive 6-week course is attended only by graduate nurses who proudly display their wings upon graduation. SAM is also the training home of the Physiological Training Officer (PTO). The PTO is entrusted with the knowledge and training of all physiologic aspects of the varied environments of high-performance aircraft.

Also of interest to fighter crew members, are the R&D activities of USAFSAM, many of which are directed specifically toward flight personnel of high-performance aircraft. Areas of R&D considered by USAFSAM which impact the "fighter" pilot include (but are not limited to) extreme changes in temperature and pressure, high acceleration forces, and environmental contaminants including chemical and radioactive hazards of warfare. In addition, and at times concomitant with these R&D efforts, are research interests in work-load, fatigue, performance, and human factors aircraft accident investigation.

Now that you have been introduced to the many personalities of Dr. SAM, it is easy to identify the multitude of similar interest that exists between physicians, scientists, and engineers at USAFSAM and those persons who fly high-performance aircraft. Since we have common interests, we also share common goals—to improve the flyer's performance, comfort, and safety. In order to best accomplish these tasks, an exchange of ideas and knowledge must occur between those who fly and those who support the flyer. It is hoped that this regular Dr. SAM column from the USAF School of Aerospace Medicine can help accomplish this objective.

At the end of this column will always appear an address where the author can be reached by the flyer. Questions, ideas, and comments from aircrew members are eagerly solicited, will be considered confidential, and will be used as the basis for future articles.

Mailing address: Dr. SAM

USAFSAM/CE

Brooks AFB TX 78235

Let's hear from you.

F-4

EMERGENCY SITUATION TRAINING



By Maj Pete Abler
Editor

You've just touched down in your Phantastic Pantom, you pull the drag chute handle, but don't feel the familiar tug as it blossoms. As the 6,000 ft marker whizzes by, you're still going 120 knots. When you step on the brakes, nothing seems to happen and that endless ribbon of concrete suddenly looks very small. Whatcha' gonna do?

a. Just take your ole size 11's and push harder.

b. Ask mobile what happened to the chute.

c. Release the brakes and grab the paddle switch.

d. Let it roll out till you slow down and make a high-speed turn off the runway.

Before we go into a long discussion of each option, let's see how a fellow aviator handled it when the same thing happened to him...

When the pilot didn't feel normal deceleration with the brakes applied, he concluded the anti-skid was malfunctioning. To prevent the possibility of a blown tire and the loss of directional control, the pilot elected to take the departure-end cable instead of following the Dash 1 procedures. Now this may sound good on paper, but as luck would have it this pilot didn't have

any green stamps, four-leaf clovers, or rabbits' feet in his possession. The hook didn't come down. The aircraft crossed the departure end of the runway at 60 knots and stopped 400 ft after the MA-1A wrapped itself around the Phantom.

So that's what happened to our friend. Let's talk a few minutes on what you could have/would have done differently.

Option A has a lot of merit. Not that it will help you any if the brakes or the anti-skid aren't working, but you're traveling at over 100 knots. It is very difficult to detect brake or anti-skid failure above that airspeed. Remember, the stopping power of your aircraft is dependent upon the friction between your tires and the runway. The brakes are simply a means of slowing wheel rotation. At 120 knots them little hummers are really spinning! The same friction which slows your aircraft is also working on the wheels to keep them rolling. At speeds over 100 knots you're just not going to get a significant amount of braking action. So, give things time to work. If you're on the binders as hard as you feel is necessary, then at least wait a few more seconds—till you should feel a significant amount of braking—before you assume you have a problem.

To quote section II of the Dash 1, "During breaking, cycling of the anti-skid system can be detected by a change in longitudinal deceleration. Cycling may not be apparent when braking at high speed, immediately after landing, with drag

chute failure, or with a wet or icy runway. Do not misinterpret this as anti-skid failure.” (Emphasis added.)

Well, what about Option B? Good question, but rhetorical in nature. 120 knots equals 200 ft per second. Given natural deceleration, etc, it should take 40-45 seconds to reach the end of the runway—from the 6,000 ft marker. If you’re planning on the departure-end cable, you’re down to 30-35 seconds—not very much time to start a long conversation with anyone. The chute is the least of your worries. An aside for mobile controllers here. If a guy doesn’t have a chute—tell him; a quick, crisp “No chute” or “You’ve got a streamer” can really help a guy.

We’ll bypass Option C for a second. (Is that a clue my dear Watson?) Since our incident pilot went into the MA-1A at 60 knots, it’s a good bet turning off the runway at that speed would be risky at best. Besides, there’s usually folks, equipment and other aircraft in the dearm area. I didn’t think too many of you would buy this one anyway.

Now it’s back to Option C sports fans. To quote the Dash 1, “Wheel brake failure may be caused by mechanical malfunction, utility hydraulic system failure, or a malfunction of the anti-skid system...at any time, the cause of wheel brake failure is difficult to diagnose rapidly. Therefore, the following procedure ensures that, regardless of cause, actions are taken sequentially to provide for the various contingencies.”

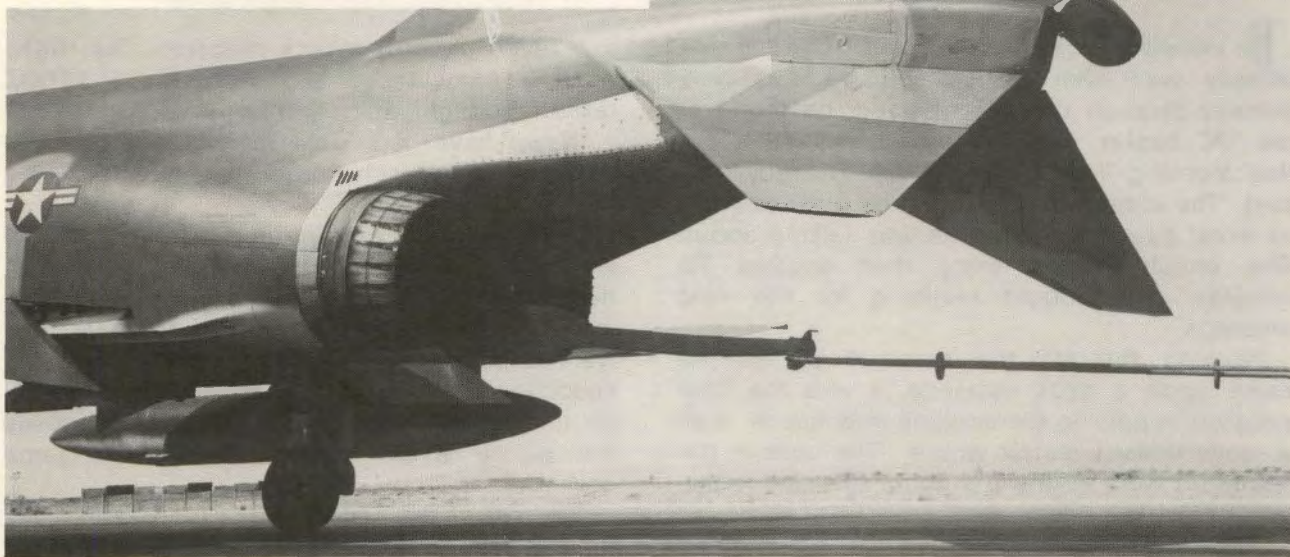
The first steps in the procedure are to release the brakes and depress the paddle switch. As you know, that disconnects the anti-skid. When you

reapply the brakes—take it easy. It’s very easy to blow a tire under these conditions. This is precisely what concerned our mishap pilot. Even if you do blow a tire, you should be able to control the aircraft. Don’t let your apprehension of what might happen prevent you from doing the correct procedures.

Now, putting the hook down is the next step. Don’t delay! In the incident, I mentioned, the hook never came down. A sludge-like buildup prevented the tailhook latch mechanism from releasing the hook. It just wasn’t this guy’s day!

After the hook goes down, all you have left to try are the emergency brakes. Using the emergency system is even sportier than braking without anti-skid. It is by no means impossible! We’ve talked so much about how tough it is to brake without anti-skid or with emergency brakes that some folks believe it can’t be done without blowing a tire. That’s W-R-O-N-G, wrong! You can do it if you take it easy. Many other folks have already proven that.

In the final analysis, you should always go with the established procedures. In 99.9% of the cases, when properly accomplished, they’ll get you out of a tight spot, so use ’em. May all your landings stay on the runway. ➤



PIECES OF THE



He leaned back in his chair and sighed. It was already well after 1800, and he was only halfway through the pile of paper he found in his "IN" basket. "And to think I cleaned it out this morning 'fore I went to fly. The guy who said, 'The mission of the Air Force is to read and to write' sure knew what he was talking about. This shouldn't take more than another 20 minutes," he thought reaching for the next message.

Working through the assorted papers, he came upon a thick message. It was the final progress report on the airplane they lost in...well it really doesn't matter where. "The guys in the squadron were asking me about this one today. Wonder what it has to say?"

"Blue Flight was scheduled for a combined

low-level/ground attack mission. The flight briefing commenced at 1000Z for a 1200Z takeoff. Preflight, start, and taxi were normal."

"Never have been able to read one of these with a completely objective outlook," he thought.

"Here we lost a front line fighter and two crewmen, and how do we describe it? 'Aircraft destroyed, two fatalities.' It's sort of like watching someone put a jigsaw puzzle together. You want to get involved, but you can't. You're just a spectator. If you had the chance, you'd probably do it differently—with more feeling; but I guess the puzzle would still come out the same anyway."

The rest of the history of the flight didn't take long to read. It simply stated how they took off,

PUZZLE

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and number three was delayed on the runway. Clouds prevented the flight from joining underneath, and number three had trouble getting "tied on" during the radar trail departure. As it turns out, he never did catch up. "It's really funny how an extra 20 seconds can affect a person's life. If he had been able to takeoff at the normal interval, this might never have happened."

A few pieces of the puzzle fell into place.

"So the delay on the runway had something to do with it. But so did the weather. They planned on going to the range VFR via the low level, but right after takeoff they had to transition to the Standard Instrument Departure (SID). And none of the flight members had ever flown this SID before. That might have added something to the confusion factor."

Another piece is added to the picture.

He sat there trying to imagine what must have been going on during the flight. He wondered what number three was thinking all that time he was trying to catch up during the departure. The board concluded the delay on the runway, the weather, the unfamiliar SID, all combined to increase the level of task saturation for all flight members—but especially for number three. What made the problem even worse as far as the board was concerned was three's recent flying experience. He had arrived at his new unit only a few months ago and had a couple months layoff before that. Not only that, he hadn't flown very much actual IMC during the past year. "Man that's tough, even for an old head." Since three had only been flying for a few years, his inexperience just added to the problem.

A few more pieces have been added to the puzzle, but it's still not very clear.



PIECES OF THE PUZZLE

A few more paragraphs into the report he got into the final phases of the flight. Even though number three had tried to catch up, he was still several miles behind number two when the flight reached the low level entry point. The flight lead decided to hold there to get the flight closer together. When the flight lead began his turn back inbound to the holding fix, number two lost radar contact so he flew a wider turn to make certain he stayed behind the leader. The investi-

gators didn't know for sure what happened to three, but the board concluded he did exactly the same thing. If he lost contact with number two under the same circumstances, he would have planned a slightly wider turn. Anyway, a shallow bank and the higher airspeed number three was probably holding put him outside the holding pattern's protected airspace—close to the high terrain. Only a slight error in altitude and—we'll never really know. Another collision-with-the-ground and no attempt to eject.

"Well, that explains what could have happened, and it's a pretty plausible explanation of a lot of the whys. But the puzzle I've been building still has some holes in it. I guess I'm still really wondering why—even though the report answered a lot of questions.

"Sure the guy was low on instrument time. But he isn't the only one in the Air Force, and the rest of them haven't dinged an airplane. As a matter of fact, he was as good as the majority of our pilots, and I'm convinced that we have a lot of good flyers. This bash scared me when I started wondering if I would have done the same thing. I had to agree I might have.

"So a guy gets delayed on takeoff. It's only natural to push the power up—(within limits) to close up the rest of the flight. It's no big deal. It happens every day. He couldn't catch up with the flight before they entered the low level holding pattern and he would naturally be in a lag position on number two if he had lost radar contact. Let's face it, even on a normal day how many of us would think about the protected airspace around a holding pattern? I'll agree we ought to know where the high terrain is and where we are in relation to it.

"I guess the thing which bugs me most about this, and many other airplane bashes, is the guy didn't do anything drastically wrong. When you put all the pieces together, it still doesn't add up to 100 percent. I guess it's natural to feel that a person bashes a plane by making many serious errors—when in the actual case, a few minor, seemingly unconnected mistakes and a little confusion are all that's required for a smoking hole. I guess that's the best lesson I can pass on to the guys at the next safety meeting."

He quickly shuffled through the remaining papers and got up to leave, as he locked the office door he knew he wouldn't sleep very well that night. Even with all the pieces there the puzzle still didn't seem to be finished. ➤

TAC TALLY



CLASS A MISHAPS	▶
AIRCREW FATALITIES	▶
TOTAL EJECTIONS	▶
SUCCESSFUL EJECTIONS	▶

TAC		
JUN	THRU	JUN
	1980	1979
4	16	17
2	10	15
4	17	19
3	13	10

ANG		
JUN	THRU	JUN
	1980	1979
1	8	6
1	7	5
0	7	4
0	4	2

AFR		
JUN	THRU	JUN
	1980	1979
1	1	3
0	0	2
1	1	3
1	1	1

TAC'S TOP 5 thru JUNE '80



TAC FTR/RECCE	
class A mishap free months	
28	33 TFW
24	56 TFW
21	1 TFW
20	31 TFW
14	4 TFW

TAC AIR DEFENSE	
class A mishap free months	
103	84 FIS
89	57 FIS
42	5 FIS
39	48 FIS
20	49 FIS

TAC GAINED FTR/RECCE		
class A mishap free months		
136	152 TRG	(ANG)
98	188 TFG	(ANG)
90	138 TFG	(ANG)
89	917 TFG	(AFR)
86	116 TFW (128 TFS)	(ANG)

TAC GAINED AIR DEFENSE		
class A mishap free months		
95	191 FIG	(ANG)
76	102 FIW	(ANG)
72	177 FIG	(ANG)
38	125 FIG	(ANG)
21	119 FIG	(ANG)

TAC/GAINED Other Units		
class A mishap free months		
131	182 TASG	(ANG)
124	193 TEWG	(ANG)
116	110 TASG	(ANG)
111	USAFTAWC	(TAC)
107	919 SOG	(AFR)

CLASS A MISHAP COMPARISON RATE 79/80

(BASED ON ACCIDENTS PER 100,000 HOURS FLYING TIME)

TAC	1979	6.9	7.0	5.9	6.6	7.4	6.2						
	1980	2.0	4.0	5.2	4.4	4.7	5.2						
ANG	1979	0.0	11.4	9.0	9.7	7.6	6.2						
	1980	5.0	7.6	6.6	7.1	6.5	6.2						
AFR	1979	0.0	0.0	19.9	23.1	17.0	13.4						
	1980	0.0	0.0	0.0	0.0	0.0	4.5						

JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC

FLEAGLE

I COULD'A SWORN I HEARD BIRDS
T'DAY WHILE ON FINAL...



HARRISON

AND MY AILERONS
WERE REAL STIFF.



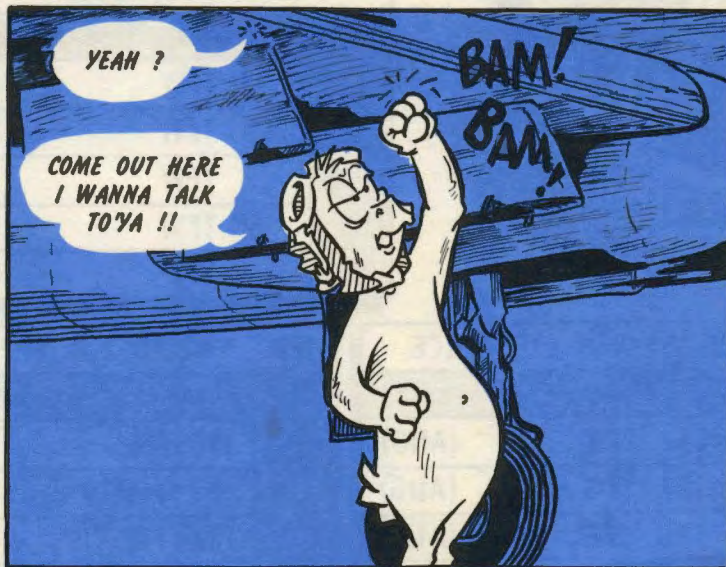
I'LL BET I KNOW WHAT
TH'PROBLEM IS.



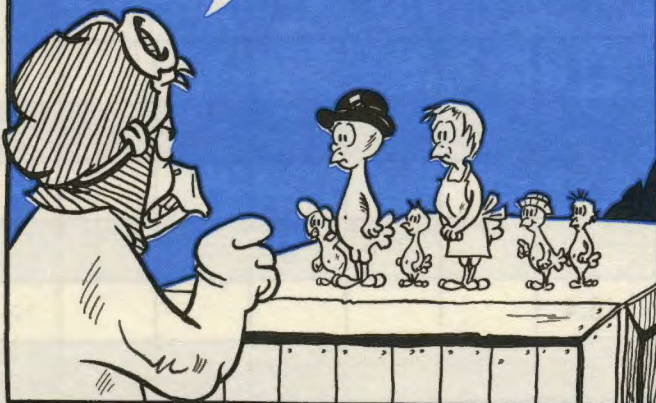
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YEAH ?

COME OUT HERE
I WANNA TALK
TO YA !!



WHEN I SAID YOU GUYS COULD HOLD UP HERE A SPELL,
I DIDN'T THINK YOU WUZ GONNA SET UP A PERMANENT
HOME. YA'GOTTA LEAVE 'FORE YA'GET ME IN TROUBLE.



IT'S JUS' AS WELL, MA, 'CAUSE WHEN
TH'YOUNGUNS WUZ PLAYIN' ON THEM
STRINGS AN' ROLLERS, TH'BLAME THINGS
STARTED T'MOVE AN' CHAWED UP
HALF OUR NEST.

