

TAC ATTACK

JANUARY 1971

TAC ATTACK

DECEMBER 1964

TAC ATTACK

MAY 1962

TAC ATTACK

JANUARY 1961

From Out Of The Past...Page 4

for efficient tactical air power

TAC ATTACK

JANUARY 1971

VOL. 11, NO. 1

TACTICAL AIR COMMAND

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Jamie sez:

Deal your words carefully if you don't want them lost in the shuffle.

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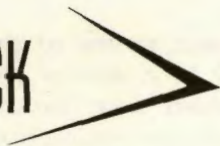
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Angle of ATTACK



A CHALLENGE

With this, my first editorial as Chief of Safety, I would like to extend my congratulations to all of you in the Tactical Air Command and to all of the commands who support us in such an outstanding manner. 1970 is now history and at this writing, we have achieved our lowest annual aircraft accident rate in TAC's twenty-five year history. We are looking at a rate in the vicinity of 4.6 — down from 6.8 in 1969.

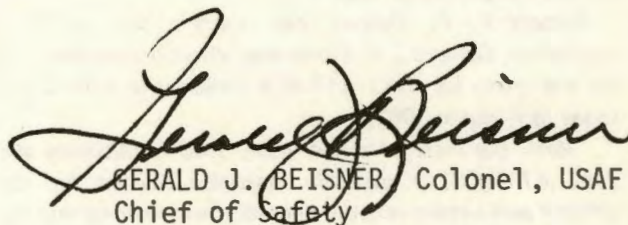
It's a fine accomplishment but don't be misled by a mere number. The philosophy of accident prevention has no real connection with statistics. They are only a way to measure what we have done . . . be it good or bad.

Our accident history, on the other hand, can be used as a tool to make our plan for 1971 more effective. Very few new accidents occur. Our experience in 1970 shows repeats of the same accidents we have been experiencing



for years. The theme of the TAC ATTACK in this issue deals with a few examples of what we have learned in the past and apparently forgotten. We must glean what we can from our past experience and apply these lessons in this year of 1971. If we can do this successfully, the statistics will take care of themselves and our programs will necessarily become more realistic.

There is a saying . . . "Accidents don't just happen, they are caused." That philosophy also works in prevention. Accident prevention doesn't just happen either! It must be caused — and you are causing it. It means that many of you in TAC are actively contributing to the prevention effort. Some more than others perhaps, but you are participating, and I hope that all of you will continue to press this lifesaving cause in 1971.


GERALD J. BEISNER Colonel, USAF
Chief of Safety

out of the PAST

The door was closed. The coffee cups were filled. Silently the staff gathered around the table. Slowly...almost reverently... the large black book was placed gently on the table and slowly opened. All eyes saw at once an F-100 on the first page of the first issue of TAC ATTACK...January 1961. As the page was carefully turned the quietness in the room disappeared as everyone started talking at once. "There was no color...just black and white." "And only eighteen pages!" "TAC Tips, Chock Talk, and TAC Tally were in the original issue!" "Look at all the cartoons!" "Oh, who cut out the picture on page 4?"

General F. F. Everest was Commander of TAC. Lieutenant General J. E. Smart was Vice Commander, and set the credo for TAC ATTACK which is as meaningful today as it was in 1961:

"With the start of a new year, TAC is initiating the TAC ATTACK, a monthly magazine written for the officers and airmen actively operating and maintaining the

weapon systems of this command. The TAC ATTACK will be a series of verbal thrusts directed at potential accident areas within the command. Logistical and operational information for this purpose will be selected from all available sources. Above all, it will be your magazine, designed to furnish information which will assist you in doing your job better. To help make this a reality, you are urged to take an active interest in the magazine, and to submit material for publication, particularly if you have knowledge of an incident or procedure which would be of help or interest to others."

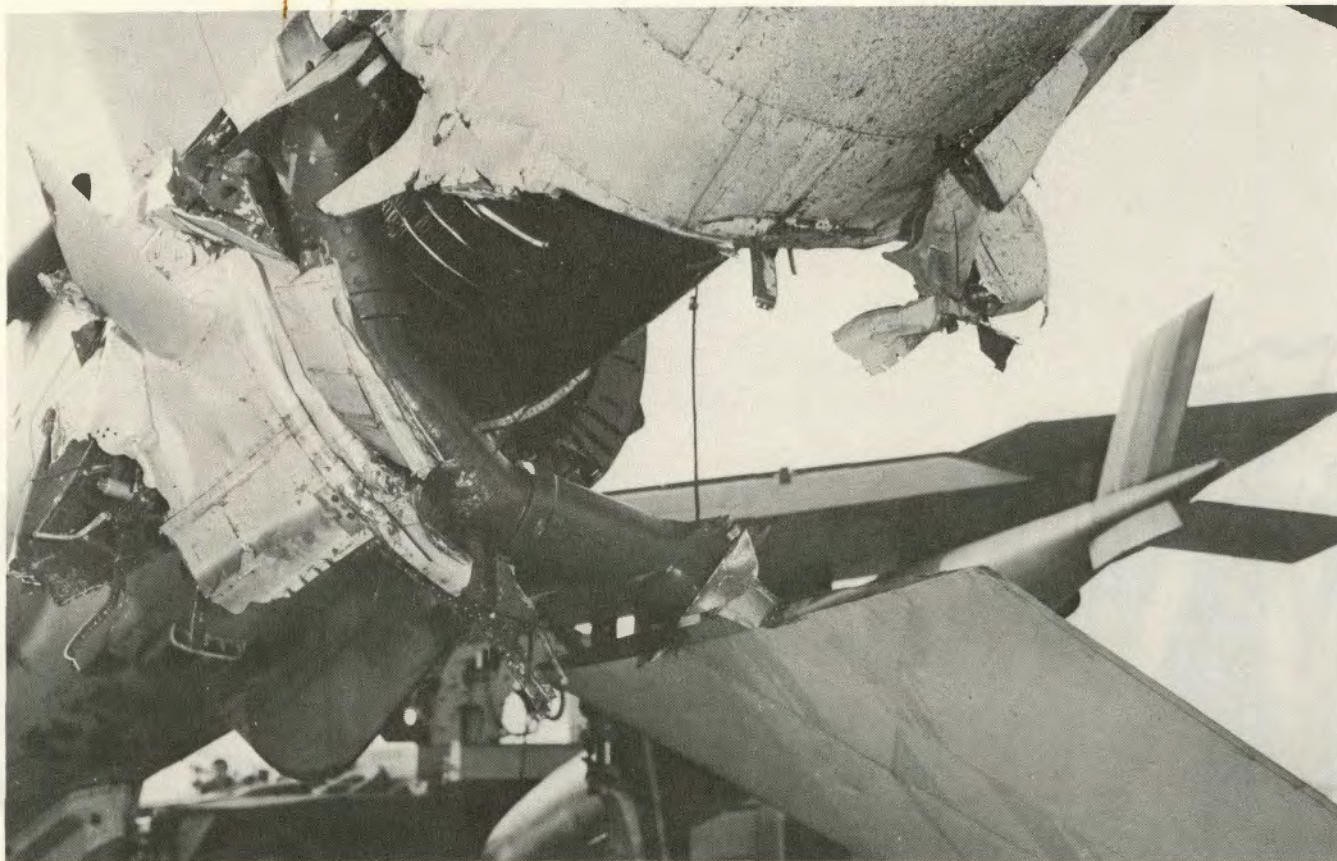
Changes and improvements came rapidly to the magazine. The March 1961 issue was printed in color, and the back cover carried "Princess Ann Says." This feature had great reader interest and in August 1962 became a full page comic strip which lasted until the original Art Editor, TSgt Heinz E. Hirsch, carried Princess Ann with him into retirement. "OI' Sarge Says," was an added feature with words of wisdom for the maintenance types. "Old TAT" appeared in the March 1961 issue with timely words to all flying types. He too was a popular cat until he departed with his favorite editor, Major Karl K. Dittmer. The "Angle of Attack" first appeared in November 1961 and it is through this page each Chief of Safety has been able to bring his thoughtful comments concerning all aspects of safety. Recognition of the Pilot of Distinction, Maintenance Man and Crew Chief of the Month began in the December 1961 issue.

And so it continued... every effort was made to bring the best and most up-to-date information available on new aircraft in the inventory, methods, and procedures to the field. More pages were added, providing more features of interest to the readers (but much more work for the staff to fill them!) Formats and layouts were changed. Many leaders (and those who were yet to become leaders) contributed to the magazine. We were proud when bouquets were tossed our way, but downhearted when the brickbats came...however deservingly! The most encouraging part of all is that the mag has always been read, ideas exchanged and evaluated, commented on, and hopefully, used for the improvement of all concerned.

As the pages of the magazine were slowly turned, the last ten years passed in review. Names, events, places... each brought their own special memory.

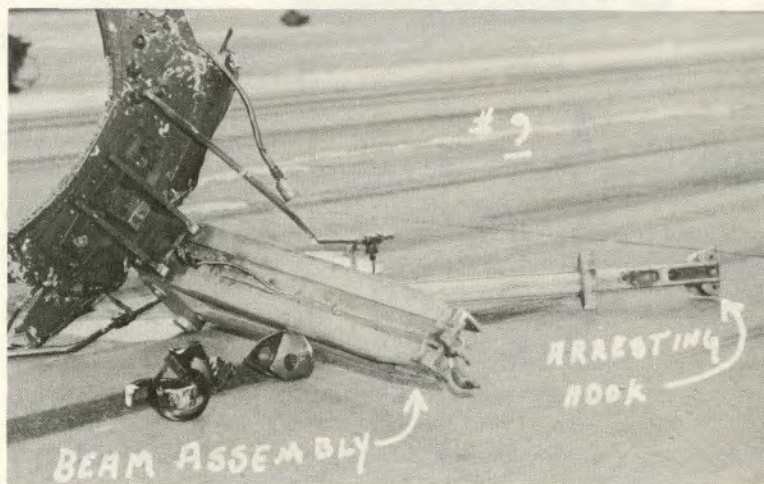
We discovered that over the years, a wealth of accident prevention information had been disseminated through the medium of the TAC ATTACK. We also discovered that a lot of information in these pages documented accidents that occurred in TAC last year.

A good example is the Second Look beginning on page 14. It's from a 1966 magazine and contains two very pertinent stories. The first concerns servicing a recip aircraft with JP-4, and should still be on our minds... the



other concerning inadvertent approach and arrestments really hit home for we had another last month. It seems that this F-105 pilot may have run into the "Sinkhole" (page 8). He landed short, but not hard, and as his main gear rolled over the BAK-9, the pendant cable bounced up — and guess what? Yup, another major accident. The pendant cable caught his stowed (but unguarded) hook, slammed the nose to the runway — failing it, then proceeded to tear the hook and part of the aft section out of the aircraft. You couldn't really call this mishap an accident — it was planned about ten years ago. An Engineering Change Proposal (ECP) to install a guard on the F-105 hook was proposed by the contractor in October of 1961. It was disapproved in January of 1962. The F-105 has neither a hook guard nor a "Tailhook Down" light in 1971. So we wait for the next one.

There is a saying, "If you want to know the future, look at your past." Without change, a lot of it will repeat. On the other hand, the only way to make a massive change in your future . . . is to make a massive change in your thinking. Why don't we do that? Our 1970 rate of 4.6 is going to be tough to better, we won't do it unless we can stop the "repeat accidents." Let's set realistic goals right now, this month. Have a plan, not just on paper — but a plan of action for '71.

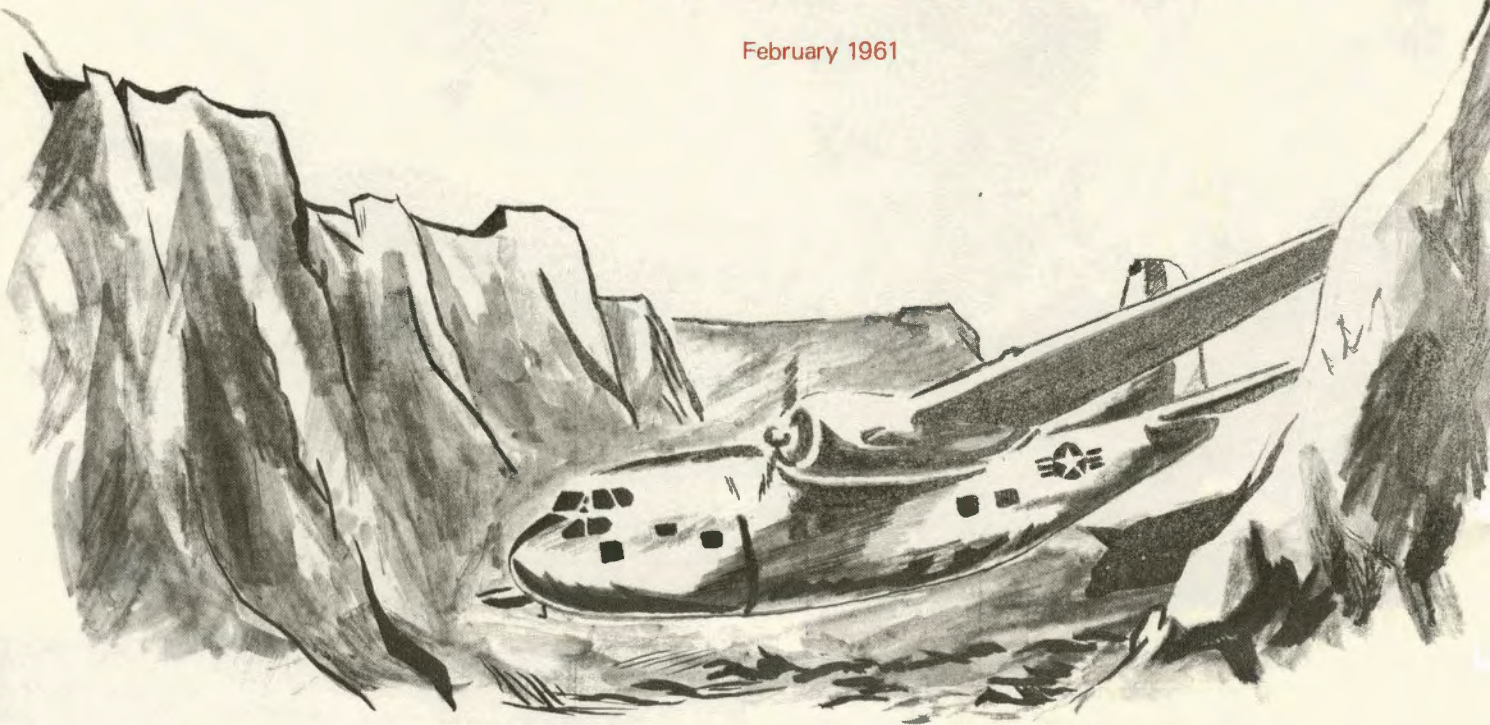


We hope that the next ten years of TAC ATTACK will continue to be meaningful to you, the officers and airmen who actively operate and maintain the weapons systems of this command. As we close the book on 1970, we'd like to leave you with this thought: "A unit is merely an extension of the people in it. If you can't do it, it won't get done."

THE STAFF

SUNDAY DRIVER

February 1961



A twin-engine cargo aircraft belonging to this command departed a western air base about eight o'clock on a crisp, clear Sunday morning. The pilot had filed for another air base some 360 miles away. His route would cross through some of this country's rougher terrain. Here is the story of that flight.

The tower operator briefly wished he could be on board the clean silver machine as he watched it accelerate down the runway and lift smoothly free. He squinted as he looked into the early morning sun to watch the pilot turn the aircraft neatly to the left, then bank back to the right in a 270. As it droned across the field climbing on course, he guessed it to be about 1500 feet. The field was over 5000 feet above sea level.

About fifteen minutes after eight an Air Force Technical Sergeant and his family were enjoying the scenery as they drove along a road winding along a valley in the mountains. As they watched, a large twin-engine aircraft flew up the valley, flying about five or six hundred feet off the valley floor, well below the peaks on either side. At first the Sergeant thought the aircraft was in trouble, but he couldn't see any smoke and the pilot

seemed to have the aircraft under control . . . still he felt uneasy. "I wonder why he's flying so low?" he said aloud to his wife; then in an attempt to answer his own question said, "You don't suppose he's in trouble?"

As they watched, the pilot banked and turned up a canyon intersecting the one they were driving in.

At about eight-twenty a man looked up from chopping wood to stare at a twin-engine aircraft with Air Force markings and said to no one in particular, "That guy's flying low . . . kinda looks like he's following Cougar Creek . . . guess he's looking for a good fishing spot."

Five minutes later a young man stepped out of a restaurant and heard the throaty roar of aircraft engines in synchronization. Glancing in the direction of the noise, he saw the machine flying up the valley floor apparently following the creek. "I wonder what that fella is up to," he thought; then fumbled at the cellophane covering on the package of cigarettes in his hand. "Whatever it is, he's sure low."

A former Air Force pilot with considerable mountain flying experience was walking toward his car on the road which follows Cougar Creek, his mind wandering from



topic to topic. Perhaps it was the noise or the flash of movement; anyway, his attention was attracted to the big twin-engine aircraft maneuvering up the valley. As he watched, he almost automatically checked wind conditions. Only a slight breeze was blowing. "Air must be pretty stable," he thought, noticing the aircraft's smooth progress. "If the wind was like it usually is, he'd have clobbered some ways back at the altitude he's at." The aircraft was about fifty feet above the timber tops. "Lord, I thought flat-hatting was a thing of the past... guess I should turn the darn fool in for his own sake."

A couple of miles upstream a young man cast a fly out onto the placid clear water of a beaver pond fed by Cougar Creek. The roaring of engines shattered the quiet of the valley and a twin-engine aircraft passed directly over his head. He stared at the passing aircraft and frowned, resisting the impulse to shake his fist at it.

At about 0830 the elderly caretaker for a tunnel through the mountains paused from feeding his pet deer to listen to what sounded to him like a large truck in low gear. As he listened, an aircraft passed overhead so low the swaying of pine trees marked its passage. As he watched, the telephone rang and he shuffled inside to answer it. The familiar voice of a crony living down the valley

responded to his hello by saying, "John, did that crazy pilot get up as far as your place?"

The caretaker replied, "Yep, he did, but doubt he'll get much further the way he went by. Dern fool was so low the trees were blown about by the air from his propellers. Wonder if he knows that this is a blind canyon?"

"I doubt it, John. He was awful low when he flew by the Falls and I didn't expect him to make it up far as you. Guess I was wrong. Could be he'll make it out. These newer airplanes can go almost straight up if they have to." The caretaker nodded agreement.

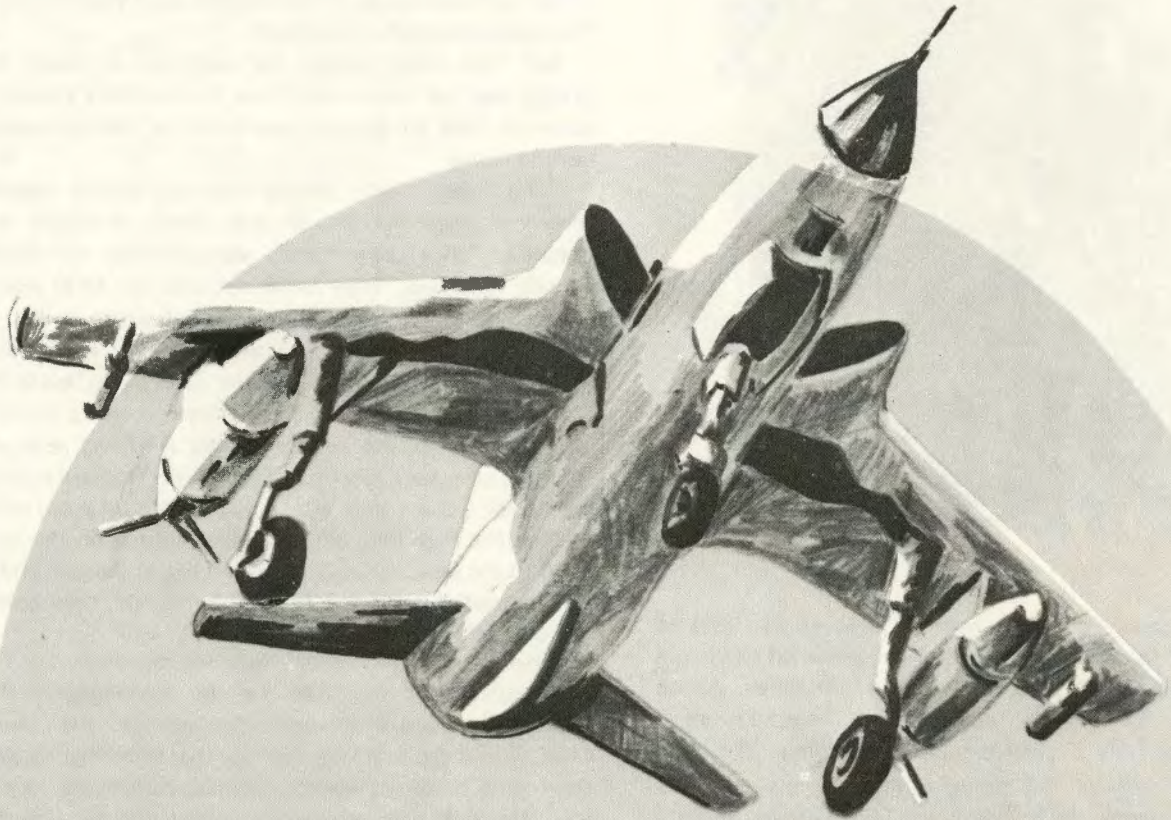
But they were wrong, for unknown to them the aircraft was less than a mile from the caretaker's shack, a scattered mess of broken aluminum, its nine occupants beyond caring.

Before long flight service and ops people became convinced that the aircraft was down. A search was initiated. Police departments were notified and search aircraft launched. They were airborne by 1500 hours. Fifteen minutes later a highway patrolman called to report an aircraft similar to the one being reported as missing. He had seen it shortly after eight flying low in the Cougar Creek area. At 1530 the Sheriff of Jake's Crossing called. Some of the people in the area had seen the aircraft flying very low up Cougar Creek. One had heard a loud noise a short time after it just barely cleared a ridge. A motorist had told him of seeing smoke on the next ridge to the west. Aircraft were directed to the area and at 1600 reported wreckage, but no sign of life; their search was over.

What happened? Had the machine failed man, or had man failed the machine? In the investigation that followed, it became apparent that man was the culprit. Clues within the wreckage indicate that both engines were developing power at impact. Witness statements verified this. No one had observed anything wrong with the aircraft other than the low altitude. Lack of power could not have been the reason for flying so low, because they by-passed one prepared airdrome and climbed over two thousand feet after being first noticed at low altitude. As the reports trickled in, it became more and more apparent that the pilot was flying at tree top level by his own choice. Aside from the obvious violation of regulations, such conduct was exceedingly foolish in the terrain being crossed... this he found out the hard way. His foolishness and lack of regard for regulations cost the lives of eight other people. He held their lives in his hands, yet tossed them away because of a childish whim!

Have you taken similar risks due to an urge to impress someone or for the thrill of speed? If so, you lacked maturity. Regardless of what you've gotten away with in the past, the future of our Air Force and our nation demands that you have the maturity to resist such impulsiveness. Think it over.

THE



SINK HOLE

... is a trap off the end of the runway that is waiting for the unwary and the unwarned. You fly into it when you duck under a precision glide path trying to land in the first 1500 feet... or attempt an abnormally steep VFR final. You avoid it by understanding it... and using enough power.

It was good to see familiar terrain below him in the letdown even if it was only light patterns on the ground. He knew he could land VFR if he couldn't raise GCA, but he called again for one last try. At last the controller answered!

They exchanged the standard greeting... "How do you read?"... "Fine, how do you read?"... "Fine." Immediately the GCA operator, in a somewhat concerned voice started saying he was 500 feet high and five miles from the runway. He eased back the throttle, leaned forward on the stick a bit, and started toward the glide path. Even with speed brakes in, he corrected rapidly. At two miles he was on glide path and stayed on it until just after the controller announced one mile.

As he ducked below glide path he noticed the VASI lights go red-red. He didn't look at them again. When the picture in front of him looked about right, he started back

on the stick to flare for a smooth landing. A little correction to the left for wind and...

The nose came up abruptly. He released back pressure to break the stall and jammed the throttle all the way forward.

The aircraft touched down hard in the first five feet of the overrun. The left gear was dangling when he came back down on the runway. The drop tank held his wing off for a while, but when he went off the side of the runway the airplane was sliding sideways. The right gear folded outward. Finally all motion stopped.

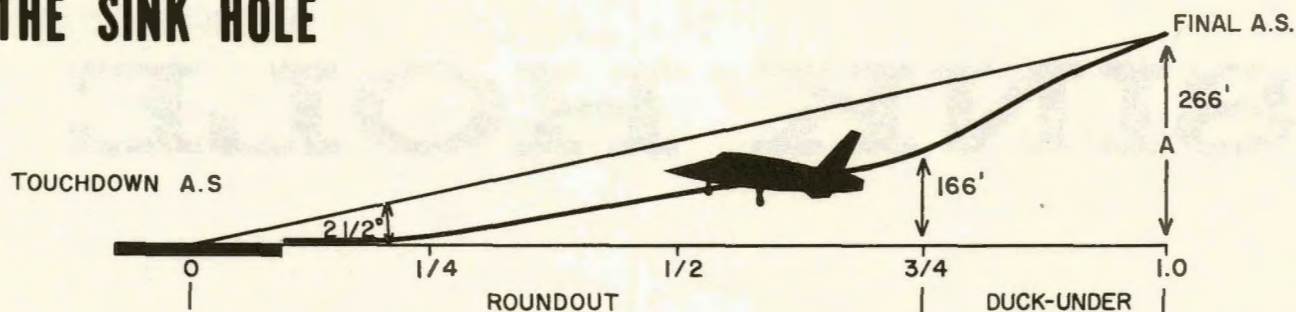
He felt like crying.

There was no fire.

He unstrapped and got out.

There's a trap out there on final. Many of us who drive high-performance (high wing loading, low aspect ratio... call it what you will) airplanes have fallen into it.

THE SINK HOLE



No, we usually dive into it...or let down into it. It's about a half mile out from the threshold.

The trap is where you get into a sink rate you can't recover from. Sometimes you can't recover even tho you recognize it immediately. You might call it a sink hole!

The path to the sink hole is not a straight line. It is not a "glide slope" as we think of it on GCA, ILS, or VASI. It is curved. Two curves. One curve starts at a position on or above "glide path" and descends to a point somewhere below it. Then the curve reverses. The second curve is the flare or round-out that decreases your descent to almost zero as you contact the runway.

You get into trouble right after the transition from one curve to the other... when the airplane realizes it doesn't have enough thrust to follow the path your eyeball has planned for it. And that's the other half of it, landing an airplane is still strictly eyeball. All the approach aids in the world will not land the airplane for you. They'll give you a lot of help during the approach to a landing, but you must land the airplane! The only landing aid you'll find in the books, or anywhere else, is what connects the stick to the throttle... the pilot!

Most of us dive below the 2 1/2 degree glide path at some point inside the mile-to-touchdown point if we expect to land in the first 1500 feet. After you dive below the glide path, you use the first quarter of the remaining distance to momentarily increase your rate of descent. Then you

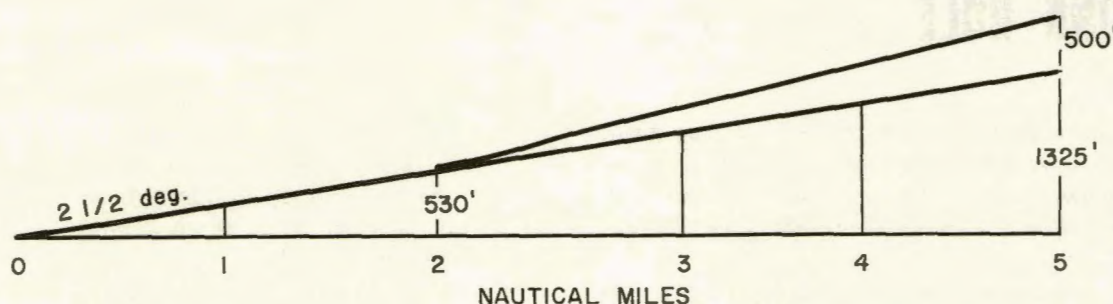
raise the nose to resume a normal sink rate and attitude. If you hold a normal glide path power setting, this will net you no increase in airspeed. The energy you gain in the dive will be dissipated when you rotate the nose up again.

When you reverse the curve and start the final landing arc, you are usually approximating a 1 1/2 to 2 degree slope instead of the 2 1/2 to 3 degree instrument approach slope you left earlier. It's worth noting that the angle of the final approach slope has decreased bit by bit ever since someone invented the term. While WWII Jugs and Spam Cans could handle a slope that was 3 1/2 degrees or steeper with impunity we're finding that the current crop of fighters land best... shortest, safest, gentlest... out of an approach that is somewhat less than two degrees.

Tests conducted by the RCAF revealed that their F-104s and F-101s which had been landing 1800 to 2500 feet down the runway from a 2 1/2 degree GCA, were able to touch down 700 to 1000 feet closer to the approach end from a two degree glide path.

Part of the short, safe, gentle bit you can attribute to the fact that the flatter your approach angle, the less you must rotate your aircraft. Therefore, you fly the pre-flare approach closer to the ground... and can judge it more accurately. Also, by requiring less rotation to complete the flare, the flat approach introduces less drag increase at the last moment. You don't stick as much wing up into the wind. Less drag increase means either less power

<u>FINAL A.S.</u>	<u>DEPART GLIDE PATH</u>	<u>AIRCRAFT</u>
100-130K	1/2 NM	T-33, T-39
140-170K	3/4 NM	F-84, F-100
180-210K	1.0 NM	F-101, F-104, F-105



required or less sink . . . however you want to play it.

And drag is what the sink hole is made of. We've heard for years about the back side of the power curve and the area of reverse command. They're no more than manifestations of drag. Basically it is drag that gets us into trouble on final approach . . . that makes short landings or hard landings. (Hard landings are short landings that made it up to the runway.)

Let's take the hypothetical case of a '105 (because the figures are right handy) and run thru an approach to see what we're faced with:*

assume

aircraft	F-105D
gross weight	31,000 lbs
final approach speed	185K
touchdown speed	155K
glide path angle	2½ deg
depart glide path	1 mi
wind	calm

As we said, the first 25 per cent of the distance to touchdown sees us easing the nose down and increasing our rate of descent momentarily. Then we raise the nose to resume a normal descent rate. We don't lose or gain any airspeed because the energy gained in losing altitude is just equal to what we consume when we rotate the nose down and then up again. The last three-quarters of the trip down final becomes a circular arc as we decrease airspeed from final approach to touchdown speed.

Average speed in the F-105 for the last three-quarters of a mile will be 170K. This will eat up the distance in just under 16 seconds. Since we now have about 160 feet to lose, we'll have to average 10 feet per second . . . or 600 feet per minute.

We started the flare after diving down to a position that looked good to us (185 knots and 160 feet). Right there our total energy was 52,000,000 foot-pounds (kinetic energy plus potential energy). At touchdown, with 155 knots and zero altitude, total energy was 33,000,000

foot-pounds. We lost 19,000,000 foot-pounds somewhere along the line. Why? Because we were not carrying enough power to equal the drag of the airplane . . . we were descending. This unbalanced drag force over the flare distance absorbed 19,000,000 foot-pounds of energy. Put another way, drag exceeds thrust during a normal roundout by an average 4200 lbs.

If we carry more than normal power during flare, we will either land long or touch down hot . . . or both. If we carry less than the thrust required to maintain a 4200 pound drag excess, we will find ourselves with a higher than normal airspeed bleed rate. Uncorrected, that leads to early touchdown . . . or low-speed instability problems when we hold it off too long trying to reach the pavement.

Now let's look at the example from the beginning of this article in the same frame of mind. GCA picked him up at five miles, 250 KIAS, and high, high, high on the glide path . . . like 500 feet. He decided to pull off power, leave the speed brakes in, and nose his 'Chief over to get down to the glide path. He reached glide path two miles from the runway with 185 knots . . . let's say he, too, was at 31,000 pounds gross weight. In that three miles he lost 1295 feet at an average speed of 218 knots. That's a vertical speed of 1600 feet per minute! It's also double the vertical speed he'd have needed on the same slope with speed constant. That's nice, you say . . . but he lost 65 knots in the process! That takes some pretty spectacular throttle chopping . . . with the boards still retracted!

We asked some of the people who can figure these things out what kind of power this guy was carrying. They said about 84 percent after he left the glide path. Test reports and pilot experience say that something more like 88 percent is the minimum average power needed to complete a successful flare and normal touchdown from a 2½ degree approach at his weight.

Okay, that's only four percent less than he was holding, you say . . . not much! Do you know how much thrust he lost between 88 and 84 percent? You get 5400 pounds of thrust at 88 percent and 4300 pounds at 84

THE SINK HOLE

percent. This tells us the value of the total drag force acting on the airplane. As we showed earlier, the optimum difference between drag and thrust is 4200 pounds. This changes only when you change configuration or angle of attack.

So what does he get when he leaves his power at 84 percent through the flare? Drag (9600 lbs) minus thrust (4300 lbs) equals 5300 pounds of thrust deficiency. We said a 4200 pound difference is ideal. He's 1100 pounds short in the go department. And it shows up as either a more rapid airspeed loss or, if he tries to hold airspeed, an impressively increased sink rate. Either way the results are the same. Very unfriendly.

How far can this pilot press thru his flare with power four percent low before he's in trouble? He's okay until he uses up the 19,000,000 foot-pounds of energy we figured he would normally use in the flare. Energy available divided by retarding force (drag excess) gives us the distance he will travel before his energy is used up. Plug in the figures . . . 19,000,000 foot-pounds divided by 5300 pounds equals 3580 feet. If he starts to flare at his normal three-quarters of a mile (4560 feet) from the runway, he'll slow to his 155 knot touchdown speed and descend to ground level 980 feet short of the threshold.

And that's where he came down . . . in the first few feet of a 1000-foot overrun!

What's that? He jammed on full power, you say . . . why didn't that stop his sink?

The J-75 takes six seconds to accelerate from idle to 100 percent. It takes about 2½ seconds from 84 percent. If his vertical speed was up to 1000 feet per minute when he decided to shove the throttle, he lost 40 feet in the

time it took the engine to wind up to full rpm.

Once he had full power, he held the nose of the aircraft up just short of a stall. Let's say one degree above takeoff angle of attack . . . 12 degrees. How long would it have taken him to kill off his sink?

The downward energy of his 31,000 pound chariot was in the vicinity of 135,000 foot-pounds. The 13,000 pounds of thrust at 100 percent gave him a 2700-pound vertical thrust component at 12 degrees angle of attack. The bird lost another 50 feet of altitude before he leveled it off holding airspeed constant. He couldn't stop the sink in less than 90 feet from the time he advanced the throttle.

That's the story of the sink hole. It's made out of drag. And you can avoid it with thrust. But you must know the hole is there . . . and you must keep the balance between thrust and drag where it's supposed to be. The Dash One for your bird gives you recommended airspeeds for varying weight. And it gives you recommended throttle settings. Know them well!! Also keep in mind that these are often built on the assumption that you'll be on a three-degree glide path. The throttle setting will give you enough thrust for the energy-exchange during flare. But if you're driven in for some distance on a flatter glide slope, better keep a wary eye on the airspeed meter. Be sure you're carrying enough power to keep you out of the overrun!

If you're shooting for the first 1000 or 1500 feet from an ILS, GCA, or VASI approach, you'll have to "Duck Down." You can get down to the spot you want without touching the throttle if you've the proper power set. If you find yourself high, high, high . . . and pull off some power, be very sure you put it back on and then some to stop the sink you set up!

If you don't, you can be very sure you'll touch down hard or short . . . or both! ➔

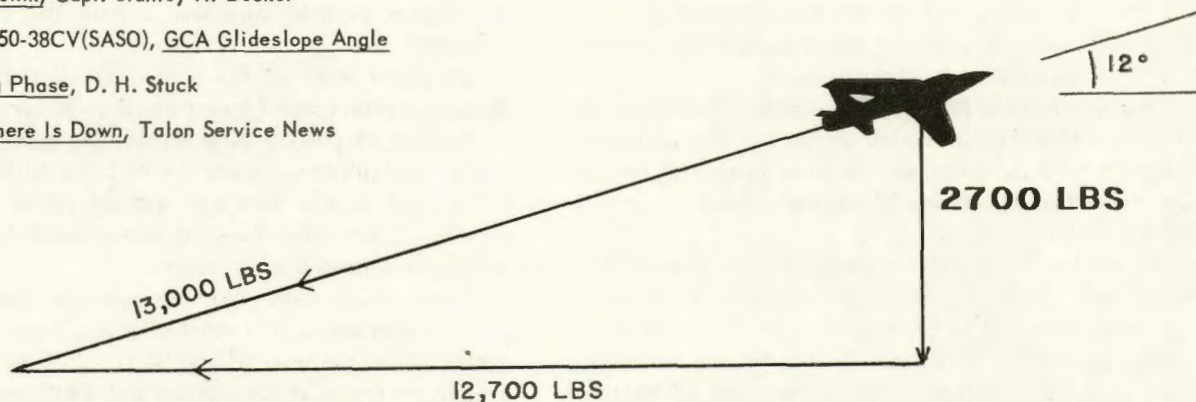
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The Landing Phase, D. H. Stuck

And Then There Is Down, Talon Service News



Tactical Air Command

Crew Chief of the Month

Sergeant Robert R. Reed, 547 Special Operations Training Squadron, Hurlburt Field, Florida, has been selected to receive the TAC Crew Chief Safety Award. Sergeant Reed will receive a letter of appreciation from the Commander of Tactical Air Command and an engraved award.



Sgt Reed

Tactical Air Command

Maintenance Man of the Month

Staff Sergeant Edward L. Stover, Jr., 436 Tactical Fighter Squadron, Homestead Air Force Base, Florida, has been selected to receive the TAC Maintenance Man Safety Award. Sergeant Stover will receive a letter of appreciation from the Commander of Tactical Air Command and an engraved award.



SSgt Stover

A 2ND LOOK



As the pilot applied power for takeoff, number two started to backfire. Since there was plenty of runway ahead and number one was developing good power, he decided to press on and give the bad engine a chance. Number two cleaned itself out and was running smoothly at liftoff. Trouble really started after the pilot pulled back to METO power. Cylinder head temp on number one rose rapidly to 280 degrees with a two inch manifold pressure drop . . . and number two engine followed shortly with the same symptoms.

The crew, in weather by this time, suspected carburetor ice, tried heat to one engine and then the other. But this only produced backfiring, detonation, and further loss of power. After pulling off carburetor heat, opening cowl flaps, and turning back to the field, the crew found that cylinder head temps would come back to a reasonable figure with power reduced. Number two smoothed out at 2600 rpm, but number one was still rough and torquing on the mount. On final they feathered number one and got the 20 passengers safely on the ground without further trouble.

Damage to the engines was such that both had to be changed.

The almost simultaneous and identical problems on both engines pointed toward contaminated fuel, and investigators found that the aircraft was serviced the day before with a 50-50 mixture of Avgas and JP-4! The aircraft commander had personally seen the 115/145 sign

on the fuel truck and the flight mechanic noticed that the fuel was the proper color when he serviced the bird. Further checking revealed that an airman with only several weeks total service had inadvertently filled the 115/145 truck with JP.

The lock control system provided by TO 42B-1-1 was not in use at this base. This system makes such an incident "impossible" by providing the JP driver a key that will only unlock the JP pump.

A second look, beyond the pilot's failure to abort takeoff when the engine backfired, reveals a pitfall that is always waiting for us . . . the hazard or accident potential that we have long since recognized, taken action to correct, and dismissed from our package of current worries. The disastrous effects of jet fuel in piston engines was recognized many years ago. It attracted a great deal of attention and an almost fool-proof fix was devised. Incidents of JP in Avgas trucks and recip's tanks decreased . . . then dwindled to nothing. It was no longer a problem. Compliance with 42B-1-1 disappeared from our safety survey checklists. Then, of course, the old, forgotten problem reared its ugly head!

No accident potential is ever completely eliminated. It may be suppressed . . . but suppression is an active thing. When you relax the suppression, control, or awareness that "eliminated" a problem . . . the problem is still there as big as ever. ➔



The pilot had been airborne one hour and twenty minutes when his O-1 started bucking and backfiring. Fortunately, he found an abandoned airfield nearby and made a smooth emergency landing.

Investigators found that the Birdog had used excessive oil two flights previously. Although four quarts of oil in three hours on that flight had not exceeded TO specifications, the engine technicians borescoped the engine at the time and found number three cylinder was scored. On the next flight, with a new jug in number three, the engine used three quarts of oil in one hour and forty-five minutes. This time the ground crew added oil and sent the bird off again . . . to land in the abandoned airfield.

When engine specialists arrived at the emergency field, they found oil-fouled spark plugs in number three and four cylinders. No real problem . . . plenty of plugs. But after the plug change the Maytag Messerschmitt was still running rough, coughing smoke, and dropping 90 to 110 rpm on the mag check. Since these were still the symptoms of bad plugs, the technicians changed the again oil-saturated plugs in number three and launched the bird for home station . . . forty-five minutes away.

As could be expected, the engine ran rough on the way home, but the pilot managed to get it safely on the

ground before the engine shook itself off the mounts. This time the maintenance troops looked beyond the oil-fouled plugs and found worn intake guides. In six hours they had both cylinders changed and the problem cured.

A second look at this determination to launch a single-engine aircraft with a known engine problem raises serious doubts about the soundness of the decision. And hindsight is not involved. Maintenance supervisors had adequate information before they authorized takeoff with only a stop-gap plug change.

The first cylinder change actually increased oil consumption from 1.3 to 1.7 quarts per hour. In spite of this, they launched the bird after only servicing it with oil. Their decision to risk return from the emergency field may have been based on the greater ease of maintenance at home. Perhaps they considered the fifty-five minute trip back against the hour-twenty before the engine failed on the last flight as reasonable odds . . .

However, the decision was made, you still have the grim picture of a single-engine airplane taking off with two bad jugs out of a meager six available. And six hours of maintenance would have made it possible to avoid the risk. Two-thirds chance of success sounds like a gambler's approach to flying. ➤



The message referred to a major accident where an F-105 inadvertently engaged the BAK-9 on the approach end and an incident where an F-100 damaged its tail skid by contacting the barrier cable. From there on it spoke for itself: THE F-100 INCIDENT IS SIGNIFICANT IN THAT IT WOULD PROBABLY HAVE RESULTED IN A MAJOR ACCIDENT HAD IT BEEN AN F-105. THE UNGUARDED TAILHOOK ON AN F-105 WOULD HAVE ENGAGED THE BAK-9 CABLE ON A TAIL-LOW LANDING RATHER THAN RESULTING IN A BROKEN TAIL SKID AS IN THE CASE OF THE F-100. ACCIDENTS AND INCIDENTS INVOLVING

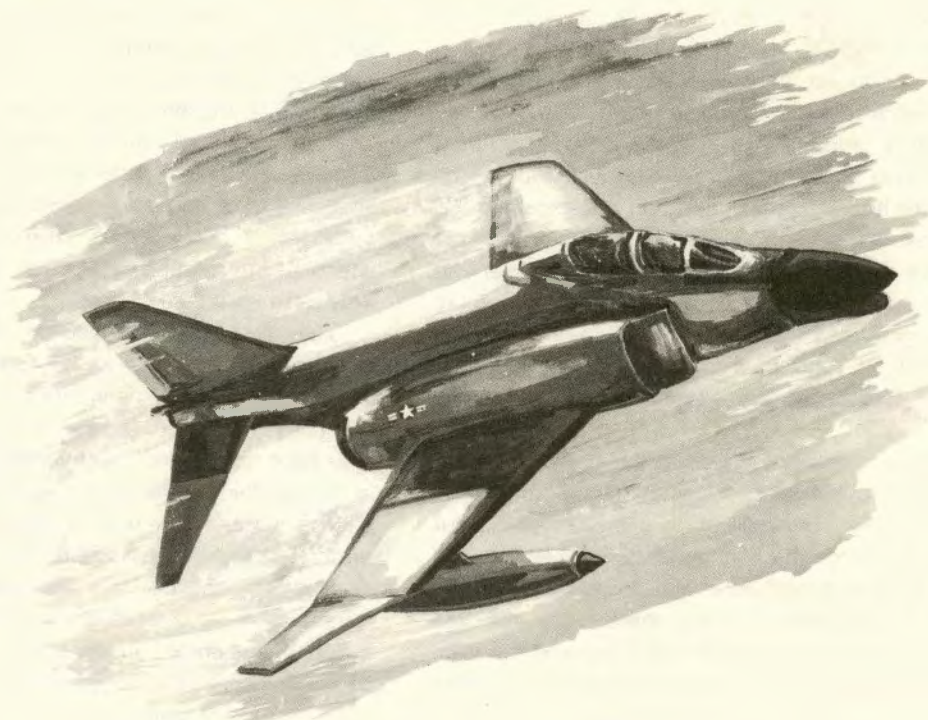
INADVERTENT APPROACH END ARRESTMENTS OF TAILHOOK EQUIPPED AIRCRAFT HAVE BEEN OCCURRING SINCE 1961. POSITIVE CORRECTIVE ACTION TO INSTALL TAILHOOK POINT GUARDS AND TAILHOOK INDICATOR LIGHTS ON THE F-106, F-102, AND F-100 AIRCRAFT WAS NOT TAKEN UNTIL MAJOR ACCIDENTS VERIFIED THE NEED FOR THESE DEVICES.

Does it take a second look to see deficiencies in similar equipment when we've pinned down an accident cause factor in one design?

Then why don't we take that look? ➤

more on...

TURNING THE F-4



Adapted from material by

Captain Don Calvert
originally published
in the USAF Fighter
Weapons Newsletter

What is all this about turning the F-4?

It's learning, and being able, to get the most out of the airplane, isn't it? It's knowing how to get maximum performance out of it in a fight. And until someone comes up with something better, we in the fighter business will hang our hats on an Air Combat Tactics (ACT) training program to prepare us for ... turning the bird.

A good ACT program will give you the knowledge and skills that increase your combat capability in all phases of fighter flying. And a

good ACT program must start on the ground floor. In other words, you must master basic maneuvers before you can move on to tactics.

It's not just a matter of jumping in the airplane and going out to fly these maneuvers, either. A solid academic foundation in each phase of training will give you a better understanding of... and consequently make you better at ... turning any fighter airplane.

Before you go out to learn maneuvers, you must understand the performance characteristics of your airplane. Then you can prac-

FIG. 1 Relative wind (angle of attack) on downgoing wing during roll.



tice maximum performance flight. What you will be doing is learning to operate the bird efficiently under high angle of attack conditions. Once you have mastered that, you will be able to perform all the fighter maneuvers you need in an air combat situation.

While it is important for you to be able to maneuver the F-4 at maximum performance, there are other factors which are equally important.

You must recognize your enemy and his armament. If he has missiles, his tactics and yours will follow one pattern. If he's trying to press a gun attack, you'll both maneuver differently. In either event, you must know your enemy's capabilities and limitations.

In practice, you are generally pitting one F-4 against another. The performance of both the attacker and his quarry are about the same. And it's only natural that these exercises often progress to a minimum airspeed contest.

In general, you should always avoid a fight that places you at minimum airspeed. If you can entice a faster enemy into maneu-

vering at your best airspeed, you have him.

The advantage of keeping the fight up around your best turning speed is that you are in the optimum portion of your flight envelope. At low and medium altitudes, you can pull the airplane all the way to the G limits before you reach critical angle of attack. At five thousand feet you only need about 10 units angle of attack to pull 6.5G at best turning speed.

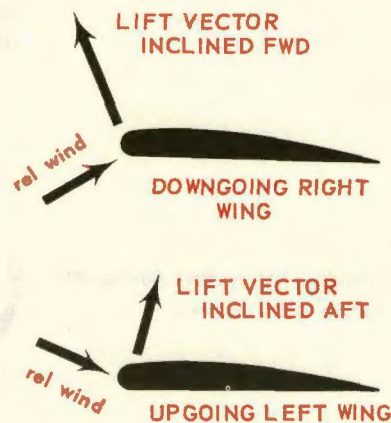
The only time you need maximum performance maneuvering in the low speed area where angle of attack becomes critical, is when you find yourself slow and need a last-ditch maneuver to survive ... say when you find yourself the target of a missile and have to take drastic action to survive.

ROLL CONTROL

In maneuvering the F-4 through max performance turns, you use basically the same technique as in other sweptwing, century-series fighters. You use two separate techniques:

- At low angle of attack you use conventional control ... aileron and spoiler for roll, rudder to

FIG. 2 Lift vectors are inclined at differing angles during roll.



keep the turn coordinated. You control rate of turn, or roll intensity (as in a barrel roll), with aft stick.

- However, at high angle of attack, you must hold your ailerons and spoilers neutral while you maneuver. Rudder becomes primary for roll control and turn direction. You still use backstick to get the turn rate or roll intensity you want.

Adverse yaw, which the F-4 encounters with normal control at high angle of attack, dictates the difference in control. Yaw opposite the turn or roll direction, adverse yaw, comes from two major sources:

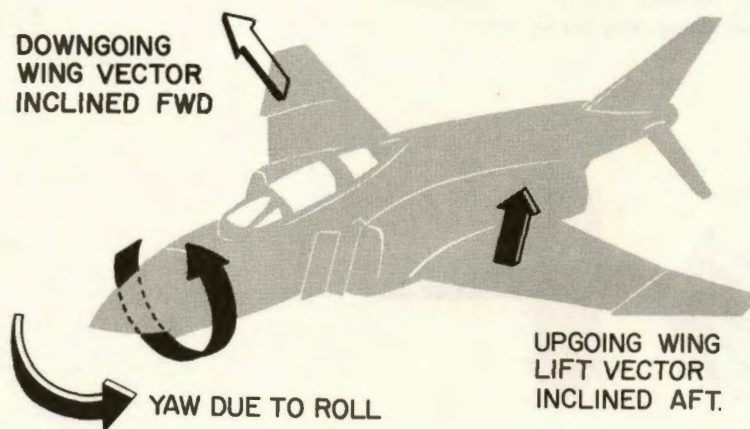
- Yaw created by the drag of the downward deflected aileron on your high wing, and

- Yaw caused by the roll itself.

In a right roll, as your right wing goes down it encounters a new relative wind (fig 1). This new relative wind meets the wing at an increased angle of attack. Your left wing, going up, encounters a new relative wind which it sees as decreased angle of attack.

This difference in angle of attack between the two wings causes their lift vectors to be inclined at different angles (fig 2). The result

FIG. 3 Differing lift vectors during roll to right induce yaw to left.



is a yawing moment opposite to your roll direction... adverse yaw. (fig 3)

Both sources of adverse yaw are greatest at high angles of attack and, of course, with maximum aileron deflection.

When you roll the aircraft or change turn direction with rudder, you are using a principle called dihedral effect. You could call it roll due to sideslip or yaw. By using right rudder and causing a yaw to the right, you increase the sweep angle of the right wing and reduce the sweep angle of the left wing (fig 4). Due to the change in sweep angle, your right wing loses lift and your left wing gains lift. The result is that you roll in the direction of the rudder you applied (fig 5).

By using this principle at high angle of attack, you have eliminated one source of adverse yaw... aileron drag. And you have applied rudder to counter the second source of adverse yaw before it becomes significant.

Turning the airplane with dihedral effect at low angles of attack produces roll rates much lower than what you can get using conventional control. But at a high angle of attack dihedral effect

gives you a higher rate of roll. And for all practical purposes, you have eliminated adverse yaw.

Okay, those are the basic control techniques. Let's see what happens when you use incorrect techniques:

When you move an aileron down while the wing is at high angle of attack, the drag it creates causes adverse yaw. That yaw creates unequal lift on your wings and a rolling moment... dihedral effect (fig 5 again). But now, that dihedral effect is working against the direction you want to turn. So you give it more aileron. The airplane's tendency to roll out of the turn increases. You give it more stick into the turn. Finally, you have increased angle of attack on one wing until it stalls... a snap roll results!

And you seldom improve your tactical position by snap-rolling out of a defensive turn... or in the middle of an attack!

IN-FLIGHT RIG CHECKS

Before you practice max performance turns or try air combat maneuvers, you should check your aircraft for proper rig and trim. The people at the Fighter Weapons

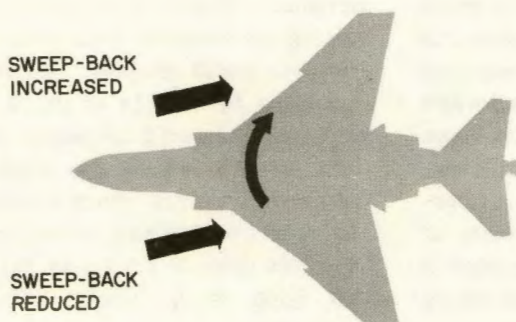


FIG. 4 Change in sweep-back during yaw (right rudder).

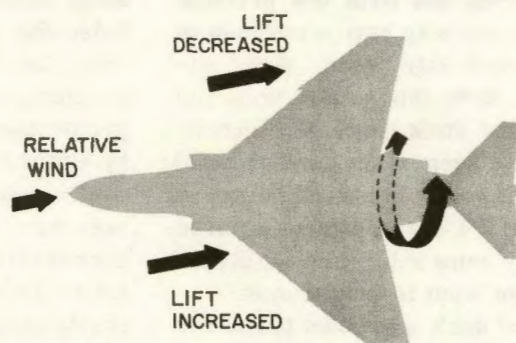


FIG. 5 Right rudder induces roll to right due to asymmetrical lift on wings from dihedral effect.

School use a rig check that you can easily accomplish in the climb. It goes like this:

With Stability Augmentation (Stab Aug) engaged, trim the ball to the center (from the rear cockpit). Check that your aircraft will fly wings level with ailerons and spoilers neutral. A slight roll tendency is acceptable. But if you must use a large amount of trim to hold wings level (1 to 1-1/2 inches of aileron down at 350 knots CAS), you either have an airplane that is out of rig, or a Stab Aug that is acting up.

To isolate the source, go through the same check with Stab Aug off. If the airplane still takes the same amount of trim to hold wings level, it is out of rig. A word of caution here... it's easy to overcontrol in pitch with Pitch Aug disengaged. If you have three Stab Aug switches, leave Pitch Aug on. When you have only a single Stab Aug switch, use caution at high airspeeds.

If you didn't need a lot of trim with Stab Aug off, suspect the Stab Aug.

In either case, don't try to fly the aircraft to max performance! Handling characteristics are extremely poor and you may lose

control under these conditions. Fly the bird home, write it up, and let the experts correct the problem.

After you're satisfied with the rig check, move on to a check of the Stab Aug. Induce moderate roll, pitch, and yaw moments. Stab Aug should damp them out after one overshoot. *

GETTING THE FEEL

During your initial max performance turn training, use a canned situation. Begin the maneuver at 30,000 feet, Mach .9, and full military power. Enter a rapid, coordinated bank and simultaneously apply smooth back pressure.

Continue back pressure until you have 19 units on the angle of attack indicator. Use back trim to

relieve the stick forces. Now hold the 19 units with back stick and continue to trim until you reach 200 knots. Recover by placing the stick forward of neutral.

Remember, you've been trimming the stick back. You must positively move the stick away from you to place it forward of neutral!

But don't forgo the back trim just because of the recovery. Without the stick pressures trimmed out, you can easily induce small side pressures without knowing you are doing it. Even small aileron deflections will require that you reduce back pressure to maintain control. And there goes the maximum performance!

Learn to fly the rudder exactly as you do the ailerons. Develop a feel for the pedals and use them to control turn and roll. Again, the word is smooth... a rapid, full rudder deflection will put you right into that snap roll we talked about. The one that won't do you any good in a fight.

And be critical of yourself! Any time the nose wallows around while you are practicing high angle of attack turns, you are using too much rudder!

* During all air combat tactics missions in the Fighter Weapons Instructor Course, the people there leave the Stab Aug roll axis disengaged. This prevents Roll Aug from countering the rolling moment of dihedral effect at high angles of attack. When you leave Roll Aug engaged, it generates an undesirable cross-control or pro-spin condition.

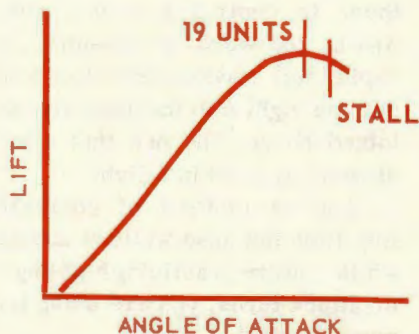
During the first few practice turns, you may have a tendency to subconsciously apply some aileron, even though you think you have the stick centered. Concentrate on keeping the stick centered until it becomes second nature to you. Don't try to control adverse yaw by using aileron in the direction you want to turn or roll.

And don't use rudder to counter the aircraft's tendency to roll out of the turn. At high angles of attack, you can encounter adverse yaw of such magnitude that full rudder will not counteract it. Your only recovery is to reduce angle of attack, rate of roll... or both. Incorrect control technique may put you right into poststall gyration or a fully developed spin.

WHY 19 UNITS?

By now you may be asking some questions... Just what is maximum performance? Why 19 units angle of attack?

You can define max performance as the angle of attack at which your wing generates maximum lift. Any higher or lower angle of attack will give you less than maximum lift (fig 6). At subsonic speeds the F-4 wing generates maximum lift at approximately 19 units angle of attack. At super-



sonic speeds the angle of attack value for max lift becomes variable. But this doesn't present a problem, because supersonic max performance in the F-4 is limited by either G or full aft stick. When you're supersonic at high altitude, max turn is full aft stick... stabilator limited. Supersonic at lower altitudes, you encounter G limits before you reach maximum lift and max performance... structurally limited. **

If you're generating maximum turn while supersonic and decelerate to subsonic speed, be prepared for a pronounced dig-in. Stabilator effectiveness increases as you go subsonic. If you don't overstress the bird, you will at least lose a good chunk of your Mach in the high speed stall. After a few practice turns through this area, you will learn to anticipate the increased stabilator effectiveness. You get light buffet shortly before the dig-in. Just ease off a bit of back pressure.

And when you're accelerating through sonic speed you'll have to increase back stick to keep the F-4 at max performance. But watch the G-meter at lower altitudes, you can overstress the aircraft.

As we said earlier, 19 units give you max lift subsonic. You can use the angle of attack indicator in certain areas, but trying to generate 19 units at high CAS and low altitude will normally get you a high speed stall or overstress. At high altitudes... say 18,000 feet and above... you can easily get 19 units if you use the control techniques we've discussed.

In fact, you can generate more than 19 units. But why? You'll lose lift when you pass 19. And induced drag will increase rapidly... drag due to angle of attack. In addition to that, you're entering an area

where aircraft control becomes marginal. Remember, you're turning the airplane with dihedral effect to avoid trouble. And that increases the angle of attack on one wing beyond whatever you were holding before you started the turn. If you're above 19 when you start, you're just cutting into what you have to turn with. When that wing stalls, you're out of business!

Unless your tactical situation makes it desirable to lose airspeed or altitude... or both... there's not much sense in going past 19 units.

It's not generally possible to use the angle of attack indicator in a tactical situation. In turning the airplane its use is limited to training. Therefore, you should try to develop a feel for maximum turning performance during your practice. You can use buffet intensity as a crutch in determining max performance, but be careful. The indications for one situation don't necessarily hold true for another. Practice in all areas of the flight envelope.

Once you've mastered max performance turns, you will be ready to progress to basic fighter maneuvers. These maneuvers are the key to success in air combat.

And that's what we're here for!

** For simplicity's sake we've treated the transition from sub- to supersonic flight as a single point. Aerodynamically, the F-4 experiences many changes in lift, drag, and stability between about .92 and 1.05... but most of our flying is either above or below the transonic zone. Similarly, we know that max lift on the F-4 wing occurs at 18 degrees angle of attack below .92 Mach, which equates to about 19.6 units on the meter we look at. But who can read tenths on it? So we've used terms and figures that will be meaningful to us in the air.

Pilot of Distinction

Capt Grimm



Captain David M. Grimm of the 336 Tactical Fighter Squadron, Seymour Johnson Air Force Base, North Carolina, has been selected as a Tactical Air Command Pilot of Distinction.

Captain Grimm completed a Crested Cap support mission in an F-4E and departed Griffiss Air Force Base, New York for Seymour Johnson Air Force Base, North Carolina. Immediately after takeoff at dusk, as the landing gear and flaps were being raised, there was a loud explosion and the aircraft yawed sharply to the right. The rear seater observed flames along the right side of the aircraft and Captain Grimm retarded the right throttle to idle. After increasing airspeed and altitude, he completely

shut down the right engine. As he burned off fuel, Captain Grimm was informed by Griffiss RAPCON that weather conditions were deteriorating. He expedited reducing gross weight by extending his speed brakes and using a high power setting on the left engine. He made a successful single engine approach and landed under marginal weather conditions. Investigation revealed that the loss of thrust was caused by internal failure of the torque motor in the nozzle area control.

Captain Grimm's rapid evaluation of a critical inflight emergency and taking prompt corrective action readily qualifies him as a Tactical Air Command Pilot of Distinction.

TAC TIPS

...interest items, mishaps

CARBURETOR ICE

Carburetor ice can be a serious problem in humid areas almost the year around. Recently a pilot from another command found his A-1 backfiring with a high cylinder head temperature. He selected alternate air and the carburetor temp rose from five to 32 degrees. It dropped back to five degrees when he selected direct air. The pilot headed for the nearest airfield and declared a precautionary emergency. (It wouldn't have cost him one cent more to have just declared an emergency.)

The tower cleared him number two behind another aircraft on a three mile final. While turning a wide base, the engine quit, he decided he couldn't make the airdrome and turned toward a small field. He hit some trees while trying for this field. Fortunately, the engine started running again at about this point and he limped in to the airfield. Investigators criticized him for leaving the engine on direct air when carburetor temperature was near freezing and for not declaring an emergency to gain priority over the other traffic altho the engine no longer seemed to be giving difficulty at the time he entered traffic.

August 1965

LUCK!

After becoming spatially disoriented, a reconnaissance fighter type had to eject as he passed 10,000 feet. The egress system worked just fine and chute deployed automatically, but the pilot lost a glove and his helmet during the ejection. Luckily, a ship happened by and picked him up about ten minutes after he hit the water. He was in pretty good shape, but a little short of survival gear. It seems he hadn't bothered to hook his survival kit and raft to the chute harness, nor did he wear his LPU-2/P underarm life preserver. Fortunately, he hadn't forgotten his rabbit's foot.

June 1965

SAFETY THRU EXAMPLE

Fly safely!
Be professional!!
Be careful!!!

The first is inane.

The second is insufficient.

The third is insufferable.

The soft, impotent, "be careful" attitude characterizes much of our human error prevention efforts.

Telling the vain, self-centered razza-matazz, twang-the-wire-and-kick-the-tire-type (that's ME!), who would dearly love to be thought of as hot, to "be careful" isn't going to get you any marbles. But if we had the wisdom to talk to him about values and the ill effect of vanity and false pride, we might at least get into the game. Maybe we'd succeed in touching the tender nerve of conscience that all of us have. But here's the rub. Before we can ever hope to speak with wisdom we must first fight the razza-matazz battle within ourselves. To the degree that we're willing to make the effort there will be progress in the push to reduce human error.

The alternative is to continue to preach "be careful."

The lectures you deliver may be wise and true but I'd rather get my lesson by observing what you do.

LCDR Jim Dennis, USN

August 1965

LEFT PHLANK

The Phantom broke hard left and headed for the boonies when the pilot engaged nose wheel steering at 65 knots on landing roll. He disengaged steering, paddled off the anti-skid and used hard right rudder and brake, but the big bird continued to turn left, going 180 degrees before it

with morals, for the TAC aircrewman

stopped about 300 feet off the runway. Tires had to be changed, but the gear was undamaged. Investigators found a defective potentiometer that was allowing random signals to cause the hard-over steering. A fix, ECP 532, is on the way, but until we are able to forecast random failures it doesn't look too smart to give this kind of malfunction a chance to occur. Sure, the Dash One says "directional control can be maintained with... nose wheel steering in the high speed region of the roll." It doesn't elaborate on the wild ride that follows a malfunction! The crew training folks at Davis-Monthan have experienced a long string of nose wheel steering troubles and now recommend that you use it only for taxi and the initial phase of takeoff roll. Their local directive says that nose wheel steering will not be engaged in the landing roll except as an emergency measure... it will be engaged at a slow taxi speed to turn off the runway.

July 1965

LESS LIGHT

A recent C-130 landing incident re-emphasized the problems involved in landing the big iron bird with less than the customary two landing lights. The change in shadows, when using taxi lights or a single landing light, affect depth perception and have embarrassed many a pilot and (sorry to say) damaged many a landing gear. Most often, the pilot thinks he is higher than he really is. Understanding the changes in visibility and planning for them will help to eliminate the problem. Using the longest runway available and a power-on approach, stair-stepping down to the runway, seems to be the best plan.

November 1965

PILOT ERROR?

From a non-TAC mishap... The pilot was being directed back to the line and had to pass very close to a hangar to miss another parked aircraft. Clearance seemed

a bit too critical and the pilot stopped the bird and shut down the engines even though the lineman was still giving him a come-ahead signal. No one said a word. The line crew got a tug and tow bar, hooked up the bird, and proceeded to tow it to the line. Sure enough, the wing tip crunched the hangar.

July 1965

WHO'S CHECKLIST?

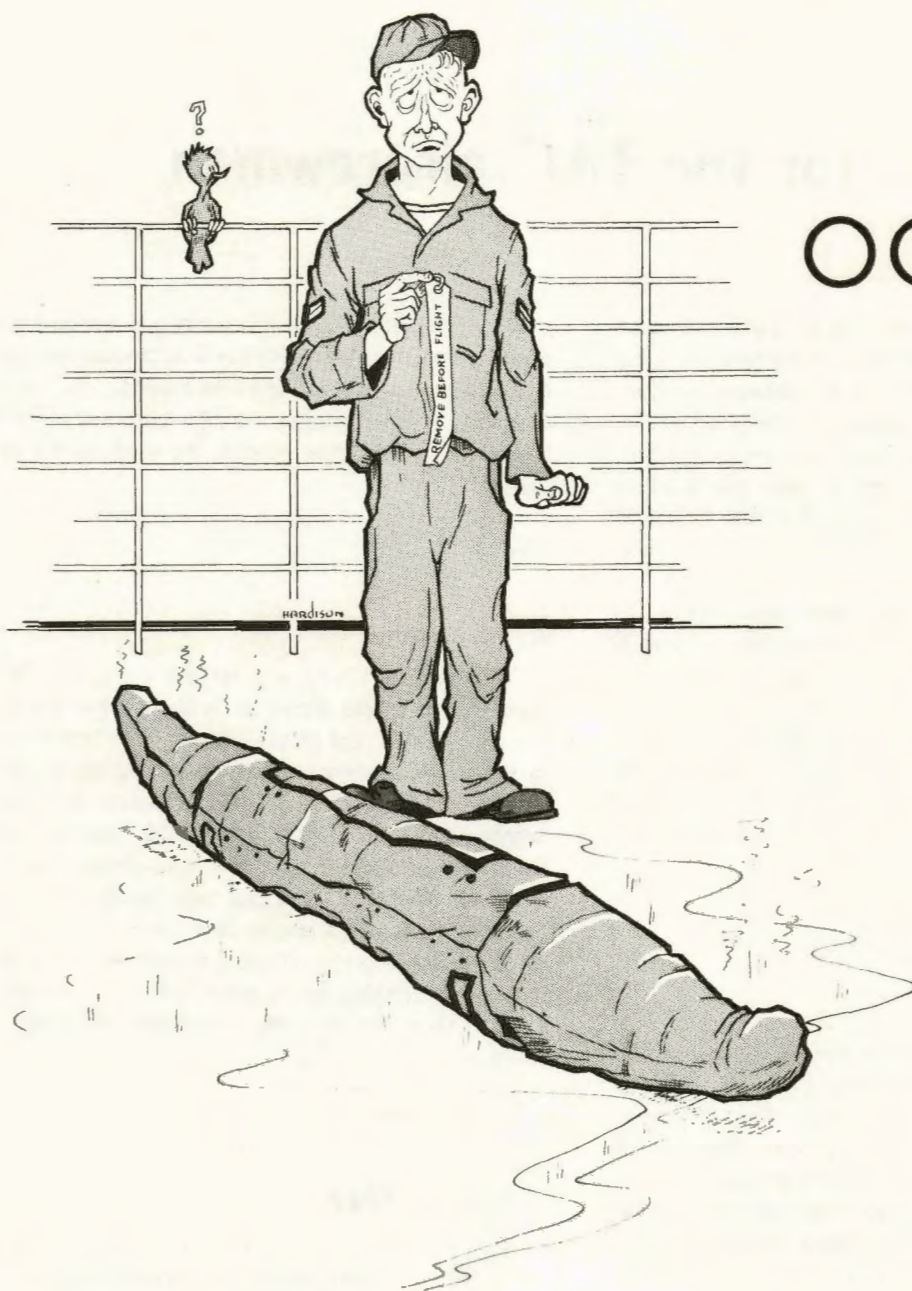
The terrible T-bird was tearing along at 320 knots, eight thousand feet above the ground, when the crew felt the aircraft yaw and vibrate. The engine instruments were in the green, so they headed for the closest suitable, and landed. They found the left engine access panel and their baggage pod missing. Only one of the seventeen attaching fasteners had been torn out. The other sixteen had not been fastened. The primary cause was listed as a crew chief problem because the access panel is on his checklist. But there's now one brace of T-bird terrors who look long and hard at the engine doors when they're under the wheel well... their clothes were in the pod and it hasn't been found yet!

November 1965

FORTUNATELY

For you non-believers who still don't pull your visor down when tooling around at low altitude, we'll quote one of the many birdstrike reports that daily drift through our in-basket. "On climb-out at 350 knots and 4000 feet a loud bang was heard, and something hit the pilot in the face and arms. A hole approximately six inches in diameter was noted in the upper corner of the right windscreen side panel. Bird remains (species unknown) and plexiglas were scattered throughout the front cockpit. The pilot received minor scratches on his left wrist. Fortunately, his helmet visor was down and he suffered no damage to his face."

November 1965



OOoops!!

As soon as it happened, George knew what it was. Safety pins! No safety pins in the pylons!

It had been a routine work order . . . arm the centerline station of an F-4C. He and Tommy had been assigned the job. As they walked toward the bird, they saw that there were no safety pins in the left pylons. George and Tommy didn't talk about it, but they both figured someone must have dearmed the pylons. Why would anyone leave an airplane sitting on the ramp without pins?

They hooked up external power and George got in the

cockpit. Tommy went under the bird with his voltmeter. The stray voltage check on the centerline station went smoothly. George selected centerline station . . . Tommy confirmed no voltage. Then George pressed the external stores emergency release button . . . the next step in their procedure.

That was when the outboard pylons and the left inboard pylon jettisoned to the ramp.

They had not been using a checklist. Had they used one . . . and started with it right from the top, you'd be reading another story on this page.

Another day, on another base . . . a load team arrived

at an F-105 to check out a write-up on the MN-1A control panel. They removed the MN-1A and replaced it with one from the shop. Then they checked safety pins inserted in the centerline MER and the MN-1A.

Next, one member of the team headed for the cockpit to troubleshoot the control panel discrepancy. As he sat down, he accidentally depressed the external stores jettison button on the left sub-panel.

That was when the left and right inboard pylon tanks and the left outboard pylon jettisoned to the ramp. The right inboard pylon didn't jettison . . . it had been safetied in preparation for loading an MA-2A rocket launcher.

They had not been following a checklist. Had they used one, and started with it right from the top, this story wouldn't be here either. And the other eighteen similar cases of . . . Oops! Safety pins! . . . in the last two years could have been avoided the same way.

Twenty times someone . . . or several people . . . forgot about safety pins and an accident happened. Some were serious and people got hurt. Some were less spectacular . . . little more than an initiator firing in disconnected lines. But every one was an accidental detonation of an explosive device . . . and that's dangerous!!

Where did it happen?

In the maintenance area, mostly. Nineteen times the airplane involved was at its home base, undergoing some form of maintenance by people of the home outfit. The twentieth case was away from home . . . an F-4C pilot watched his left LAU-17 jettison when he turned on external power for preflight. The design deficiency that caused this unhappy accident has been corrected.

Who did it happen to?

We're going to step right out and say supervisors . . . although they were seldom standing next to the airplane when all the excitement occurred. Four times the guy at the airplane was the Crew Chief, seven times it was the Load Crew. Five times it was Egress troops. One Armament guy and two Fire-Control technicians were the principles on the scene when the action started.

Sometimes these people were little more than innocent bystanders. But often they failed to see if someone else had forgotten something . . . like dearming initiators or inserting safety pins. In some cases, so many people ignored their checklists that you'd think they are going out of style!

In going through the reports, it turns out that aircraft crew chiefs take eleven counts for checklist failure. This is probably because the CC is the guy who is usually

supposed to insert the pin in the first place. Next biggest safety pin offender is the load crew member, who bought seven of the accidents for not following his checklist. Egress troops followed with five counts, and Armament was rapped with one. Supervisors were specifically singled out twice.

Then why did we say we were charging supervisors as the leading offenders? Read on . . .

Was there a pattern?

You bet! It was a pattern of bunches. Where supervision didn't live up to its name.

Ten of the twenty accidents occurred on new equipment . . . the F-4C . . . where the experienced supervisor should be hovering over every maintenance action. At least until he's sure his troops understand the whole operation. Only one time did an F-100 troop slip . . . and that bird's been around long enough for many of us to have experience on it.

Eighty percent of the F-105 accidents happened in the same wing!

How about explosive accidents in Reserve Forces assigned to TAC? Three of those four occurred in National Guard outfits in the same state!

Any time mishaps are grouped in such small segments of the total exposure, you wonder how all the rest of us escaped the same trouble. It can't all be black magic and dumb luck.

Lack of supervision showed up in many ways. Sometimes local procedures weren't worked out to take care of every eventuality. Sometimes a young, well-meaning troop was turned loose on a job he had no business attempting without real close guidance . . . like over-the-shoulder. In other cases, there weren't enough safety pins to go around . . . so everyone ignored the problem and pressed ahead hoping nothing bad would happen.

You're right, the bad had already happened when they told the crew chief to go ahead and forget about the pin. The muffled explosion, shocked faces, and accusing fingers were all anticlimax.

Does that mean everyone else is clean?

No, not quite. We still have two crew chiefs; three loaders; and one each fire-control, supervisor (again?), armament, and seat installer . . . who managed to outsmart the whole system.

They didn't read THEIR checklists . . . which said to play like everyone who went before you goofed, and . . .

CHECK THE PINS!



CHOCK TALK ...incidents and incidentals

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MAINTENANCE DISCIPLINE

Have you noticed that the experienced mechanic, the one who should know better, is often the one who walks into the prop or is sucked up the intake? The same experienced mechanic is often the one who takes short cuts or uses substitute hardware which causes trouble.

Depot "experts" performed maintenance without capping fuel lines; another failed to follow the checklist and omitted a cotter pin; a TAC mechanic failed to torque a marman clamp . . . each caused a major aircraft accident.

None of these individuals wanted to destroy an aircraft, but long association with a particular job had created complacency. This complacency shows up in other areas, such as tech order compliance . . . "The aircraft got by yesterday without compliance, why not today?" And, again, this has caused its share of accidents.

Other areas of high accident potential are improper strut service and tire inflation, failure to monitor oil consumption and failure to make proper entries in aircraft records. These are relatively simple, everyday tasks usually assigned to the less experienced mechanic; yet, each can be deadly if not properly accomplished.

Maintenance discipline demands strict compliance with checklists and technical orders. Each is prepared for the sole purpose of insuring a safe, serviceable aircraft, and each requirement was placed there for a definite purpose. To omit any portion is to invite disaster.

June 1964

BUTTON IT UP

This seems to be the season for leaving fasteners unfastened and dropping aircraft panels about the countryside. The most frequent cause is that somebody failed to fasten all the Air Locs or Dzus buttons . . . and the aircrew, crew chief, or transient alert crewmen didn't notice the oversight. Without going into a lengthy

discussion about looking for the unexpected instead of the routine on a preflight, we'll pass on the corrective action taken in a couple of units after a panel came off in flight. They simply established a policy that anytime a panel is replaced on an aircraft, ALL the fasteners will be secured, not just the one or two needed to hold it in place until the removed part or the pilot's clothing is put back in. This may cost you an extra minute or two when you have to remove the panel again, but that's nothing compared to the damage that can result.

August 1965

PUTTING ON THE PRESSURE

A set of external tanks was installed, fueled, and the aircraft declared ready for flight. A roving inspector then asked the crew chief to check the pressure of the main landing gear tires. The gage read 50 PSI shy of that required for the aircraft gross weight. That's hardly shy enough to catch a pilot's eye on preflight but certainly enough to cause tire failure on takeoff. A perfect setup for a maintenance error accident.

October 1963

IF

The aircraft's range remained constant at twelve o'clock as the F-100's cannon rattled out nine quick rounds of API. Some of the 20 MMs penetrated the bird around the cockpit area, passing right on through and tearing off the end of the refueling probe. Leaking fuel and the two flares in the pilot's survival kit burst into flames causing more damage to the already crippled aircraft.

If the burning aircraft had been an enemy fighter and not another F-100 sitting securely chocked across the

with a maintenance slant.

ramp...but there were a lot of ifs. If the munition personnel had used their checklist when they made the power-on check of the guns...if they had used plain horse sense and looked to see if the guns were loaded...and if they had cleared the area in front of them, this accident wouldn't have happened. What if someone had been working on or in the cockpit of the bird they damaged? I wonder if it would have changed their procedures or if he would be dead?

November 1965

ETERNAL VIGILANCE

The F-4 crew was cruising peacefully at 18,000 feet when the right engine began to compressor stall. The phront phlyer reduced power to idle and landed without further incident. When the engine troops got in the act, they found imprints of a 10/32 steel bolt on the compressor blades. This one doesn't seem to be a case of overlooked inspections or lazy supervisors. The unit involved is very conscious of the FOD and reverse air flow problems on the Phantom. They run an aggressive FOD prevention program which includes vacuuming all engine bays before installation. Rather, this incident emphasizes the need for all hands to be constantly alert, to understand the consequences of a moment's laxity, and to identify themselves with the men riding the engines day after day.

November 1965

BIG BLAST

Out in the exotic East a maintenance crew thought they had finished adjusting a prop and made ready to run up the engine. A couple of metal pallets were in back of the bird, but since they weighed about 300 pounds each,

the ground crew figured they'd stay put. Sure enough, they did. They ran the engine up to max power and the ground controller reported no problems.

This would end our little story, except the prop didn't check out and they had to shut down and make a minor adjustment, which called for another run up.

Before the engine reached full power one of the pallets got itchy feet and decided to travel. It sailed aft some 30 yards into a 3800 watt transformer. It paused just long enough to short out the transformer then careened another 20 yards before skidding to a halt in the middle of a service road.

The moral is quite obvious.

September 1964

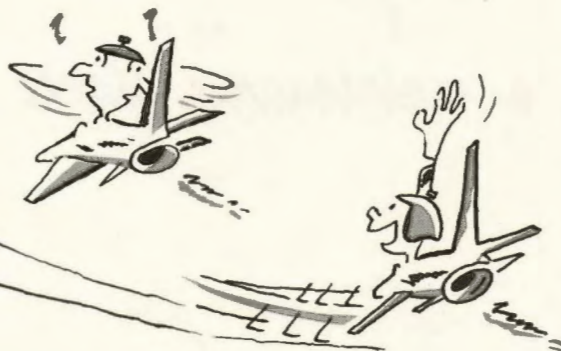
BUNDLE TROUBLE

During a 4 G pullup from a weapons delivery run, an F-4C pilot noticed the left hand generator out light come on. He reset the generator, but the light illuminated again under Gs and this time it wouldn't reset. After recovering at the home patch, maintenance discovered the generator wire bundle, PN 53-79006B204, figure 4-136, index 65 page 4-471, TO 1F-4C-4-4, had worn thru by rubbing against hydraulic power control number one tee fitting, AN783D16, figure 3-119, index 29 page 3-423 TO 1F-4C-4-3, during G maneuvers. Electrical arcing caused the generator failure and burned a hole in the hydraulic tee fitting. Fortunately, hydraulic pressure wasn't lost, but a serious fire hazard was created.

A one time inspection revealed about fifty percent of the unit's aircraft had similar chaffed wire bundles. It seems this problem usually occurs in the number one engine area above door number 140. A look-see in your birds wouldn't hurt.

October 1965

Sideslip



Sideslip characteristics are normally good. However, a critical limit exists beyond which the maneuver may progress into uncontrolled flight. The out of control condition is severe.

THE LOSERS

"One horse on you," Sideslip grinned with victory in his eyes, "and you're staying on trip'fours in one?"

Sideslip took the leather cup and went through his elaborate ritual of shaking it at the ceiling, the brass foot rail, and the mirror, before he gave it one last flourish and rolled the cubes out on the mahogany.

"Okay, okay," he exaggerated the irritation in his voice, "horse apiece . . . I'll come back at you."

His next three rolls only produced three threes. He was reaching for his wallet before Jim Watson finished shaking the cup.

"I was just starting to tell you about that wild one I had today when you insisted on losing another round to me, Slipper," Jim obviously had to talk about this experience, so Sideslip resigned himself to listen it out.

"When we leveled at about 35,000, I took the bird and let the student relax for a minute. As we accelerated, I was trimming forward, bit by bit . . . you know, the way you always do."

"Uh-huh," Sideslip grunted, waving two fingers at the bartender. "D'you suppose that guy'll ever look over here, Jim? What a loser! I can't even get the drinks after I lose the roll to you!"

"Well, it didn't feel like the trim was doing anything . . . stick was getting heavier." Jim continued,

ignoring Sideslip's interruption. "Then, all of a sudden... the stick was moving forward all on its own... after I stopped trimming!"

Sideslip turned toward him, raising an eyebrow.

"Honest... I wasn't touching the trim and the stick just drove forward by itself. And when I tried to trim it back again... like the thing was too far forward now... the trim button wouldn't do any good. Just the way it was when we first leveled off!"

"Yeah!" Sideslip decided not to play straight man for the punch line he knew was coming. "And did the funny little airplane fly itself all the way back to the fuel pits?"

"No, Slipper, honest!" Jim was serious. "This is no kidding. I was using two hands on the stick to keep it from really nosing over. The kid in the front seat was breathing pretty hard... being his first ride in the bird, and all."

Jim wasn't joking, this had been real!

"Even when I had the stick all the way back, the bird was still going down. So I told the kid to try trimming on his stick... it didn't do any good!"

"So what'd you do? You didn't bail out, did you?"

"No, let me tell you... all I could do was honk back the throttle and pop the boards. I was still holding the stick all the way back. And after we'd lost a couple of thousand feet, she began to come out of it. Ailerons were normal the whole time, but for some reason... well, I guess the slab wasn't moving... or something."

"So you pulled out of the dive," Sideslip wanted to hear the rest of the tale, "and then what happened?"

"That was it... just like that!" Jim snapped his fingers. "Trim was normal again and everything... strangest thing in the world!"

"Couldn't help overhearing you, Jim." George Lambert leaned over Sideslip's shoulder. "What bird was that you had the trouble with?"

"Ohh... let's see. We were supposed to take 452 and it didn't come in on time so we took the spare. That was... 573. That's right 573."

"So what happened the rest of the flight?" Sideslip felt that Jim's story wasn't over yet. There must be more to it.

"Nothing, Slipper... That's it. Nothing! Trim worked fine in both cockpits for the rest of the mission."

"Yes! 573... that's the same bird!" George had carried his glass around Sideslip and was now standing between them, facing the bar. "You say it went ape right after you leveled off, right?"

"That's right."

"At about 35,000?"

"That's right."

"How about that!"

"How about what?" Sideslip knew he wouldn't like what George was going to say.

"Why, I had the same thing happen to me a couple of days ago... in the same bird." George said it.

"I'd sure like to see how they cleared your write-up, George." Sideslip was working up a good mad. "You wanna bet it was signed off: 'Unable to duplicate malfunction, checked in accordance with some damn TO... ' just because they can't get away with 'ground checked OK,' any more!"

George was silent.

"What did they tell you when you talked to the flight control people in debriefing, Jim?"

"I didn't see any flight control people in debriefing, Sideslip," Jim sounded almost sheepish.

"So did the crew chief remember anything about what they'd found on George's writeup?"

"Nope."

"Well, did he say anything about it?"

"Nope."

"What'ja do? Just write it up in the Form and walk away?"

"No, Slipper," Jim looked at George and then back to Sideslip. "I didn't write it up."

"You didn't WHAT?"

"Well, cheez, Slip... you know how they act when you come down with some weirdo write-up like that. It happened once early in the flight and then for the last forty minutes, everything was normal. They kinda look at you and shrug their shoulders..."

"Don't you realize it could be a simple thing like a shorted wire in the stick grip, or something? It wouldn't take long to trouble shoot. And if they didn't find anything after George wrote it up, your experience would just make them look that much harder. Jim, I..."

"Slipper," George interrupted, "at this point I probably shouldn't open my mouth, but I didn't write it up either... for the same reason. It happened once, early in the flight. It could have been the student with his big hooks where they shouldn't be... or any thing! And nine times out of ten, they'll never find a malfunction unless you land with it still malfunking."

Sideslip was at a loss for words. This he had not expected! Not from two fellow instructors!

He turned to the bar, carefully placed his empty glass on the far side and picked up a full one. He took a long, slow drink. Then he turned back to his two embarrassed friends.

"And I thought I was a loser!" Sideslip found his voice. "This is the way you handle the airplanes I may fly right after you! You guys scare me!"

Sideslip picked up his hat from the table as he went through the door. Outside, he paused to see if George or Jim was coming with him. Then he turned and strode off toward Maintenance Control. ➤

LET'S GO DROP SOME

BOMBS



Hot Rod 31	Hello Slipshod Range. This is Hot Rod 31 at the IP.
Flash 24	Flash 24 Final . . .
Slipshod	Standby 31 . . .
Flash 21	31 . . . Slipshod said standby . . .
Hot Rod 31	Roger 21. Your range period is over . . .
Slipshod	Clear, 24 . . .
Slipshod Scorer	22 . . . your last bomb run was unscorable at 6 . . .
Hot Rod 31	Hello Slipshod. This is Hot Rod 31. Are you ready for my line up and events?
Flash 21	Final
Hot Rod 31	Slipshod, Hot Rod is departing the IP . . .
Flash 22	31 . . . 21 said for you to stand by. We aren't finished . . .
Slipshod	21 . . . you're cleared . . .
Hot Rod 31	Slipshod, were you calling for Hot Rod 31's line up? . . .

By Capt Earl J. Bird, Jr.
306 TFS
Homestead AFB, Florida

And so it goes . . .

Would you believe that the pilots who made those radio transmissions are supposed to be the best trained, best qualified, and most highly professional pilots in the world? Sometimes you wonder. Whose fault is it? Do we blame the range officer? The pilots? . . . Supervisors?

Who do we blame?

Our flight leaders are supposedly the best leaders in the squadron. And this is usually true. Of course, supervisors are always right, so this leaves the range officer.

Now, since we all pull range officer, I guess the hot potato falls in our own laps.

Sure, I know you're thinking right now that the last time you were range officer you ran a tight ship . . . but did you? How many presses were actually fouls? How many dangerously low pullouts should you have evicted from the range? (Well, he was just trying to see where he was strafing.)

There are certain parameters that must be followed and enforced by every range officer. As the old cliché goes "give a man enough rope and he will hang himself." In our case it's "let a pilot get away with a foul and he'll hang you at the accident board." Just think how easy your tour on the range could be. When you're flying on the range, do you do all those irritating things that perturb the range officer? I don't know . . . maybe our range regulations are too lax.

What happens to the pilot who fouls? How many have

been called in on the carpet for it? How often, as range officer, did you not kick someone off the range because he's your buddy . . . or in your squadron?

As it stands right now the range officer has all the authority he needs. Maybe he needs a little political immunity* to go along with the authority so he doesn't have to face the firing squad when he returns to the outfit. How often have you heard a pilot, when he returns from the range, say, "Who is that range officer? The guy is fouling everybody!"

I don't think any range officer has ever fouled a pilot maliciously. It is usually the other way around . . . they bend over backwards to give you a break.

A bombing range is supposed to be a restricted area for the purpose of making practice ordnance deliveries by the "Worlds Finest." How can we make it that way? Here are some "don'ts" that may help:

Don't make unnecessary radio calls.

Don't fly events that were not briefed.

Don't lose positive control of your flight at any time.

Don't argue with the range officer.

Don't foul in an attempt to better your score.

Don't release ordnance in any unusual attitude.

Don't tell the range officer where your bombs are hitting . . . he knows how bad you are.

Don't do acrobatics on the range to impress the scorers (they're only impressed by your score).

DON'T MAKE LOW PULL-OUTS.

I believe if we all took 10 minutes off to think about how we could help, it would greatly improve our range discipline. Maybe it would save a few lives. ➤

*would you believe . . . understanding? — Ed.

TAC TALLY

AIRCRAFT ACCIDENT RATES

* Estimated

MAJOR ACCIDENT RATE COMPARISON

	TAC		ANG		AFRes	
	1969	1970	1969	1970	1969	1970
JAN	6.8	4.8	28.9	5.9	0	0
FEB	6.2	3.9	12.8	2.6	0	0
MAR	6.8	4.6	12.6	1.7	0	0
APR	7.4	4.9	15.1	2.4	0	0
MAY	7.5	6.2	12.9	3.6	0	0
JUN	7.2	5.5	12.6	3.6	0	0
JUL	7.4	5.1	11.3	6.1	0	0
AUG	7.3	5.0	11.5	7.0	0	0
SEP	6.9	4.7	10.5	6.6	0	0
OCT	7.1	4.5	9.9	6.8	0	0
NOV	6.6	4.6	9.4	6.6*	0	0
DEC	6.8		9.5		0	

UNITS

	THRU NOV			THRU NOV	
	1969	1970		1969	1970
9 AF	2.4	2.0	12 AF	9.7	7.3
4 TFW	4.1	0	23 TFW	16.2	4.2
1 TFW	2.2	5.7	27 TFW	3.6	7.6
33 TFW	13.1	0	49 TFW	5.5	10.4
31 TFW	3.5	4.5	479 TFW	9.1	10.1
354 TFW	0	0	474 TFW	22.7	0
4403 TFW	-	0			
363 TRW	6.4	6.0	67 TRW	4.0	12.6
			75 TRW	4.0	3.5
316 TAW	0	0	64 TAW	0	0
317 TAW	0	0	313 TAW	0	0
464 TAW	0	0	516 TAW	3.8	0
68 TASG	-	0	58 TFTW	13.0	15.3
			4442 CCTW	0	6.5
			4453 CCTW	7.0	6.9
			71 TASG	-	0
TAC SPECIAL UNITS					
1 SOW	3.8	5.4	2 ADG	0	0
4409 SUP SQ	0	0	4500 ABW	4.2	0
4410 SOTG	8.9	0	57 FWW	18.4	0

TAC SUMMARY

	NOV 1970	THRU NOV	
		1969	1970
TOTAL ACCIDENTS	4	64	39
MAJOR	4	54	34
MINOR	0	10	5
AIRCREW FATALITIES	4	41	30
AIRCRAFT DESTROYED	4	43	31
TOTAL EJECTIONS	2	33	27
SUCCESSFUL EJECTIONS	2	23	21
PERCENT SUCCESSFUL	100	70	78

