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TAC ATTACK

MARCH 1968



HARDISON

how the Herkeys
did it... page 4

for efficient tactical air power

TAC ATTACK

MARCH 1968

VOL. 8 NO. 3

TACTICAL AIR COMMAND

COMMANDER
GENERAL GABRIEL P. DISOSWAY

VICE COMMANDER
LT GEN ALBERT P. CLARK

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COLONEL H. B. SMITH



CHIEF SAFETY PUBLICATIONS
LT COL CARL E. PEARSON

editor

Maj John M. Lowery

associate editor

Don Reynolds

art editor

Stan Hardison

layout & production

SSgt James E. Fields

editorial assistant

Mariella W. Andrews

printing

Hq TAC Field Printing Plant

current interest

A HERCULEAN TASK	Pg 4
- C-130s fly their lowest accident-year	
NO OTHER WAY	Pg 10
- General Graham speaks his mind	
STRING SAVER	Pg 14
- five-cent string heals a sick F-4	
YOU CAN BE ... YOUR OWN WORST ENEMY	Pg 17
- battle damage does not all come from below	
FLIGHT LEADERS	Pg 20
- something new for TAC ATTACK readers	
A WINNING COMBINATION	Pg 22
- dual chutes cut egress hazards	
A DISCOURAGING SOUND	Pg 25
- sliding bellies screech a lot	
CAUTION ... TRAILING TWISTERS	Pg 26
- chopper vortices are a threat	

departments

Angle of ATTACK	3
TAC Tips	8
Pilot of Distinction	13
Chock Talk	16
Letters	30
TAC TALLY	31

TACRP 127-1

Articles, accident briefs, and associated material in this magazine are non-directive in nature. All suggestions and recommendations are intended to remain within the scope of existing directives. Information used to brief accidents and incidents does not identify the persons, places, or units involved and may not be construed as incriminating under Article 31 of the Uniform Code of Military Justice. Names, dates, and places used in conjunction with accident stories are fictitious. Air Force units are encouraged to republish the material contained herein; however, contents are not for public release. Written permission must be obtained from HQ TAC before material may be republished by other than Department of Defense organizations.

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Angle of ATTACK



A Passing Score

Have you ever thought about how you'd prepare for an examination if your life depended on the score? If you consider that thought for a moment you'll probably realize that every time you fly you're essentially taking just this kind of examination.

When you fly a routine cross-country the exam is relatively simple. This test of your basic flying ability has probably become so routine that you do it almost by rote. Occasionally though, someone fails this simple test and the Air Force loses an aircraft and too often its crew. Thirty-nine failed in 1967. Maybe it was a simple mistake ... failed to plan for an alternate, got low on the glide slope, misread the altimeter, or thought he had the runway made. Regardless, this particular part of the exam required a perfect score. Unfortunately, it's the accident board who must correct it to one hundred percent.

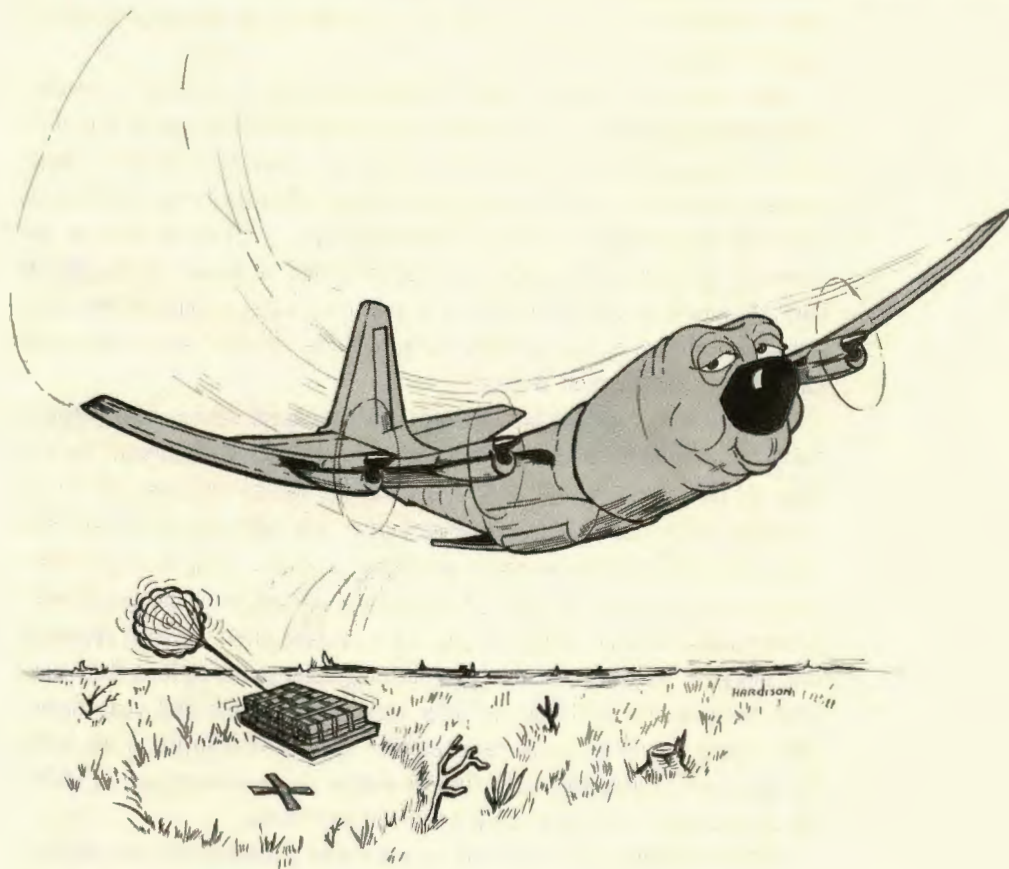
Those flying tactical aircraft face an even more severe test. Almost daily the combat crewmember is required to test his professional knowledge by taking his aircraft to the limit of its design envelope. If you're a fighter pilot, for instance, you put your life and aircraft on the line every time you practice maximum performance maneuvering during air combat training. This test of your professional knowledge must be passed with a one hundred percent score. If you are a student pilot, you must approach this phase of training cautiously, practicing each phase at less than maximum performance until you and your instructor are sure that your knowledge meets the exam score requirement. The tactical airlift pilot faces the same set of problems each time he makes a heavy weight assault take-off or landing ... or a low, slow aerial resupply drop.

TAC's airpower team depends on each man's professional knowledge. When you take your exam tomorrow make sure your homework is complete.

H. B. SMITH, Colonel, USAF
Chief of Safety

a herculean task

by Don Reynolds

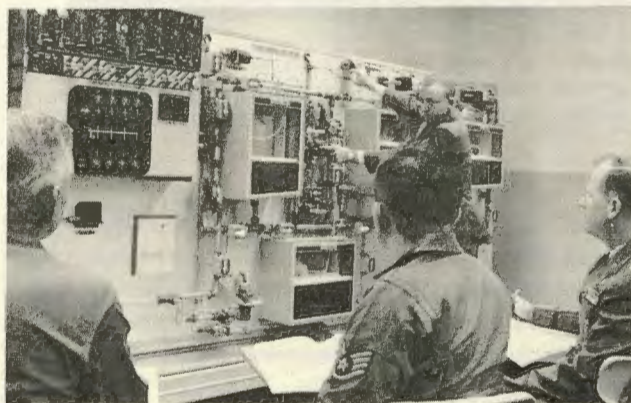


C-130 aircrews set their lowest accident rate in TAC's history, during 1967, while flying a record productive mission schedule.



Air assault operations, one of the more hazardous missions of TAC's C-130 aircrews, demands expert technique on short unimproved strips. Hercules flyers proved their proficiency in 1967 by flying the lowest accident rate in the aircraft's long history.

Best possible instruction on all Hercules systems is given aircrew trainees. Functions of C-130E fuel system components are demonstrated on a working mock-up by SMSgt. Edward N. Gaines, instructor at ATC's 304th Flight Training Detachment at Sewart AFB.



C-130 aircrews flew a more productive year than ever before in TAC's history at the lowest cost ever suffered in damaged Herkys. The Hercules flyers scored a rate of 0.48 accidents per 100,000 flying hours in 1967, bettering their best previous record by more than 100 percent and topped 1966 by almost four times. The crowning achievement in setting the new low rate was that they hauled more operational cargo and passengers than during any previous year.

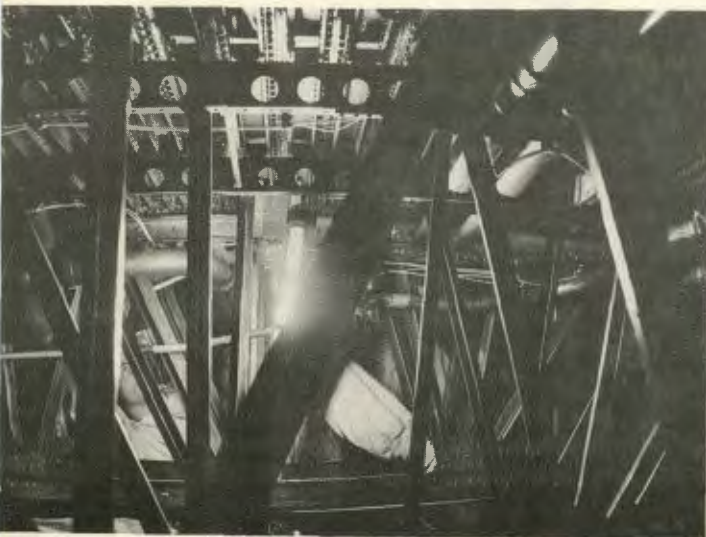
A very important and logical question is: Why? Or more exact: How? How has the C-130 fleet been able to hold a low accident rate during a heavy operational year which included participating in several emergency operations demanding maximum effort; airlifting a record number of passenger and tons of cargo; and flying an intensified training syllabus (with increased hazards) to broaden tactical airlift capability? How has this success been gained even though

the PCS drain of experienced men has been countered with aircrews whose average experience level (hours in the C-130) is lower than some previous years?

This question was put to several TAC men. A line mechanic answered, "Shortcuts are out." An aircrewman said, "No checklist deviations," and another said, "We're sleeping with the Dash One." A wing commander stated, "Supervisory control." All of these men could be right. TAC's Herkys flew 208,110 hours with only one major accident and no loss of life.

C-130 operations during 1967 extended from Alaska to South America and from Africa to Southeast Asia. Squadrons were assigned rotational duty in England and Panama, providing airlift to many isolated U.S. and allied military and diplomatic units.

Several birds supported recent operations in The Congo, flying from short unimproved strips. Phase



Maintenance kept the C-130s flying for the aircraft's greatest passenger and cargo carrying year. AIC Stephen Wilson, 316th FMS, inspects number two fuel cell seals.



Aircrew trainees watch each component of C-130 nose gear. This mock-up swings gear through its full arc and is actuated by same hydraulic and control systems used by Hercules crews. The Sewart AFB ground school instructor is MSgt. Wayne Anderson, 304th FTD, and students are Capt. Xavier Garza (left) and Maj. Dan Dillon.

II and III replacement training crews joined TAC regulars to fly hundreds of Cold Date missions over the Atlantic and Pacific Oceans for Military Airlift Command. More than a dozen joint-force exercises kept Herky crews busy, sharpening their tactical airlift techniques.

An unexpected operation tested the mettle of C-130 units. An airlift operation was begun in response to threatening civil disorders. TAC-owned C-130s from its 15 squadrons began the deployment phase, airlifting Army troops and supplies. A few days later when the redeployment began, each sortie was given an hour of ground time for loading. By the second day, aircrews were on takeoff roll about 30 minutes after touchdown.

When the operation ended, the Herkys had logged 680 sorties to airland 11,202 personnel and 4,723 tons of equipment and supplies.

About two months later, a similar emergency was declared. The airlift operation required more than 200 sorties during a five day period to airlift troops and supplies.

The annual report of TAC's Herky fleet activities shows that their aircrews were mighty busy. For instance: 130,810 personnel were paratropped during training and joint-force exercises; C-130s para-

dropped more than 20,000 tons of equipment and supplies; TAC's world-wide operations airlanded 236,075 personnel and 107,109 tons of cargo.

The expanded training syllabus offered new risks in all units, including the combat crew training center at Sewart AFB, RTUs, and all operational squadrons. It is obvious that accident-free flying in this category must be credited to strong leadership of instructor pilots.

Flying techniques added to the 1967 training program included buddy engine starts, windmill-taxi engine starts, three-engine takeoffs, no-flap takeoffs and landings, backup and turns on small strips, Container Delivery System (CDS) cargo drops, and radar beacon paradrops.

Add these techniques to an already hazardous tactical airlift training program, including short field operation at near max gross weight, and you've got a good picture of IP responsibility.

But there is no quicker way to tie an IP's hands than to have him work with an insecure student frustrated by an insecure bird. TAC knows that a sick bird can soon be a dead bird. Avoiding the risk of lost lives because of sick birds is the charter of maintenance and quality control personnel. And if their efforts are less than 100 percent, the success of t



Keeping Herkys tuned for safe flight was a major contribution to the C-130's greatest operational year and lowest accident rate. Here, ground crewmen of 36th TAS, Langley AFB, use testing gear to check cockpit gages for proper indication of engine phase and RPM.



FOD is a constant hazard in keeping the Hercules humming. Engine intakes are checked by 37th TAS quality control inspectors, TSgt. John Horner (left) and SSgt. Lenard Catlett, at Langley AFB, Va.

mission is hopeless, regardless of aircrew ability.

New systems are continually being studied by the Tactical Airlift Center, Pope AFB, to provide improved mission capability. This organization also is developing new systems to decrease hazards faced daily by aircrews. The tested systems include: new drop methods; new flap control techniques for CDS drops; and an integral weight and balance system, the A/A 32H-8, which gives the aircrew an instant computerized reading of cargo weight, center of gravity, and gross weight at the flip of a switch.

It was a good year for the C-130s and the units that fly them, and a bet on a repeat performance during 1968 can be had at better than even odds, based on tips of airmen from line mechanics to IPs. They are the first to credit each other's professionalism as the key to C-130 success. The 0.48 rate is proof. They are also the first to say that there is room for improvement.

A six striper put it this way. "From where we stand, we can make the top. But that's not the priority job. Putting-out to hold our hard-earned position comes first. Then it's not far from there to perfection."



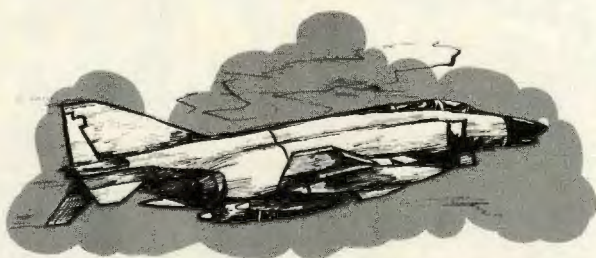
Thousands of ground hours are flown annually in C-130 simulators of 4442nd CCTW, Sewart AFB. Trainees learn to cope with many inflight hazards before their first actual flight. Instructor pilot and crew chief work with same aircrew through all flight training phases. This simulator flight is supervised by Capt. John R. Humm (standing) and SSgt. Alfred Blanche.

TAC TIPS

MISTAKEN IDENTITY

An F-105 pilot in PACAF who was trying to eject, grabbed the newly installed limb restraint instead of the ejection seat leg brace. This lad tugged on the limb restraint several times. Since nothing happened he looked down and discovered his error.

The similarity of the two shapes, limb restraints and leg braces, makes this an inevitable and understandable error. This looks like a good case for some human engineering. A brief check through maintenance failed to show any recommended corrective action. Looks like a good case for the UR program as well.



F-4 CONTROL SYSTEM FAILURE

Several different changes are in the works to insure that the F-4 jock will not lose all flight controls after failure of the aileron power control cylinder.

The first step taken (T.O. IF-4-724) involved inspection of all existing stocks of cylinders. So far, the results of this inspection appear questionable. The second and probably most important change is re-plumbing of PC-1, PC-2, and the utility hydraulic systems so that one system will remain operational in the event of dual system failure (T.O. IF-4-780). Kits are already in the field and at this writing about one fifth of the TAC F-4s have been modified. The third and final fix is fleet retrofit with new steel power cylinders of improved design. First items will become available in April 68, however, TAC won't receive any until late '68 or early 1969. In the meantime, the pilot is protected by the re-plumbing fix.

The re-plumbing accomplished by T.O. IF-4-780 will remain in the aircraft even after the new cylinders are installed. This will be a great feature to have especially if you receive battle damage to the hydraulic system.

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

HOT FOOT

A recent safety tip from the 1st Marine Air Wing cautions aircrew members against wearing jungle combat boots in aircraft. They are admittedly very comfortable and cool ... until you get into trouble.

In the case cited, three aircrew members who were wearing the canvas-sided boots received severe chemical burns on their insteps and ankles because their feet were soaked by 115/145 fuel from a ruptured fuel tank. Where their feet were protected the leather portion of the boot there was no injury.

Other reasons the Marines listed for not wearing the jungle boot when flying; no steel toe protection, a



must for ejection seat aircraft; inadequate ankle support when making a parachute landing fall.

Looks like a strong case for the leather flying boot.

BIRD STRIKE REPORT		AF Form 457	
1. DATE OF STRIKE		2. LOCATION	
3. TYPE OF STRIKE		4. TYPE OF WEATHER	
5. TYPE OF AIRCRAFT		6. TYPE OF STRIKE	
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99. TYPE OF STRIKE		100. TYPE OF STRIKE	

BIRD STRIKE REPORTING

Although the program started in January there may be some who haven't heard about the Bird

TAC ATTACK

Strike Study. Every bird strike that doesn't fall under AFR 127-4, in other words no damage resulted, is to be reported on AF Form 457, the OHR form. Only the front side of the form is to be filled out. Under the block labeled "Description" you're requested to include things like airspeed, number of birds observed, number of birds struck, bird size and the point of impact with the aircraft.

The OHR Form 457 is being used instead of developing a new piece of paper. Air Force Reg 127-301 does not apply when the Form 457 is used for this study. The OHRs will be routed through the base safety office then forwarded directly to the major command at the end of each quarter. The purpose of the report is simply gathering of bird strike data. The statistics are to be used by USAF safety types in an effort to further reduce accident potential.

General Disosway has stated at frequent intervals, "I'm Tactical Air Command's Chief of Safety."

Major General Graham, now Ninth Air Force Commander, verifies that command emphasis is just as important to accident prevention in a combat environment.



by Major General Gordon M. Graham

no other way

There is a widespread belief in some Air Force circles that combat operations inevitably generate higher aircraft accident rates. Perhaps this persistent notion is a carry-over from World War II, Korea, or even World War I, when there was far less emphasis on flying safety. Increased accidents and mishaps were an environmental *sine qua non* of combat flying in those days.

That such a belief is completely erroneous has been unequivocally demonstrated in the past 18 months in Southeast Asia.

Equally compelling and obvious is the driving force behind highly successful flying and ground safety programs - COMMAND EMPHASIS. Unless the commander charged with overall conduct of the operations personally enters the picture and generates a command emphasis down to wing and squadron commander level, disregard for the fundamentals of aviation safety will occur. There simply is NO OTHER WAY to prevent accidents and drive the rate down.

THE ACCIDENT POTENTIAL

In July 1966, Seventh Air Force's aircraft accident rate stood at 14.6. If you consider the several thousand sorties flown daily, the figure might not seem unusually high. However, the number of aircraft lost was alarming. Moreover, many went down in Viet Cong held territory and could not be recovered and repaired.

The numerous hazards associated with normal flying operations are greatly intensified during combat and you will discover that additional hazards present themselves. Let's consider a few of the many that reared their ugly heads in SEA.

The rapid build up of fighter, airlift and Tactical Air Control System units and equipment, coupled with

simultaneous construction of air bases and associated facilities, provided far less than an ideal environment for accident prevention.

Weather conditions, and Southeast Asia has its own brand, increased the accident potential. Thunderstorm flying became a way of life in order to complete the mission. Wet runway takeoffs and landings, particularly in the F/RF-4 units, presented less than optimum conditions. Add the weather factor to night strike and recon sorties (a quarter of the total flown) and you end up with a further opportunity to bash aircraft and people.

The intensity of operations and associated congestion in and around the air bases, gave rise to gargantuan problems of command and control. At Tan Son Nhut and Bien Hoa, for example, the combined total of aircraft movements was well in excess of 100 thousand a month. Aircraft of every description, including both civilian and military. The military aircraft included those of the U.S. Air Force, the U.S. Army and the Vietnamese Air Force. Primitive or nonexistent communications links and navigation aids did not enhance the situation. The danger of a mid-air collision was ever present.

Ordnance delivery on a CONUS range, under optimum control and weather conditions, differs drastically from attacks on targets in the jungle or in mountainous terrain at night while contending with a thousand foot overcast, low visibility, and a heavy gross weight aircraft.

Multi-service and multi-national strikes in the same target area at the same time, the need to conduct airlift operations out of austere airstrips sometimes under fire, artillery coordination, and other factors provided their share of hazards. These, and many other aspects of operations contributed to the accident potential.

no other way

COUNTERING THE POTENTIAL

The tools of command to conduct safe flying operations, even under combat conditions, are well known to most of us. However, the Seventh Air Force did not become a well-knit fighting force overnight. Many of the programs which were initiated ultimately depended on the availability of personnel and facilities and, of course, the dictates of the mission.

Vigorous command attention was focused on all aspects of our operations. Specifics were identified and isolated. Preventive and corrective actions were taken, at times on the spot. As a matter of interest, some of the actions taken are worthy of mention.

Wing and group commanders were directed to make immediate and personal telephonic reports to the Seventh Air Force Commander when a major accident occurred. Personal appearances by the wing or group commander within 72 hours after an accident were directed (so-called "Star Talk").

Increased safety officer manning, both in quantity and quality, was deemed vital and priority action was taken in this area.

F-100 loss and damage experience indicated that action was necessary to emphasize that habitual "pressing" was not the Hallmark of a professional, but rather the characteristic of a fool.

Detailed safety surveys were rapidly conducted at forward airstrips and operations locations. Airlift and Forward Air Controller operations were sometimes suspended at particular airstrips until accident hazards were removed or reduced.

The relatively large number of mid-air collisions were analyzed in detail and the lessons learned were disseminated. Immediate steps were taken to reduce the possibility of recurrences.

A special safety problem presented itself when Seventh Air Force assumed command of the Caribou fleet. U.S. Army operations, methods and procedures, as well as command control, differed from ours. The transition could not be accomplished overnight. Particularly strong command emphasis was required

to integrate the Caribou fleet into the airlift system.

A program was initiated to improve our airfields. This included runway and shoulder stabilization, runway grooving, and the elimination of unnecessary ditches, dikes and obstacles adjacent to the runways. This was a particular problem at the bases in Thailand.

An O-1 school was established at Binh Thuy and a C-47 school at Nha Trang. These were designed to insure that newly arrived FAC's and the large number of C-47 aircrews were qualified and checked for standardization by SEA criteria.

A Seventh Air Force accident prevention magazine, COMBAT SAFETY, was developed, published, and distributed.

General Momyer, the Seventh Air Force Commander, made special subjects for command emphasis of such items as (1) thorough knowledge of emergency procedures; (2) use of proper airspeeds, altitudes and tactics during ordnance delivery; (3) "looking around" instead of concentrating attention in the cockpit; (4) the "ace-in-the-hole" philosophy, or thinking ahead of the maneuver or phase and having an alternate or emergency move already plotted if the occasion arose.

A comprehensive, command-wide, standardization/evaluation and tactics review and development program was begun. This proved very helpful.

Space does not permit a description of all the effort exerted on many other portions of combat operations to reduce the Seventh Air Force accident and combat loss rate.

The lesson is crystal clear. Accidents need not be accepted as inevitable simply because combat flying is involved. The Seventh Air Force accident rate dropped from 14.6 to 5.2. It dropped despite a significant increase in exposure resulting from the overall inventory buildup and an increased sortie rate. And the reason for this reduction was COMMAND EMPHASIS!

..... There's no other way.

**PILOT
OF
DISTINCTION**



Captain Kenneth L. Blankenship of the 4410 Combat Crew Training Wing, Hurlburt Field, Florida has been selected as a Tactical Air Command Pilot of Distinction.

Captain Blankenship was flying as an A-1E instructor pilot with a foreign student in an area often used by solo students with little experience. He saw another A-1E in the same area trailing an abnormal amount of smoke. Captain Blankenship recalled several recent engine oil line ruptures in the A-1E and realized that the student pilot might not have any indication of a problem. Captain Blankenship contacted the pilot of the smoking aircraft on Guard Channel and calmly advised him of the condition. He directed him to the nearest airfield for an emergency recovery. Captain Blankenship further instructed him to set up an engine failure pattern and talked him down to a safe landing. The student pilot was on his first solo ride in the A-1E. He had no cockpit indications of the problem, either engine instruments, or smoke and fumes. Inspection revealed the 38 gallon engine oil supply had been depleted to 13 gallons during 40 minutes of the scheduled 90 minute flight.

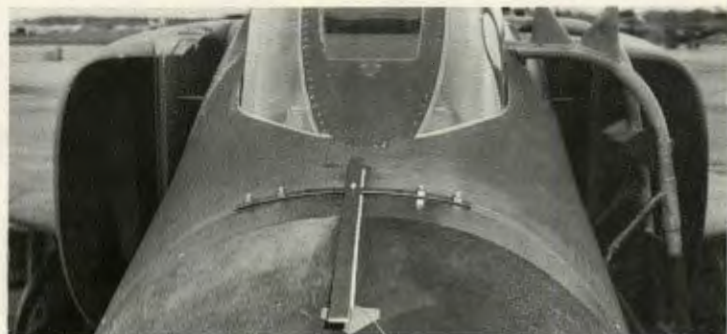
Captain Blankenship's rapid evaluation of a critical emergency and assistance of an aircraft other than his own clearly qualify him as a Tactical Air Command Pilot of Distinction.





Locally devised yaw string jig. Actually it's a custom fitted "T" square fabricated in the 4th TFW machine shop. Pencil points out machined edge of the jig.

#4



Completed yaw string installation with custom "T" square still in place...and it works at mach two.

#1

Butt the feet of the "T" square against FS 48-28. This nose bulkhead is exactly perpendicular to the longitudinal axis.



#2

#3



Run 1/16 inch reference line through the center screw of the rain removal access plate.

STRING SAVER

by 1Lt William V. Riemer, Jr.
335th TFS (TAC)

All of us flying the F-4 know the turn and slip indicators, hereafter referred to as 'the balls,' fall short of ideal. We quickly learn that although the rudder trim switch is in the front, the rear cockpit ball is the more accurate. A crew trimming technique soon develops. "...A few more clicks right...Okay, that's close...Ahhh, precision!"

But so what, you say. You and your pal Melvin Gib always FSBC (Fly Safe, Ball Centered). Besides, a little out of trim condition is more nuisance than anything else, right? No...wrong!

One of the birds in our unit was hit with four successive controllability squawks during ACM training.

They were serious enough to blackball it from the CM program. During high energy maneuvering, positive control was difficult, and attempts to fly this aircraft to maximum performance resulted in some unscheduled and surprising maneuvers. Post-stall gyrations are no longer considered acceptable last ditch maneuvers. Yet here was an aircraft that seemed to have one built in. Why?

Controllability write-ups on high performance aircraft are difficult to diagnose. Often all the pilot can say is that his aircraft didn't feel right. In our particular case, maintenance pulled flight control checks, rig checks, and stab aug checks - even sanity checks on themselves. No abnormalities were noted. The eventual culprit?...A grossly off-level rear seat ball.

The airplane was leveled on jacks and the rear ball checked. It was found to be mounted off center. When the airplane was flying with the ball centered it was actually in a healthy yaw. The indicator was loosened and leveled, and the problem disappeared.

But think for a moment of another ending to our story. Pilot trims ball center inducing the yaw; compensatory aileron trim is applied and PRESTO we have pro-spin "neutral" controls. All that's required now is an appropriate high-energy maneuver to spring the trap. Makes you wonder if some of our stall-spin accidents were set up this way.

Since leveling an aircraft on jacks for this check is a bit cumbersome, we installed yaw strings on our fleet. This device has been utilized on many aircraft over the years. Although you may chuckle, it's still the most accurate and most reliable yaw indicator yet devised. It's also the cheapest and simplest.

It is also used by McDonnell Douglas during F4 tests. Ed.

The strings were attached as per instructions contained in the 2nd Quarter 1967 McDonnell Field Support Digest. Our results with the yaw strings were very gratifying. More balls were found in error and remounted. Our flock of strange flying birds decreased proportionally.

A word to those who have recently acquired the additional duty of OIC-Strings. For all its simplicity, the success of the string depends on the accuracy of the reference line. I think everyone would agree that no string at all is better than an inaccurate one.

To achieve the required accuracy I devised the illustrated jig (See photo # 1). In reality, it's a custom "T" square fabricated by the machine shop and kept within three minutes of arc of 90 degrees. Butt the "feet" of the "T" square against FS 48-28 (See

photo # 2). This is the nose bulkhead which is perpendicular to the longitudinal axis within .005 of an inch. The reference line is placed parallel to the longitudinal axis through the center screw of the rain removal access plate (See photo # 3). This will produce a near perfect reference line (See photo # 4). We use 1/6 inch adhesive backed typewriter correction tape for the line, protected by a coat of clear lacquer (See photos).

There are many fringe benefits to a well trimmed bird that we often take for granted. Did you know that in high angle dive bomb (MK 76 training bomb) a small 8 mil slip can produce a fifty foot impact error, assuming everything else was perfect? In SEA, with generally higher release altitudes, the error could double... and who wants to go back the next day? The dive-toss delivery in the F-4D assumes coordinated flight. Any deviation will produce errors.

We say that yaw error in fixed pipper strafe is insignificant; but when shooting air-to-air with the F-4's 'disturbed' lead computing sight, a slip can produce really gross errors.

Remember, when stringing up your fleet to cash in on all these good things - be accurate. You only kid yourself if you're not. For more information on the jig, contact the 335th TFS, Seymour Johnson AFB. Good luck and FSBC... and don't laugh at our strings!



Lt William V. Riemer, Jr. has done an outstanding job, not only as String Officer for the 335th Tactical Fighter Squadron, but also as a writer passing along this valuable information. Bill is a 1965 grad of Holy Cross. He received his pilot training at Moody AFB, graduating in August 1966, Class 67-A. In March 1967 he finished F-4 RTU at George AFB and proceeded to his first full time flying job with the 335th at Seymour Johnson AFB, N. C.

CHOCK TALK

...incidents and incidentals with a maintenance slant.

parts and pieces

On the tanker for a night refueling mission, the F-100 pilot felt that his bird was yawing more than it should. He found it more difficult than usual to stay in position.

The only discrepancy he noticed before takeoff was a writeup on the yaw damper. It had been disconnected because of a leak in the actuator. But he found the bird yawing with the slightest provocation. Sometimes the ball would hang to the outside of a turn. And on one occasion the nose of the aircraft yawed excessively to the inside of the turn. He had to use rudder trim continuously to center the ball.

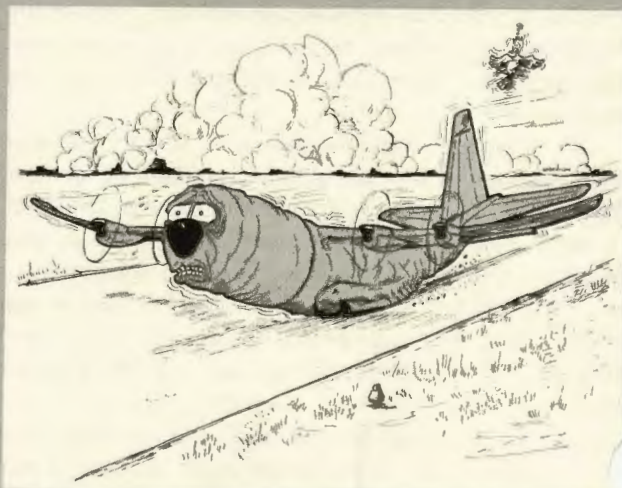
After he returned home and landed, the maintenance people found the trouble... a spacer was missing inside the rudder bellcrank. The bellcrank had been replaced during the last 100-hour inspection, and the bird had flown 96 hours since then. In that time, the bearings had been pushed inside the bellcrank, allowing considerable side play. This allowed the rudder to deflect as much as 2 1/2 degrees either side of center. Although the condition had probably been gradually worsening, it had gone unnoticed until the yaw damper was disconnected.

The crew chief who made the installation said he drew the complete bellcrank housing from supply. He didn't match the parts and pieces against the T.O. illustration to see if any were missing.

just a headset...

The overseas F-4 was scheduled for a high speed taxi run. The pilot had started engines and was waiting in the chocks while his crew chief made a leak check on the newly-installed drop tanks.

After the crew chief completed his checks on the left tank, he started forward under the wing, walking parallel to the fuselage and about three feet from it. When he reached a point slightly behind the intake he felt his interphone headset being sucked from his head. As he watched in horror, it whisked around the edge of the intake and into the engine!



belly scratcher

Approaching touchdown for a maximum performance landing the pilot misjudged his altitude and over-rotated the aircraft. With a nose high attitude the aircraft began to sink rapidly. It touched down and dragged the tail skid for about 30 feet. The aircraft then bounced back into the air. The instructor pilot attempted to level the aircraft, however, the pilot had already begun to apply reverse thrust. This caused the second hard touchdown. The aircraft was off-loaded and an inspection of the landing gear area revealed a 6-8 inch crack in the chine angle in the area of the left rear main gear.

Would you believe that the damaged tail skid area went undetected for three flights? In fact, it went undetected through a maintenance post-flight and Dash Six pre-flight inspection and three inspections by flight crews. The question that arises is, "Just how good are our inspections?" Is there room for improvement? It did happen. It could happen again.

Are you headed for a short tour in the land of the King Cobra? If you are and plan to deliver iron bombs, then read on. This article is based primarily on experience gained from F-105 operations; however, some principles should apply equally to F-4 or F-100 operations.

As the title implies, your cockpit performance and ground crew support can be a significant factor in whether you finish 100 over the North. Battle damage too often refers to damage resulting from delivery or loss of external stores. In the photos, you can see some of this. Beginning with before takeoff and ending with debriefing, here are some things to consider.

First, you must be intimately familiar with the G limits and maximum airspeeds for carrying and releasing bombs. Regardless of which aircraft you fly, bomb fins come apart at similar airspeeds.

For example, the M-117 bomb fin, commonly used on 750-pound GP bombs, has a 500 KCAS restriction. The book says that bomb fin disintegration is probably at speeds in excess of 500 KCAS. When these fins come apart, serious aircraft damage usually results from fin parts striking the fuselage. Should you pickle (release) a bomb minus its fins, at normal release speeds, it too can cause major structural damage. In actual experience with unexpended bombs we found cracks in the bomb fins when in-flight speeds did not exceed 500 KCAS. So when you hear a couple of MIG calls or there's a little flak distraction, try to live within the limits and avoid overspeeding the fins.

Another major factor to consider is the structural G-force limit, rolling and symmetrical, placed on your bomb load. Too many Gs will result in severe aircraft damage. In the photo of the F-105 minus its bomb-bay doors you see an example of what can happen. This pilot was only pulling about four Gs with five bombs hung on his center line Multiple Ejector Rack (MER). He barely made it to an emergency airfield.

This can also be caused by faulty bomb bay door rigging. Ed.

BEFORE FLIGHT

The need for a thorough aircraft and weapons preflight cannot be overstressed. A mission gets off to a better start when you know your MER is homed, all stores firmly mounted, fuse access cover plates secure, and arming wires properly installed.

The load crews and crew chiefs who take care of our SEA combat birds are the best in the business.

TAC ATTACK

you can be... **YOUR OWN WORST ENEMY**

by Maj Everett M. Sutton
23rd TFW, McConnell AFB, Kansas

Hung bombs cause serious damage when Gs are pulled. Note the hole in the bomb-bay fuel tank.



Despite this, the rush to make turn-around time causes occasional oversights. Your preflight can prevent serious errors. For example, a loose fuse access cover plate becomes a "buzz saw" at 500 KCAS. It can slice a hole up to 18 inches long in your fuselage or tail assembly.

ABORT OR GO

You may feel like you're letting your buddies down when you abort. But if you take a less than satisfactory bird on a mission, you may not be able to do your part - in fact, you could cause the mission to fail. The little problems, such as an inoperative warning light, lower than normal hydraulic pressures, an inoperative navaid, or an inoperative flight instrument may serve to haunt you. This is especially true when you find the mission complicated by weather, rescap, battle damage, and the like.

TAKEOFF

Once around the cockpit before takeoff roll is important in the States. In SEA it's very important. Takeoff roll with a combat load is no place to find the trim not set, a canopy unlocked, or an autopilot engaged. Don't laugh! You too may make some of these errors when you find yourself headed for a railroad yard, POL storage area, or other targets noted for adequate defenses.

INFLIGHT

Long missions at high gross weight, weather, fatigue, and airplanes everywhere, complicate your efforts at preventing midair collisions. We've lost birds on the way to, from, and probably in, the target area from midairs. The only answer is to look around. Keep your flight lead informed of all conflicting traffic. Proper maneuvering of a loaded bird while flying defensive or tactical formations is a mandatory fighter pilot skill. But equally important in collision prevention is understanding perfectly what is expected before you leave the briefing room. The start of a dive bomb run is no place to figure out which side you're supposed to be on.

BOMB RELEASE AND PULLOUT

There is no other phase of flight more important to your safety than achieving bomb release conditions within aircraft design limitations prior to letting



This battle damage resulted when the bombs went up and over the slab. The cause can only be classed as poor release conditions.



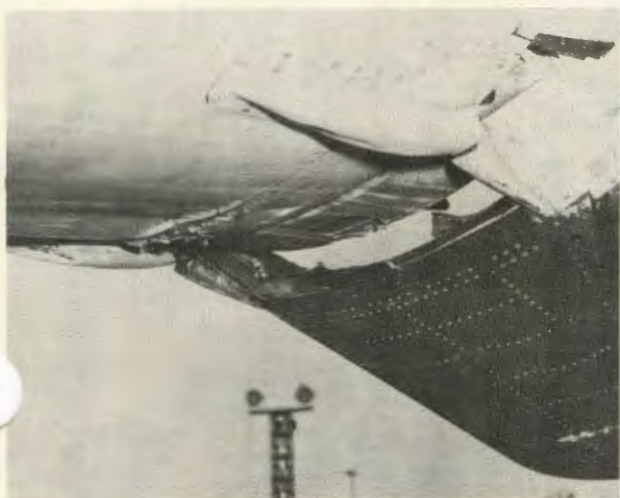
Minus fins when released, the bombs trickle down the fuselage and do things like this.



Releasing while rolling and pulling excessive Gs only serve to negate the bomb ejection velocity provided by the MER. This shows what a 750 pound bomb can do.



Thanks to the Thunderchief's railroad track-slab-spar, this aircraft made it home. Damage was caused by a pylon tank.



The ground in the North is just as hard as a stateside gunnery range. This damage resulted from a late pullout - pressing. How about this for a war story.



Up and over...an excellent speed brake. Tank failed due to excessive Gs with partially filled tank.

those babies go. Releasing while rolling, bunting (less than .7 G), pulling excessive Gs, only serves to negate the low bomb-ejection-velocity (about 6 feet per second) provided by the ejector rack. This is also true with pylon stores which have an ejection velocity of 12 feet per second.

Of course, some aircraft damage is caused by MER malfunctions such as slow burning cartridges and latches that won't release properly causing bomb hang-up. Rack maintenance is therefore extremely important and can reduce this type of problem.

If you pull out from your dive bomb run with a hung bomb your roll into the load will increase as the G force is increased. At a time like this you have a problem, so try these thoughts. Don't press your pull out altitude. Normal release altitudes give you time to clean off the bird before pullout begins. If you have pressed you won't have time.

Recheck switches prior to roll-in or at some pre-briefed point on the run-in. Know all switch positions intimately. Some birds use unusual combinations to release stores.

By all means, thoroughly debrief weapons release personnel following any weapons release problems.

External tanks are wonderful things to improve range. But when overstressed or abused they can wipe you out. When you have a MIG well cornered at six o'clock you'll probably want to jettison tanks and charge southwest. Great! But don't crank the bird into a hard turn, then punch tanks, or step too hard on the rudder and maybe tear one off. You could go home with an unwanted "speedbrake."

Low pullouts occasionally occur when weather or late target acquisition causes a less than optimum dive angle. Prior to flying combat, you should be intimately familiar with your dive recovery charts. The ground is just as hard in NVN as on a Stateside range. And no matter who built the bird it won't often survive ground impact - consistently.

In summary, what I've tried to say is, know your bird, keep your Mach up and eyes out. And above all, plan for the unusual... so you can enjoy your well deserved 100 mission party. ➤

Major Sutton is currently the Chief of Safety, 23d Tactical Fighter Wing, McConnell Air Force Base, Kansas, and an F-105 instructor pilot. He completed 100 missions in F-105's with the 355th Tactical Fighter Wing while acting as Wing Director of Safety. Prior to SEA duty Major Sutton served as Jet Safety Officer with the Alaskan Air Command.

INTRODUCING

FLIGHT LEADERS

by Lt Col Carl E. Pearson

In the flying game takeoff can be difficult at times. Next to getting back down with a whole bird it's the most hazardous phase of flight. We've felt a need for launching a series paying some measure of tribute to those who've led the way ... a recognition of pioneering men and machines. Additionally, we hope to learn more about their flying problems and solutions. A lesson for ourselves may float by on the waves of nostalgia.

In preflighting the problem we've realized the limits of our magazine's capacity to give personal credit where credit is due: Too many deserving aviators have blazed airtrails for our present-day formations. We couldn't give fair treatment to all of our worthy predecessors even if we were a daily publication.

So we turned to recognition of early flying machines. Even they presented a total numbers and priority problem, but reasonable coverage of famous old warbirds appears to be within our reach ... with the substantial help of the Air Force Museum at Wright Patterson Air Force Base.

Where to start on our version of an aviation Audubon series? It wasn't too difficult. What else but Snoopy's durable Sopwith Camel. What other airplane could be shot down day after day and be back on the next morning's dawn patrol.

Become a bird watcher and stay with us. We'll get to your favorite flying machine in a future TAC ATTACK. If we happen to miss it, drop us a line ... we'll try harder!



SOPWITH CAMEL

F - 1

FLIGHT LEADERS

It wouldn't sound right! Can you imagine Snoopy dogfighting with the Red Baron in an airplane called the Sopwith Pup? Each time the accursed Ace of Aces clamped firmly onto the Pup's tail you'd ask, "Which pup, Snoopy or the Sopwith?"

It almost turned out that way. Luckily, development of the German Albatross fighter series forced higher performance on the friendly, obedient Sopwith Pup. The air supremacy challenge of German fighter pilots resulted in the superior follow-on Sopwith F.1, dubbed the "Camel" by World War I airmen. Successfully meeting the challenge of the fast, twin-gunned albatross, the Sopwith Camel helped the Allies regain control of the air...and Schultz avoided the canine complications surrounding Snoopy dogfighting in a Sopwith Pup.

Why call it the "Camel?" It wasn't official nomenclature, but pilots made it stick. Some think the name characterizes its personality and dangerous ride. It'd twist and bite you without advance notice. Lots of torque combined with a little too much rudder in a tight turn and, "zap"; the Sopwith Camel would spin without warning...usually fatal. Quite a contrast when compared with the forgiving, loyal Sopwith Pup predecessor.

Besides having a desert camel's personality, the Sopwith F.1 shared a slight physical resemblance. Probably the real reason for the Camel name tag. It's two Vickers machine guns mounted on top of the engine cowling fired thru the prop arc and were partly faired over by a humped top decking. This, on top of a fuselage deeper than the Pup's, suggested a Camel's hump. The name stuck.

It was famous before Snoopy flew it out of the shadows of World War I...and immortalized the Sopwith Camel. This British built fighter scored more aerial victories in World War I than any other airplane, Allied or German. It bagged an estimated 1244 enemy aircraft.

The Camel turned tightly because of the close grouping of main masses of engine, fuel, armament, and pilot. Torque lifted the nose in left turns and

dropped it in right turns. If a fledgling Camel pilot survived his early checkout, mastering the torque and sneaky spin problem, he had a fighting aeroplane. And surprisingly, it fought best around 12,000 feet. The 130 horsepower rotary Clerget pulled it up, down, in and around with the best of its day...controlling the action. The Camel's max speed at 10,000 feet was a wing-bending 113 mph. One of the first "homesick angels" it climbed to 6,000 feet in six minutes flat. Service ceiling was 19,000 feet...high enough without oxygen equipment. Pilots squeezed two and one half hours endurance out of a 243 pound fuel and oil service. The Camel weighed 929 pounds empty and grossed 1,453 pounds at its fighting weight, including 101 pounds of .303 ammo for its twin Vickers. Four 20 pound Cooper bombs could be carried on bomb racks mounted under the fuselage with a reduced ammo load.

Probably its most famous kill...in the skilled hands of Canadian veteran Captain A. R. Brown...was the German Ace of Aces, Baron Manfred von Richthofen. The renowned Red Knight in his red Fokker triplane was on the tail of another Camel when Captain Brown's twin Vickers downed him. Perhaps it's the reincarnation of the famous Red Knight in the form of the "Red Baron" that's now wreaking his vengeance on Snoopy whenever he launches his Sopwith Camel doghouse on a dawn patrol.

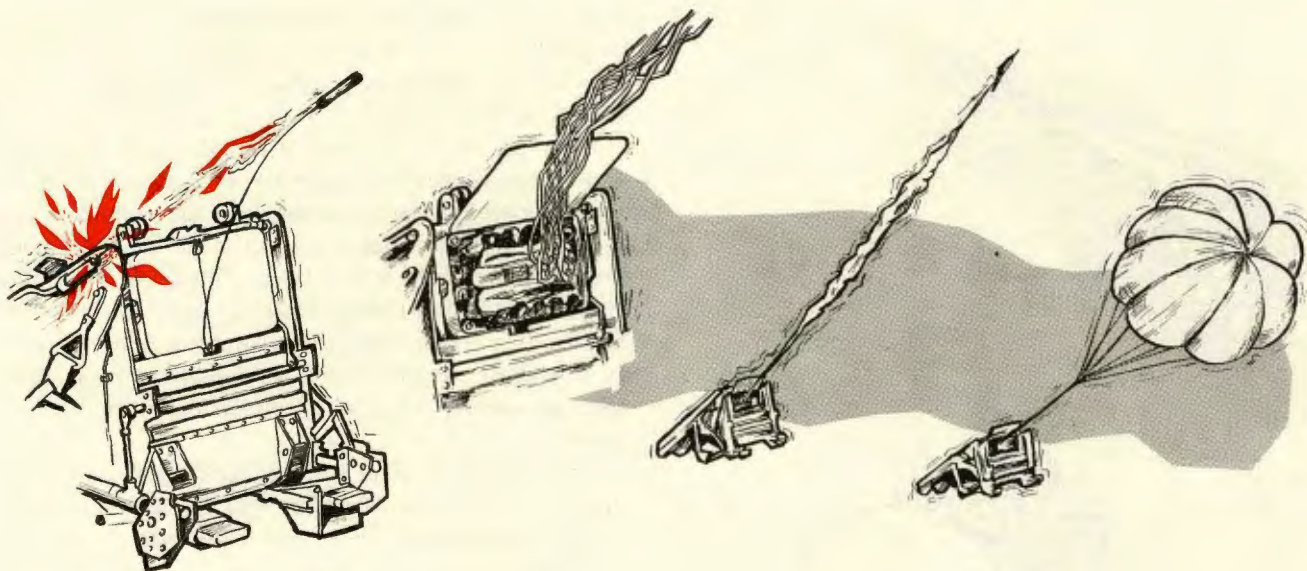
The Sopwith Camel added much to our then meager store of flying know-how. We learned quickly that speed, maneuverability, firepower, and armor were important to fighter pilot survival and air supremacy. Pilots then, just as pilots now, couldn't hamfist and boot an airplane around...especially at low speeds and altitudes. Loss of control at low altitude gave pilots small choice then...parachutes weren't universally accepted as yet. Some World War I tigers thought chutes beneath their dignity. And even the German Ace of Aces, The Red Knight, learned the hard way: You can't afford the luxury of target fixation and hope to stay alive.

A WINNING COMBINATION

by Major John M. Lowery

dual chutes cut egress hazards





As this is written Thunderchief pilots are being introduced to a new ejection system combination that will, undoubtedly eliminate past problems involving high sink rates-low altitude and seat-man-chute entanglement. This winning combination consists of the Republic Ejection Seat Retardation Chute and the Weber Gun-Deployed Parachute.

SEAT RETARDATION CHUTE

The seven foot Republic Retardation Chute is designed to slow the seat down before parachute deployment. This will provide safe clearance between the pilot and ejection seat when the pilot's parachute begins to deploy.

Seat-chute entanglement was identified as a problem back in 1958 with the introduction of the zero delay lanyard. For years the F-105 seat was free of this often fatal characteristic. However, when the rocket ejection catapults were added to the stable, sturdy Republic seat, entanglement quickly became a major problem. In the meantime, Republic engineers were

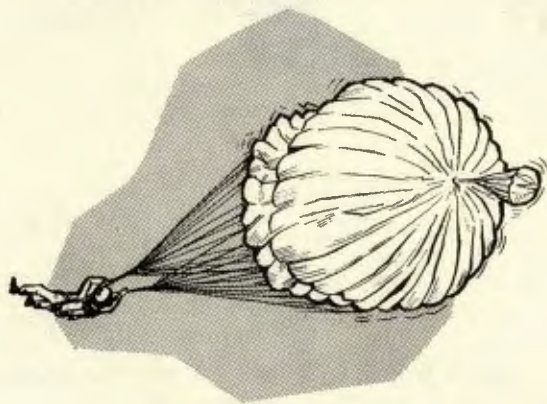
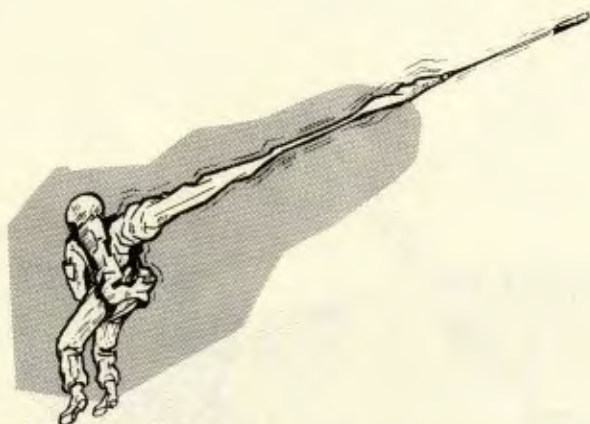
hard at work designing a fix ... a retardation chute similar to that found in the F/RF-84F.

Here's how it works. After you eject, and the seat approaches its maximum height, the lap belt M-32 initiator fires. The retardation chute system taps off some of the M-32 initiator gas which in turn fires the chute's drogue gun. This drogue gun is fired almost simultaneously with initiation of the lap belt opening and seat man separator action. The lanyard attached to the drogue gun slug unlatches the chute container and deploys the chute. Full drogue chute deployment is accomplished 0.030 seconds after the lap belt releases. The chute then provides 6000 pounds of drag to the seat. This does an outstanding job of separating the man from the seat, even if the seat-man-separator system fails or the crewmember unconsciously hangs onto the seat.

GUN DEPLOYED PARACHUTE

The parachute Weber made for Thunderchief pilots is an improved model of the one used by ADC in

A WINNING COMBINATION



the F-106. This fast opening chute originally had a limiting speed of 450 knots. However, this newer version has successfully withstood opening shock test at speeds to 600 knots.

The secret is its high strength apex, approximately one-third of the chute canopy, which is made of a nylon material twice as heavy as the normal parachute. If, for example, you eject at 600 knots (heaven forbid), your body would be at 340 knots when the chute drogue fired approximately one second later. The earlier ADC model, with a 2 second delay, opened at 275 knots. Surprisingly, this higher "safe pack opening speed" does not appear to increase opening shock.

For a high altitude bailout you'll be protected by the automatic aneroid which will fire the parachute drogue gun at the pre-selected altitude ... usually 15,000 feet.

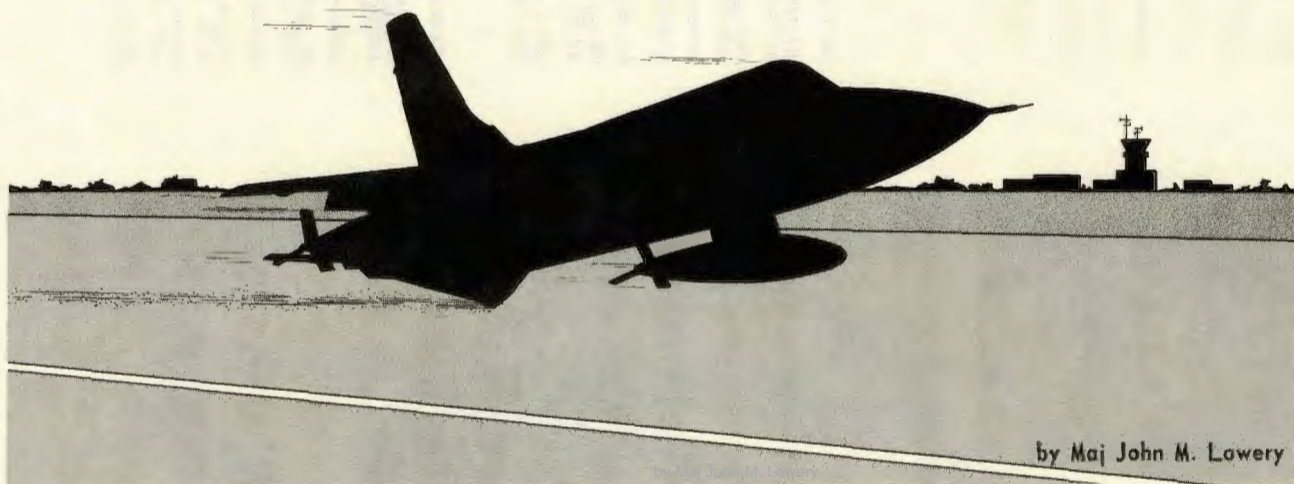
Here's how the chute works. When you enter the cockpit the parachute is plugged into an actuator disconnect instead of the old gold key-lap belt combination. (See diagram.) When you are forced to eject and the lap belt initiator fires at near peak trajectory the Weber chute, like the retardation chute, taps off some of the initiator's gas. This fires a one second time delay cartridge in the parachute gun ... assuming low altitude. The gun then fires a 12 gauge-like shotgun charge which throws a 13 ounce slug. This slug pulls the parachute canopy out of its pack to full line extension. This allows a very fast opening-inflation time.

THE COMBO

This entire system, retardation chute and gun deployed personnel parachute, has been thoroughly tested including high sink rate test at 6,000 to 10,000 feet per minute. These tests showed that at 6,000 FPM rate of sink the ejecting crewmember will have a full parachute canopy at the same height above the ground as that when he ejected ... free from seat entanglement.

This looks like a winning combination for a winner of an airplane. But fly safe and chances are you'll never have to use it.

A DISCOURAGING SOUND



by Maj John M. Lowery

That screeching sound made by the underside of an aircraft scraping along the runway is probably the most startling, easily identified, humiliating, humbling noise a pilot is apt to hear. A fellow F-105 pilot heard it recently . . . in another corner of the world. His misfortune caused us to dig out a bit of old information that some of our newer F-105 pilots may not have seen.

Over the years several old-head F-105 pilots have come to grief on takeoff, and during go-around, because they were too quick with the gear handle. They rushed gear retraction.

The F-105 in takeoff configuration requires an angle of attack of plus 9 degrees to become airborne. If the gear is retracted prematurely and the ventral fin and tail start to drag, the maximum angle of attack obtainable is plus 3 degrees. This is because your pivot point, the main gear, is gone.

The culprit involved in many of these mishaps is a cushion of air known as ground effect. On takeoff this phenomenon causes you to encounter several vaguely understood aerodynamic reactions. These combine to give you the illusion of being safely airborne . . . earlier than planned.

Once airborne, a pilot's first reaction is to reach for the gear handle and retract the gear. But time and sad experience has taught us caution . . . at least most of the time. We are continuously reminded to "leave the gear down until safely airborne."

The trap a guy falls into with ground effect on

takeoff is its after effects. Here's what happens.

Let's say ground effect has helped get you airborne a little below your computed takeoff speed. You quickly retract the gear to gain airspeed. You then begin to leave the effects of the ground cushion of air. (It's quite close to the runway, you know.) The first thing that happens, you encounter a sudden decrease in the coefficient of lift. This is because you get a sudden increase in the drag coefficient due to higher velocities of the tip vortices. The increased drag requires you to increase thrust and angle of attack in order to maintain the same lift coefficient. The aircraft then experiences a decrease in stability and a nose-up tendency follows. You may even experience an increase in indicated airspeed due to a lessening in the static source pressure.

If you have used ground effect and lifted off early, below your computed takeoff speed, you can see how these events can combine to put you behind the power curve. This type of accident is on a par with the inadvertent gear up variety. It's been with us since the advent of the retractable landing gear.

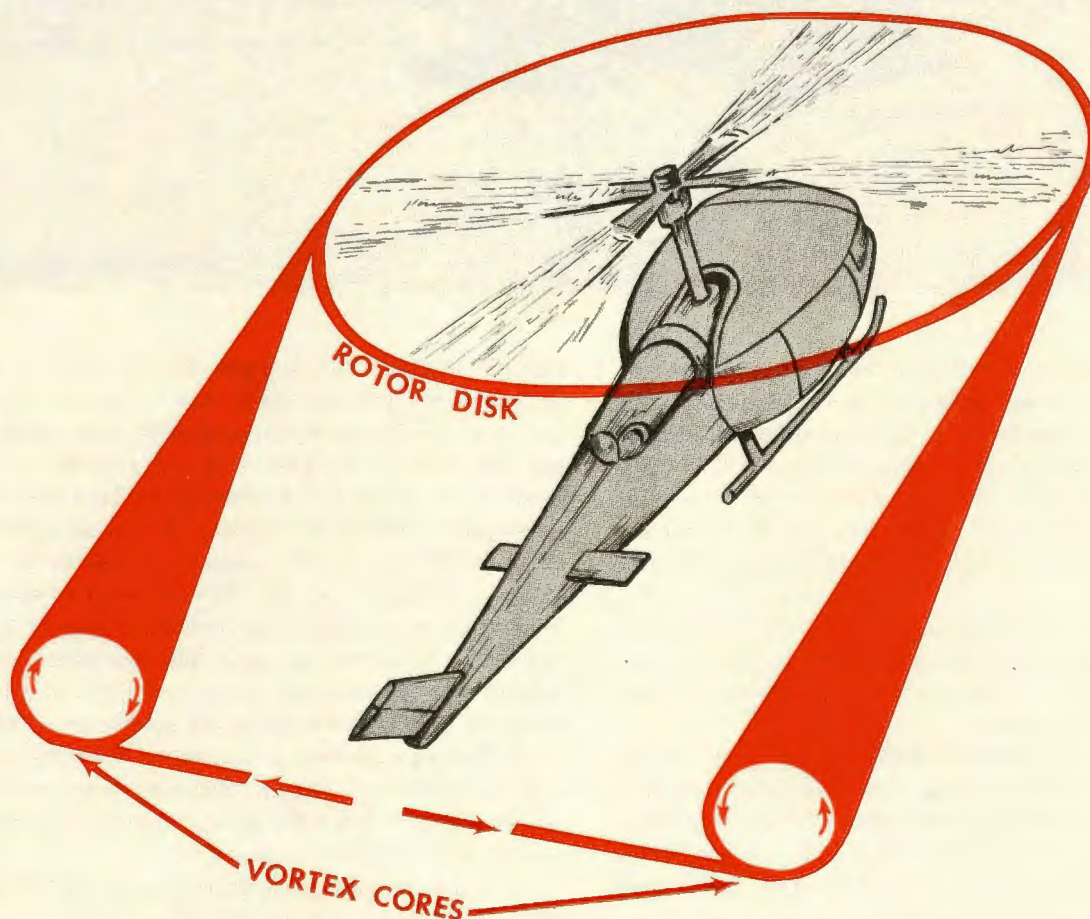
So the point to remember is, on takeoff or during go-around take your time. Rotate and fly at the proper speed.

But if you should get caught with your aft section dragging accept your fate and chop the power. The longer you wait the worse the situation becomes.

Don't get all balled up at the end of the runway!

CAUTION...TRAILING TWISTERS

by Don Reynolds



that chopper rising from your air patch
may be setting you up for a tumble. . .

Ref: Technical Note D-1227, "A Brief Evaluation of Helicopter Wake as a Potential Operational Hazard to Aircraft",
Langley Research Center, NASA.

Low Speed Vehicles Branch, Full Scale Research Division,
Langley Research Center, NASA.

A whirlybird tail can be more violent than that of the proverbial tiger. Several of TAC's fixed wing pilots who tangled with rotorwash vortices have given first hand testimony after crawling from their maimed and crippled birds. Their surprise of violent lashings, which came from a seemingly harmless chopper upwind of their flight path, is waiting to be relived by other unsuspecting fixed wingers. Helicopter rotorwash caused two major accidents in 1967.

A C-130 ran off the runway while trying to abort after penetrating rotorwash. A hovering CH-47 Chinook interrupted the aircraft's control during takeoff. The same type of helicopter-generated rotorwash was encountered by a C-7A at roundout. The Caribou's main gear hit the runway lip resulting in a major crash.

These accidents and several incidents led 7th Air Force to ask for a study on rotorwash. The following was prepared from the resulting study made by the Air Force Flight Dynamics Laboratory and completed late in 1967.

The real culprit of helicopter turbulence is not the obvious downwash of a hovering chopper, but vortices created by the rotor blades when the aircraft is hovering or in forward flight. Vortices originate from the left and right sides of the rotor diameter. When the chopper is in forward flight as shown at left, the turbulent tornados trail to the rear similar to fixed wing vortices.

The intensity, or rotation velocity of a vortex can not be dismissed as a pasture field whirlwind. Velocity may range from 50 to 100 MPH in one of these twisters and it's very possible that your plane's wing may be caught by both up and down forces at the same time, depending on the angle of penetration.

Hazardous rotor vortices can be generated when the helicopter is performing other than forward flight. During hovering or near a vertical climb attitude, a chopper generates vortices turbulence which may be more intense than that created by a four engine jet transport landing with full flaps. Here is the reason.

The intensity of vortices turbulence is directly proportional to an aircraft's weight and inversely proportional to it's wing span and air speed. So a slow flying, narrow spanned aircraft, like a chopper, will create greater turbulence than a faster flying

and wide spanned bird, even though both weigh the same. This means that a medium-sized chopper like a loaded UH-1F Iroquois, hovering over a ground target in a 20 knot wind, will leave downwind flow of miniature cyclones. They are as intense as vortices from either a loaded C-130E or an F-105D at liftoff.

It is obvious then that a helicopter, operating from an otherwise safe distance of an active runway could create a severe hazard to landing or departing aircraft. Especially if winds were moving the chopper rotorwash across the active runway.

Trailing vortices produce a downward movement and settle with time. Vortices generated more than a few rotor diameters above the ground, tend to maintain a constant lateral spacing and have a constant downward velocity. But vortices generated close to the ground tend to settle to a level closer to the ground, spreading laterally at a faster rate than those created at higher altitudes.

Crosswinds above five knots or thermal turbulence speed up vortices decay. So does ground friction at low altitudes. Final dissipation of vortices is not known, however, pilots have reported encountering trailing vortices more than five minutes after their origin.

Penetrating a helicopter's vortices will occur usually from one of three angles or modes. They are cross-track, along-track between vortices, and along-track through a vortex center.

A series of tests was conducted to determine the amount and type of force encountered in each mode, at several points from the origin of the helicopter wake. Used for the tests were a T-28 as the penetrator, and an H-34 as the generator, because both aircraft are similar in weight.

Cross-track mode is penetration at or near a right angle to the trailing vortices. This is most likely to occur in an airport traffic pattern and will tend to cause pitching and vertical motions of the penetrating aircraft, similar to gusty winds. Possible danger from incurring this kind of penetration is limited to light aircraft intersecting a heavier helicopter's wake within a minute of origin. Instinctive pilot control reaction could cause a momentary load increase, exceeding wing limits.

Penetrating a helicopter wake along-track between vortices is most likely to occur during takeoff,

TRAILING TWISTERS

climbout, or landing. The downward flow of both trailing tornadoes can cause the penetrating aircraft to settle or diminish its rate of climb, an extremely hazardous situation, especially at low altitude. This hazard is multiplied by the probability of the pilot stalling his airplane in an effort to check the settling movement.

Crosswinds during a chopper's runway takeoff tend to move vortices off the runway. One exception however occurs when the crosswind equals the lateral speed of a vortex causing it to remain on the runway until dissipated - up to two minutes. This can create very serious takeoff and landing problems for following aircraft.

The third mode of penetration - along-track through the vortex center - may also occur during takeoff, climbout, and landing approach. This may be the most dangerous of the three because it subjects the aircraft to rotational flow of a vortex, inducing a roll in the penetrating aircraft which may be greater than the capability of the aircraft's lateral control. Substantial lateral upsets can occur in this mode at up to two minutes after turbulence generation, even in aircraft of equal weight.

This can be very hazardous at altitudes less than 300 feet, especially for light weight aircraft. The upset may be less for a large and heavy airplane but the tolerable limits are also less because of a slower roll recovery due to relatively higher inertias.

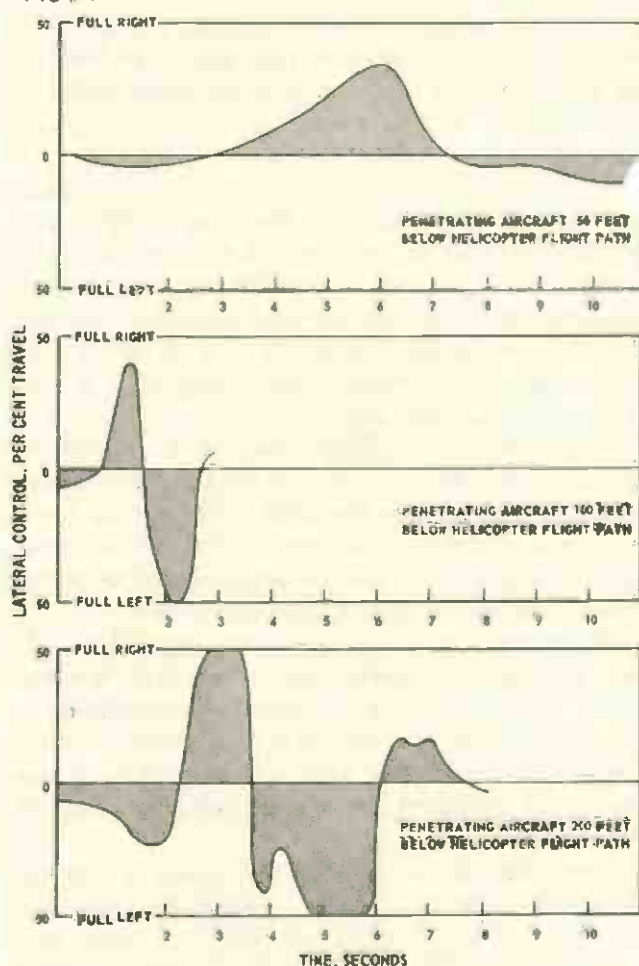
Lateral control required by the T-28 test aircraft, flying at 80 knots, is shown in Figure 1. The plane penetrated the vortex about 1,000 feet to the rear on flight levels of 50, 100, and 200 feet below the helicopter which was moving at 40 knots. Note that at 200 feet below the chopper's flight path, the T-28 required more than maximum lateral control within a five second period. A control input of this magnitude in calm air would result in a roll rate of approximately 36 degrees per second.

During the same tests, a landing approach was simulated by a descent at 250 feet per minute through the wake at 1,000 feet behind the helicopter. A pronounced roll occurred and the rate of descent was increased to 500 feet per minute. The T-28 pilot commented that should vortices-induced lateral upsets and similar altitude loss be encountered at low altitudes, the result could be disastrous.

The following conclusions were drawn from the study:

1. Helicopter vortices are similar to fixed wing vortices.
2. Lower speeds of helicopters generate higher intensity wakes with more severe vortices.
3. Helicopter vortex intensity is directly related to rotor loading.
4. Air traffic control procedures can control exposure to rotor wake vortices on and near airdromes.
5. A penetrating aircraft should fly on or above a chopper flight path or have a separation time of one to one and a half minutes if below a vortex producing helicopter.

FIG #1



(Pilot induced lateral control after initial penetration of helicopter vortex)

MAINTENANCE MAN OF THE MONTH

Technical Sergeant Roy L. Adams of the 335th Tactical Fighter Squadron, Seymour Johnson Air Force Base, North Carolina, has been selected to receive the TAC Maintenance Man Safety Award. Sergeant Adams will receive a letter of appreciation from the Commander of Tactical Air Command and an engraved award.



TSGt Roy L. Adams



Sgt John H. Nelson

CREW CHIEF OF THE MONTH

Sergeant John H. Nelson, 40th Tactical Fighter Squadron, Eglin Air Force Base, Florida, has been selected to receive the TAC Crew Chief Safety Award. Sergeant Nelson will receive a letter of appreciation from the Commander of Tactical Air Command and an engraved award.



LETTERS

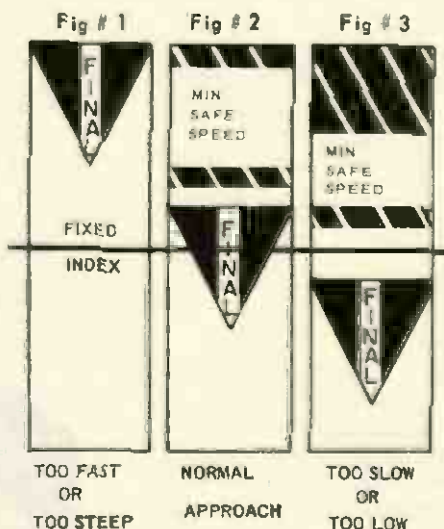
...to the editor

In regards to your article "Using Angle of Attack in the Thunderchief" (July 67), I would like to know whether you got any static on your reply to my letter in the Sep 67 issue. I've been flying angle of attack-equipped aircraft since '59, have over 900 hours cumulative in the F-101, 104, 105 and 4, and think I know how to use the "gauge." I still can't figure out, however, how I am supposed to "quickly recognize" a steep approach if I "use" my "angle of attack meter on final." I've been in a few steep approaches, I knew they were steep because I could see they were steep. If I were so dumb (or inexperienced) as to be unable to see that an approach were steep I do not know in what way "the gauge" would tell me that. Like the old story goes, "It ain't the fall. It's the sudden

stop at the end." The gauge will lie to you all the way down the steep approach that you are safe. But it isn't really lying because, as far as it knows, you are safe. It doesn't know how steep you are, how close the ground is, what your rate of descent is, or any of those other factors that are about to zap you.

Let's face it. The angle of attack indicator is a weather vane hooked to an indicator and then marked to show when the airplane is at the angle of attack that flight tests determined was optimum for a normal landing approach. Vary from the normal landing and you'd better look for additional help in getting the bird down.

Robert J. Vanden-Heuvel
Major, USAF



TOO FAST
OR
TOO STEEP

NORMAL
APPROACH

TOO SLOW
OR
TOO LOW

No, we've received no static.

The angle of attack indicator in F-105 is a management tool to help pilot get a cost effective landing. Normally you'll aim for a desired touchdown area on the runway. If you have a steep descent angle on final approach your angle of attack indicator (F-105) will show the FINAL triangle above the fixed index line (see Figure 1). This tells you the airspeed is too fast, or the angle of attack of your aircraft is too steep for the (landing) configuration of your aircraft.

If you fly final approach at a normal rate of descent, still aiming for the desired touchdown point, and maintain the recommended angle of attack you will be at the proper airspeed and angle for a safe approach and landing (see Figure 2).

If you should get low on final your first reaction is probably back stick to keep from getting any lower. Without an immediate increase in engine power your angle of attack indicator will show your attitude as becoming unsafe...the triangle will descend below the index line and the minimum safe speed hatched area will move downward. This indicates you're too slow and/or your nose is too high.

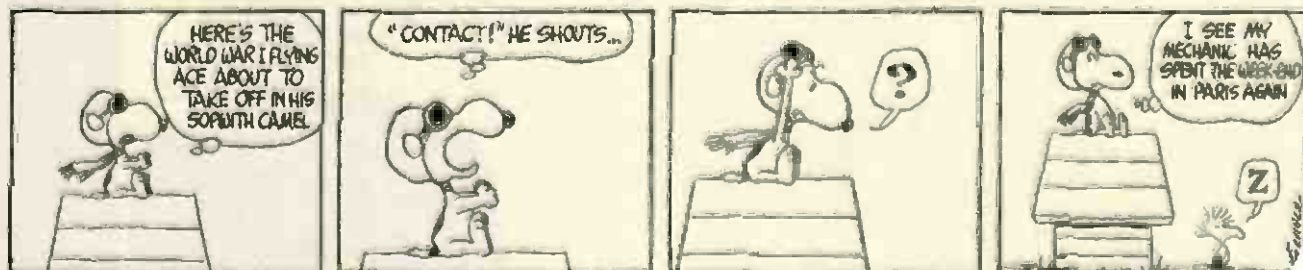
The facts should be clear: Working close to a wing's maximum efficient of lift, which is very close to stall, angle of attack information is more accurate, and therefore more important, to the pilot than airspeed indications.

The article was an attempt to show the hazards of attempting to salvage a bad approach. If you fly final at the recommended angle of attack, chances are good you'll avoid "...that sudden stop at the end."

- Ed.

PEANUTS

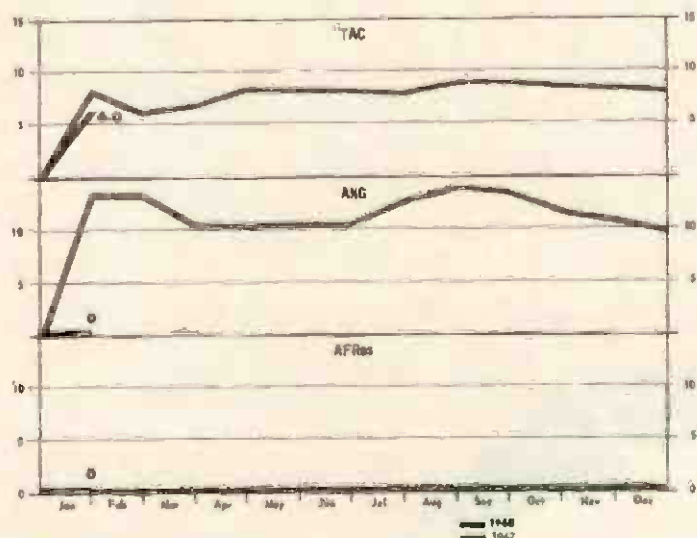
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TAC TALLY

MAJOR AIRCRAFT ACCIDENT RATES as of 31 JANUARY 1968*

MAJOR ACCIDENT RATE COMPARISON



UNITS

	1968	1967		1968	1967
9 AF	4.0	8.1	12 AF	7.3	7.3
4 TFW	0	0	23 TFW	0	41.2
15 TFW	31.1	31.1	27 TFW	0	0
33 TFW	0	45.0	140 TFW	0	0
113 TFW	0	0	479 TFW	43.5	0
354 TFW	0	0	67 TRW	0	0
4531 TFW	0	0	75 TRW	0	0
363 TRW	0	0	123 TRW	0	60.0
64 TAW	0	0	313 TAW	0	0
316 TAW	0	0	516 TAW	0	0
317 TAW	0	0	4453 CCTW	0	0
464 TAW	0	0	4510 CCTW	0	0
4442 CCTW	0	0	4520 CCTW	0	0
			4525 FW	0	0

SPECIAL UNITS

1 ACW	0	0	4500 ABW	0	0
10 CCTW	35.4	0	4440 ADG	0	0

TAC ATTACK

AIRCRAFT			1968	1967
TYPE	TAC	ANG		
A-1	0	0		
RB-66	0	0		
F/RF-84	0	0		
F-86	0	0		
F-100	0	0		30.4
RF-101	0	0		0
F-105	0	0		0
F/RF-4	22.8	24.8		0
C-47	0	0		0
RC-97	0	0		0
C-119(AFR)	0	0		0
C-123	41.8	0		0
C-130	0	0		0
T-29	0	0		0
T-33	0	0		0
T-39	0	0		0
O-1	0	0		0

* ESTIMATED FLYING HOURS

you can HYDROPLANE :

in
heavy dew
or
splashing rain



SLOW DOWN