UNITED STATES AIR FORCE • JULY 1972

Aerospace SAFETY

Cover photograph by Capt. Harry F. Houdeshel, 15th Military Airlift Squadron, Norton AFB, California.

UNITED STATES AIR FORCE **JULY 1972**

Aerospace SAFETY

FOR AIRCREWS, MAINTENANCE & SUPPORT TECHNICIANS

SPECIAL FEATURES

REGULAR FEATURES

DEPARTMENT OF THE AIR FORCE • THE INSPECTOR GENERAL, USAF

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JULY 1972 AFRP 127-2 VOLUME 28 NUMBER 7

SALUTE TO EXCELLENCE

This issue of *Aerospace Safety* salutes the winners of the 1971 safety awards described in AFR 900-26. Spirited competition for the prestigious organizational awards made selection among the top contenders extremely difficult. Finally, after many hours spent minutely scrutinizing the nominations, the Board selected Air Training Command and Southern Command for the Secretary of the Air Force Trophy.

One of the newer awards, the Chief of Staff Individual Safety Trophy, stimulated a tremendous increase in interest with twice as many nominations as for the preceding year. Unfortunately, only four nominees could be selected from a very highly qualified group of candidates. The names of the winners and a brief statement of their accomplishments are presented on page 17.

Three other outstanding achievements, two by organizations and one by an individual, are annually recognized by awards of long standing: The Major General Benjamin D. Foulois Memorial Award (formerly Daedalian Award) presented annually by the Order of Daedalians to the major command having the most effective aircraft accident prevention program for the preceding calendar year; the Colombian Trophy, established in 1935 and presented annually for the most meritorious achievement in flight safety attained by a tactical organization; the Koren Kolligian, Jr., Trophy presented by the Kolligian family in memory of their son, an Air Force pilot, who was lost in an accident in 1955.

1971 was a year of outstanding accomplishment in flying safety for the Air Force. Consequently, competition for all the safety awards was very keen. This was reflected by the qualifications of the candidates, the magnitude of their accomplishments and the quality of the nominations, which were unusually well written and documented.

To each of you who were held in such high esteem by your Commands that they considered you worthy of the individual awards, we would like to offer our sincere appreciation for a job "well done." In the final analysis, it was your effort, innovations and dedication that produced the low rates the USAF recorded last year, in recognition of which, we are proud to be able to give this small degree of recognition.

The awards and winners are presented on pages 16 and 17, with winners of Safety Plaques listed on the back cover. ★

Pilot Error

"The only way to get a zero accident rate is to ground all the airplanes."

"As long as there's a mistake to be made, somebody will make it."

"You gotta expect some losses."

BALONEY!

Reach into the hat. Pull out a "pilot error" accident at random. Don't let me see it! Now, without looking, without touching, with one wave of my hand, this very hand, I will tell you . . . that accident could have been—should have been—prevented! Right? You bet your bailout bottle I'm right!

There are 24 "pilot error" accidents in a run we just pulled out of the computer. It's monotonous, the way they fall into nice, neat categories. Group them up and they sing an old, familiar song.

There was one midair in the group. Nobody saw; nobody avoided.

There was one case of a fighter pilot who departed the range and entered an area of low ceilings, reduced visibility and rising terrain. The end was entirely predictable. His wingman maintained formation integrity.

Four accidents occurred during takeoff. A C-47 IP tried to get airborne after leaving the runway, rather than abort. He didn't mak

it. Another taildragger groundlooped on takeoff—pilot forgot to unlock his castering gear and the Ops officer wasn't notified of weather warning for high winds. An F-100 pilot ignored his precomputed takeoff data, rotated prematurely to an abnormally nose-high attitude and never quite got out of ground effect. Another jet type elected to let his squat switch do the work for him and raised his gear handle prior to liftoff. V-e-r-r-ry impressive!

The old spin/stall in the landing pattern trick cost us three birds—plus the aircrews. A student pilot in a T-38 overshot final and stalled in; ejection attempt unsuccessful. An A-37 pilot did the same thing. The pilot of an RF-101 didn't like the landing he was making in a gusty crosswind, tried to go around, entered a "pitch-up" and crashed.

There was one hard landing mishap. The pilot of the F-105 was in the soup making a radar approach. The final approach was so erratic that GCA directed missed approach, but the pilot transmitted that he was going to press down a bit farther and see if he could pick up the runway. He did, although it took some fancy maneuvering to line up. The landing was 340 feet past the approach end, after application of MIL power and a flare so abrupt that the aft end of the bird touched along with the main gear. The impact was sufficiently hard to slam the nosewheel, blowing the tire, and causing the tailhook to drop. The pilot then raised the nose for aerodynamic braking, and the tailhook snagged the approach-end barrier, slamming the nosewheel again and shearing the nosegear.

THREE PILOTS ARRIVED with red faces—mostly from the reflection of the light shining in the gear handle. In no case was there anyone on the ground checking landing configuration.

Three pilots made it to the runway but couldn't keep it there. One low-time F-101 pilot left the runway in a gusty crosswind. His Operations section recognized—informally—that low time pilots should have more restrictive crosswind limits than those published in the Dash-one, but had taken no steps to establish those limits. A T-38 IP and student landed long and hot, blew the tires, left the runway and sheared the gear. Another F-101 started to weathervane and hydroplane after dragchute deployment. The pilot jettisoned the chute, lowered the nose and tried to control it but found neither nosewheel steering nor brakes had any effect. The bird hit a snowbank on the attempted go-around. Turned out he hadn't slowed down enough for brakes and steering to be effective. It also turned out that the flight had been cleared in violation of local crosswind limits.

BY FAR THE LARGEST category is the loss of control during flight. One T-Bird, acting as target for a low-altitude intercept mission, rolled over and dived into the ground. Another T-Bird bit the dust during a spin data test; investigation disclosed many supervisory ramifications, including an elapsed time of eight weeks between spin demonstration and the spin data flight. In another testing situation, a UH-1N test pilot retarded one throttle for single-engine testing, but the other throttle followed; at least part of the ensuing crunch has to be due to the slim margin for error built into the test parameters. One bug-smasher type flew into weather and turbulence the pilot couldn't handle. And one fearless pilot, flying an airplane which he suspected of having a control problem, elected to continue a weapons delivery mission and snap-rolled into the ground out of the final turn.

UNDER ANALYSIS, a great many "gaps in coverage" emerge. In many cases, the pilot's judgment was notably deficient, and we wonder where, in the process of *educating* that pilot, we failed to get through. In many cases, the pilot's training was notably weak, and we wonder why, in the process of *training* that pilot, we failed to provide what he needed. In a number of cases, the pilots involved were very short on time—less than 20 hours in the previous 90 days, less than 50 hours in type—and we wonder why our *scheduling and supervision* failed to allow for less-than-optimum proficiency when aircrews were matched against missions. In one case the pilot was flying on a waiver of crew rest, and fatigue could well have contributed to the accident. In almost every case, there was a deficiency in supervision which contributed, directly or indirectly, to the accident.

In *every* case, the accident could have been prevented. Better education, better training, better supervision or a combination of all three would have beaten the "inevitable" accident. ★

PREVENTING MIDAIRS IN TERMINAL AREAS

While there has been a drastic decrease in the past 20 years in the number of midair collisions involving USAF aircraft, a midair is potentially so serious that we cannot afford any semblance of complacency.

The avoidance of midair collisions depends on the air traffic control system and the actions of human beings—air traffic controllers and aircrews. It is the latter, primarily but not exclusively, to whom this article is directed.

The midair problem is not a simple one. As long as more than one airplane is flying, the collision potential is present. And as the number of aircraft increases and operations in terminal areas grow in number, the probability of collisions increases, unless effective remedial actions are taken. Therefore, the following is concerned with terminal areas.

All of our readers are, or should be, quite knowledgeable of traffic control procedures and practices. This knowledge does not, however, preclude the possibility of a midair collision. There are several reasons:

- A mix of IFR and VFR traffic and aircraft of widely differing capabilities.
- At most USAF bases there is not a total radar environment for traffic control.
- Other than USAF aircraft fly in and adjacent to USAF control zones.
- Aircrew tasks are more numerous in the terminal area, making constant attention outside the cockpit difficult.

It is axiomatic that devising solutions depends upon defining the problem. The prevention of midair collisions is a very complex problem and we're not certain that it has been defined with anything approaching 100 percent accuracy. Nevertheless, we're going to offer some possible solutions.

First, let us simplify the task by eliminating a couple of distracting factors. One of these is associated aircraft, i.e., aircraft flying in formation, refueling, etc. Collisions between such aircraft are a difficult problem requiring other solutions. Studies have indicated that the greatest number of midair collisions occur within terminal areas—during approach or in the traffic pattern, and over navigational fixes.

There is a funneling factor in air base terminal areas where traffic converges to a narrow path over the ground toward a single glidepath to a common touchdown point. The problem of separation is aggravated by a confusing mix of aircraft flying at different speeds, using various traffic patterns, different radio frequencies, IFR and VFR flight plans, as well as by different levels of pilot knowledge and ability.

Adding to the confusion is the fact that there are usually several different agencies controlling traffic within the area, and some traffic is completely uncontrolled. The lack of a single agency to control *all* traffic in the terminal area is a serious problem which has been present in midairs involving USAF aircraft.

The problem for the Air Force is further complicated by operations from joint use bases and by uncontrolled airports existing within the control zone of an Air Force base.

One solution would be to establish mandatory IFR operations where possible, or at least during certain hours. This, of course, would depend upon the manpower and equipment available. However, even at undergraduate training bases and tactical and gunnery training bases, mandatory IFR would probably be feasible after normal duty hours.

RADAR ADVISORIES

Most of us are familiar with Stage I radar, although there seems to be a lack of understanding among many general aviation pilots, and even some military. Stage I is a radar advisory service for VFR aircraft. However, it is dependent upon the controller's immediate workload, so there's no guarantee of its availability. Nevertheless, it is a useful service which points to the possibilities to be realized from more comprehensive radar coverage, which is called Stage II.

Stage II radar service provides arriving VFR aircraft with wind and runway information and sequences them with IFR traffic.

The important thing about Stage II is that it places VFR aircraft under radar surveilance in the most congested traffic area. The procedure is for the VFR pilot to call in 20-30 miles out and request the service. The pilot is given instructions on where to enter the pattern or may be provided radar vectors to properly sequence him in the pattern. But remember, availability of this service is based on controller workload.

Stage II is available at a number of bases and airports in the CONUS, and the Enroute Supplement contains information.

Stage III is the next logical step, which will provide IFR and participating VFR aircraft with traffic separation. Stage III is mandatory for all USAF aircraft at a few bases.

One of the problems with these services is that, even where they are available, many pilots won't use them. Another problem that arises at Air Force bases results from multiple control. FAA may be providing the service but the aircraft must be turned over to USAF tower control.

The Air Force has long been a leader in the use of radar for air traffic control. This interest is continuing with a long range Air Force Communications Service modernization program. This program contains a number of elements designed to decrease the midair collision potential in the vicinity of Air Force bases. Hardware includes:

- TPX 42A (interrogator set). This system translates the output of a beam transponder in the aircraft to a visual display on the controller's scope. Mode and code of each aircraft are displayed, as well as altitude in 100-foot increments. The controller is furnished an automatic monitoring capability to detect emergencies or loss of radio communication within 200 miles, and he can filter out aircraft not required to be displayed. First production model is expected to be in service next fall.

A follow-on to the TPX 42A will provide identification of each aircraft under control and its ground speed.

- GPA 133 (Brite System). These radar indicators designed for daylight use are already operational in some USAF and FAA control towers. The controller can see the position of each aircraft even in bright daylight. The Air Force has bought 110 of these and they all should be installed by July 1973.

- GPA 131 (video mapper). This electronic map permits up to five different scope presentations for controllers' use in detecting special patterns, corridors, danger areas, navigational aids, runway locations, airway borders or centerlines, Standard Instrument Departures, etc. The mapper will be valuable in keeping aircraft out of danger areas and lined up with correct paths. The GPA 131 should be in operation by mid-1973.

- A sophisticated radar air traffic control simulator is already under contract and is expected to be operational at Keesler AFB within 12-18 months. This device will train four student controllers at one time in a realistic setting not before possible except during practice in live situations. Problems can be pre-

◆**BEALE AFB,** CALIF. (Marysville) 39°08'N 121°26'W GMT–8 (–7DT) **H–1, L–2**
AF 113 BL6, 7, 8, 9 H120 (CON) (S160, T300, TT490) (SWL 65/PSI 560) **(KBAB)**
JASU- (MA–1A), (MC–1A), 4(MC–2A), (MD–3A), (MD–3M)
FUEL- A+J4, SP, W, WAI, O–128–133–148 LPOX LOX
A–GEAR
RWY 14 ———————— BAK–11/BAK–12 (1) RWY 32
(204' OVRN)

STAGE III RADAR SVC- Call SACRAMENTO APP CON 25 NM out on 327.5 125.4

sented and re-run to permit analysis of the student's mistakes. The trainer can set up complicated problems involving rain showers, tornadoes, variable densities of ground clutter and ECM.

AIR BASE ENVIRONMENTS

There are myriad conditions a commander must address in providing a safe environment in the air base terminal area. And each base has its own peculiar set of conditions, such as proximity to other airports, cities, towns, highways, low altitude airways, terrain, rivers and other features used as aids to navigation. There are conflicts with approach and departure routes of other airports to be considered, ATC facilities and locations, traffic patterns.

One approach that has been used successfully by a number of bases is a council consisting of local authorities and users and operators of airports in the vicinity. A variation of this in which the local traffic problems were analyzed and presented to aircraft operators and airport officials has been used by the 3510th Flying Training Wing at Randolph AFB *(Aerospace Safety,* December 1971).

Most of this article has been devoted to air traffic control, primarily through the use of radar. But there are other aspects. The see and be seen concept will be in force for a long time to come, and probably will never be completely eliminated unless air pollution eventually produces a 100 percent IMC environment. Therefore, there are other considerations involving conspicuity. Paint to serve this purpose has been used by the Air Force quite successfully but the quality of paints and cost, along with other considerations, led to curtailment of the use of conspicuity paint on USAF aircraft. Perhaps the development of better paints will reopen consideration of this means of making aircraft easier to see.

Directorate of Aerospace Safety studies conducted in the fifties recommended the use of strobe lights on aircraft. Yet today only a few USAF aircraft are so equipped. Hopefully, a program to install high intensity lighting will be accelerated.

Collision Avoidance Systems have been thought of by many as a panacea for preventing midairs. These range from simple pilot warning indicators to highly sophisticated systems that indicate to the pilot the existence of a threat and which way to go to avoid it. There are two basic approaches and no standard has yet been set as to which will be implemented.

Perhaps someday all Air Force aircraft, perhaps all aircraft flying, will be equipped with some form of CAS. However, these systems are expensive, and much development remains to be done. Therefore, while there's much to be said for the use of a CAS, we do not now have such a system and probably won't for some time. This means collision prevention is dependent on two factors:

- Ground Control (primarily for IFR aircraft).
- Pilots using the see and be seen method.

WHAT CAN PILOTS DO?

The pilot is frequently named as the cause factor in a midair collision. To protect his life and to avoid the onus of being named the cause factor in a midair, there are several things he can do to prevent collisions. None is new, but they are repeated here, especially for the "new guys." The pilot can:

- Take advantage of the stages of radar monitoring now available and becoming more common.
- Develop the technique of scanning so that he knows how to "see." Stan/Eval and proficiency instrument checks can be oriented to include evaluation of a crewmember's practice and knowledge of see and be seen. ("Light Plane—12 O'Clock," *Aerospace Safety,* February 1969.)
- Keep his head out of the cockpit in VMC. Precision instrument flying to the last foot and knot is of little value if the aircraft collides with another.
- Realize that his aircraft is protected under an IFR flight plan from other IFR aircraft only. That feeling of euphoria that comes with a controller's "positive identification" should not serve to put blinders on pilots.
- Use on-board radar, on aircraft so equipped, for the navigator to monitor VFR approaches. ★

(Based on a study by Lt Cols David Elliott and Sam Henley, Directorate of Aerospace Safety.)

◆ **BEAUFORT, MCAS,** S. C. 32°29′N 80°43′W GMT–5 (–4DT) **H–4, L–18–20–27**
(KNBC)
MC 38 BL4,6,7,8,11 H122 (ASP/CON) (S105, T137, TT205) (SWL 50)
JASU- 2(GTC–85), 3(NC–8) (A4, F8 probes)
FUEL- A+J4, J5, SP, O–148–156 PRESAIR LHOX LOX
A–GEAR
RWY 4 ← E5–1 (65′ OVRN) E–27(B) (1900′) —— E–28(B) (1900′) E5–1 → (65′ OVRN) RWY 22
RWY 14 ← E5–1 (65′ OVRN) E–28(B) (1250′) —— E–28(B) (1250′) E5–1 → (65′ OVRN) RWY 32

STAGE I RADAR SVC- Ctc APP CON on 314.0 125.6.

HEAD UP...GEAR UP

Most of you will read this article. A lot of you will talk about it for a while, and then—one of you will go out and land his bird *gear up*.

Much study and many words have gone into "why" pilots fail to lower the gear for landing, but as yet we haven't devised *the* answer. All the warning lights, horns, and indicators haven't (and won't) prevent our next full slide. About all we can do is tell you about some "most embarrassing moments" experienced by other pilots in hope that you get the clue, and recommend that you work out a personal system for preventing an inadvertent gear-up landing.

Some experts say that strict adherence to the checklist will stop this stupid maneuver. However, we could devote a page to the two words "gear down" but it won't prevent one accident unless somebody looks at it. So let's be realistic for a minute—we know that all pilots don't use check lists before landing, and what's more, we have little hope of insuring that they will. In fact, in a single-seat bird, just where do you whip out your list and read the magic words "gear down"? On an overhead pattern you may have 5-30 seconds on downwind, so where do you refer to the checklist? Anyway, by this time you've done just about everything but gear and flaps. How could anybody forget one or two items before touchdown? Evidently it's not too tough, because we just can't seem to eliminate a mental lapse that comes over a pilot now and then.

For example:

- After a series of touch-and-gos, the T-29 pilots realized they were about to land sans gear. They applied power and made it around—almost. On postflight the crew chief found a bent prop.

- A fighter pilot made a series of touch-and-go landings. Gear check was called, but he managed to look somewhere besides at the gear indicators. He slid to a stop 4000 feet down the runway.

- An O-2 pilot *and* copilot were distracted by another aircraft flying an erratic traffic pattern. They put the handle down but failed to recheck their indicators.

- The pilot of an A-37 put the gear handle down but *not all the way* down. The gear was about one-third extended at touchdown.

- Several embarrassed cargo type drivers found out that the gear horn system doesn't guarantee immunity from a gear-up landing. In one case, the handle had been placed in the "down" but somehow or other it managed to work its way back "up". Unfortunately, the warning system in this particular type bird won't activate until the power is reduced for touchdown.

- Another pilot retracted the gear after becoming airborne but then elected to abort because a hatch came open. He retarded the throttle for the abort but neglected to put the gear back down.

So what does all this mean to you as a guy who is responsible for insuring the gear is in the proper position? First of all, it seems that one of the most likely situations which leads to a gear-up landing is in the touch-and-go traffic pattern. "After five or six landings, the pilot acknowledged the gear down and checked and proceeded to land gear up." For some reason, we get complacent doing this sort of thing and anything can happen when complacency sneaks in.

If there was some method of building a black box that would warn a pilot when his habit pattern was broken we might take a step in the direction of preventing "gear-ups." *Anytime* you deviate from the "usual way" of flying your pattern, BEWARE. "Extend your downwind for spacing," "Do a 360° to the right (from the GCA pattern controller)", "Delay your break, aircraft on the runway," "Continue your pattern, but be prepared for a go-around," "Holding at the gear." All these remarks should trip a warning signal in your brain that you had better be extra careful to insure everything is re-re-checked before you cross the threshold!

Although it is not specifically in their job description, the tower operators have done a fine job in averting this embarrassing maneuver. They saved 21 gear-ups in CY 1971. Nice going, but the crew can't depend upon anybody but themselves. Tower operators, too, should be especially alert when they direct a pilot to alter his pattern.

The only guy who can prevent a gear-up landing is the guy who can reach the gear handle. All the warning systems, RSU, and tower operators combined can't reach it. The problem is in the cockpit and you are the one who'll have to face the music—so keep your head out and get the gear down. ★

THRUST REQUIRED CURVES

A clear understanding of the relationship between thrust required and airspeed is important for safe flight in any jet aircraft. Particular attention to thrust requirements is essential in the F-111 because of its variable sweep wing, sharp drag rise at high angles of attack (typical of aircraft with high wing loading), relatively slow thrust buildup during engine acceleration, and because of the nature of the flight control system.

Figure 1 shows how thrust required and thrust available change at different airspeeds for a typical F-111 configuration and gross weight. Thrust required can be defined as the amount of thrust you need to sustain your present airspeed, altitude and g. The pilot must be aware of the rapid drag rise, or increase in thrust requirement that exists at higher angles of attack in the F-111. Occurring over a very small range of airspeeds, this drag rise (the steep slope of the left side of the thrust required curve in Fig. 1) can lead to loss of control unless the pilot recognizes it, and makes timely corrections.

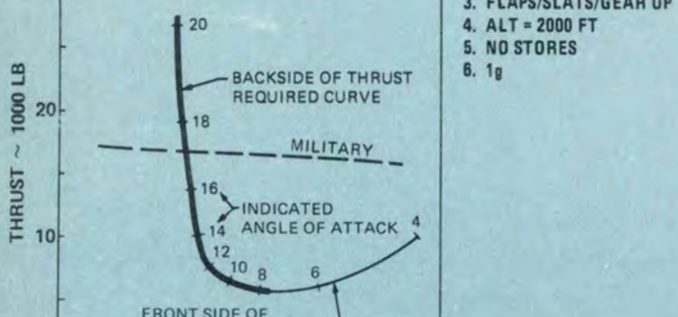


Figure 1 THRUST REQUIRED CURVE

In Figure 1, the thrust required curve has been drawn as a heavy line to the left of the lowest point and a light line to the right of the lowest point. These two parts of the thrust required curve will be considered separately, because the aircraft behaves differently on each part. The heavy-lined portion is commonly known as "the backside of the thrust required curve" or "the backside of the curve." For lack of a better name, we will refer to the light portion as "the frontside of the curve."

Note that as airspeed decreases during flight on the frontside of the curve, less thrust is required for steady one-g flight. On the backside of the curve the opposite is true: it takes more thrust to fly slower.

Changes in thrust, g, airspeed, gross weight and configuration affect the flying qualities of the F-111 at high angles of attack. Each of these changes will now be discussed separately.

EFFECT OF THRUST CHANGES

Most of the time, aircraft are flown on the frontside of the curve where it takes more thrust to fly faster and less to fly slower. When thrust reductions are made on the frontside of the curve, the aircraft slows down until it reaches a new speed at which thrust required equals the new thrust which the pilot has selected.

On the backside of the curve, however, this is not true. Thrust reductions on the backside of the curve are divergent—that is, once thrust is reduced, speed will begin to reduce and, unless a correction is made, never stabilize at a lower speed. The reason for this may be seen in Figure 1. Choose a point on the backside of the curve, and imagine that you're flying there in 1 g stabilized conditions. Now reduce thrust slightly. The aircraft begins to slow down, but at the slower speed even more thrust is required, so you slow down even faster. The aircraft will continue to decelerate until control is lost or until a correction is made.

EFFECT OF SPEED CHANGES

A similar result can also be produced by a decrease in speed at constant thrust. If, for example, speed falls off slightly due to atmospheric disturbances (gust, turbulence, etc.) during flight on the frontside of the curve, airspeed will eventually rebuild and stabilize at its initial value.

On the backside of the curve, thrust will be insufficient at the lower speed, and speed will continue to decrease until a correction is made or control is lost.

EFFECT OF g

An understanding of the effect of g on thrust required may be obtained by referring to Figure 2 and considering the following example. Curve A in Figure

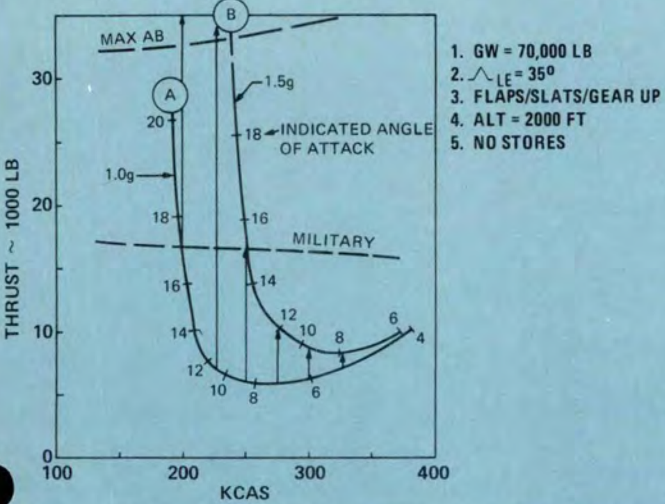


Figure 2 EFFECT OF g ON THRUST REQUIRED

2 is for one g flight. Curve B is for 1.5 g flight. Pick a point on Curve A and assume that you are flying there in one-g level flight. You then roll into a level 1½g turn at the same airspeed. By so doing, you have jumped straight up from Curve A to Curve B on Figure 2. You can see from Figure 2 that at lower speeds the increase in thrust requirements can be very big (the longer arrows on the left side of Figure 2). Also, at any speed, pulling g can place you on the back side of the curve. At higher speeds, it will take more g to get you there but it can still be done if you pull hard enough.

EFFECT OF GROSS WEIGHT

The effect of gross weight upon thrust requirements is similar to the effect of g, in that pulling 2g is the

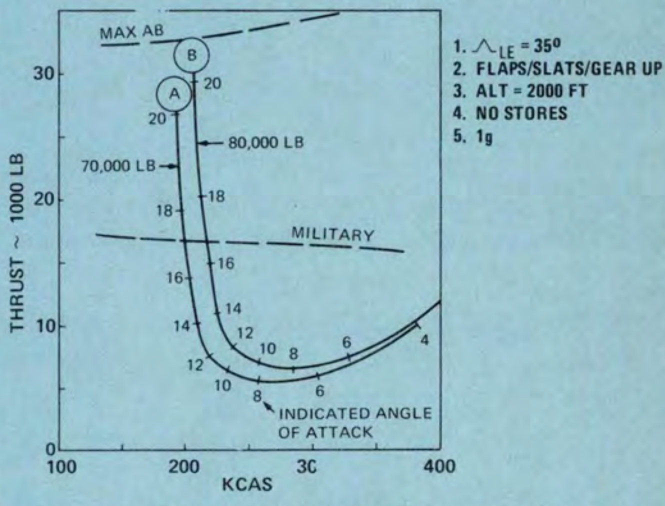


Figure 3 EFFECT OF GROSS WEIGHT ON THRUST REQUIRED

same as doubling the weight of the aircraft. Figure 3 shows two curves. Curve A represents the same conditions as Figure 1 (70,000 pound aircraft) and Curve B represents an 80,000 pound aircraft. Note that for the heavier aircraft, the backside of the curve extends to a higher airspeed; therefore, when flying a heavy aircraft, particular attention must be paid to angle of attack in order to avoid inadvertent flight on the backside of the curve.

EFFECT OF FLAPS AND SLATS

Figure 4 shows two thrust required curves. Curve A is for the aircraft with flaps and slats retracted, and Curve B is for the aircraft with flaps and slats extended.

Note that the slope of the backside of the curve is more gradual with flaps and slats extended; hence, drag and angle of attack buildup will be easier to detect and control.

Figure 4 also shows that if extension of flaps and slats is delayed during decelerating flight, the clean aircraft will reach the steep backside of the power curve at a much higher airspeed than it would if flaps and slats were extended.

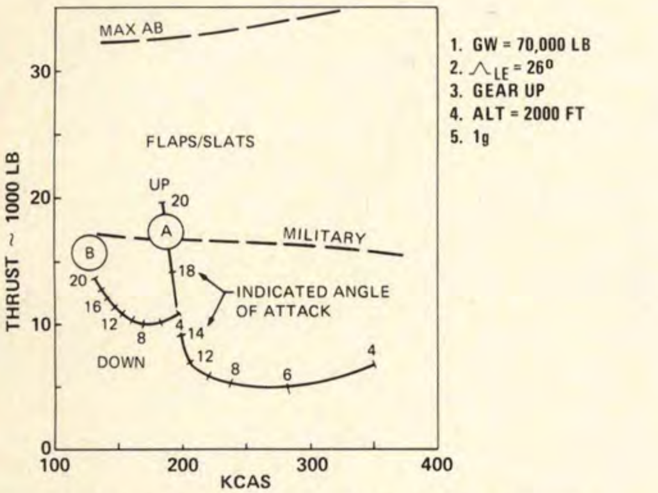


Figure 4 EFFECT OF FLAPS AND SLATS ON THRUST REQUIRED

It is most important to remember that any delay in selection of flaps and slats can be critical during decelerating flight.

EFFECT OF WING SWEEP

Figure 5 shows thrust required curves for 16, 26, 35, 50 and 72.5 degrees wing sweep. Note that although the slope is more gradual at wing sweeps aft of 35°, the backside of the thrust required curve extends to higher airspeeds at aft wing sweeps.

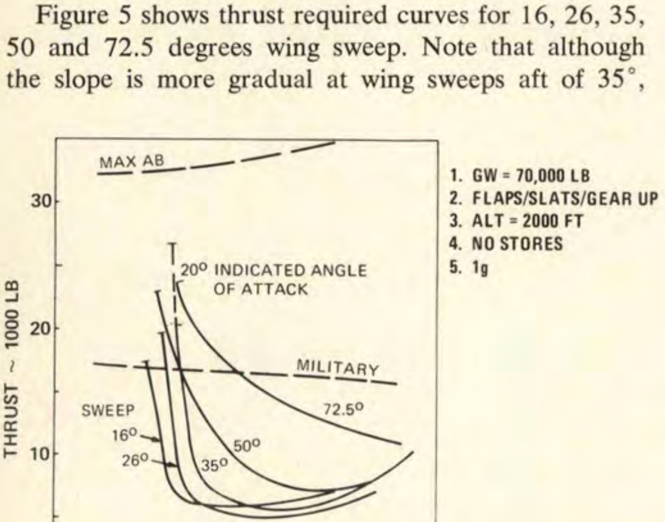


Figure 5 EFFECT OF WING SWEEP ON THRUST REQUIRED

An important effect of wing sweep is that if wings are inadvertently left aft of 26 degrees, flaps and slats cannot be extended. This may place the aircraft at a critical airspeed in the clean configuration, and unless immediate corrections are made, thrust required may exceed thrust available.

FLIGHT CONTROL SYSTEM EFFECTS

In most aircraft when you slow down at constant g you have to trim nose up or hold in back stick. This trim change or stick force change is an indication to the pilot that speed has been lost. In the F-111 during decelerating flight at constant g, command augmentation will produce additional elevator deflection with no pilot input. As a result, in the F-111, stick force and trim change are not available to tell the pilot that speed is being lost. The F-111 pilot has to refer to his flight instruments, particularly during decelerating flight at lower airspeeds, and must control angle of attack to avoid inadvertent flight on the backside of the curve.

CORRECTIONS

There are four types of corrections that can be made to prevent loss of speed due to insufficient thrust on the backside of the curve:

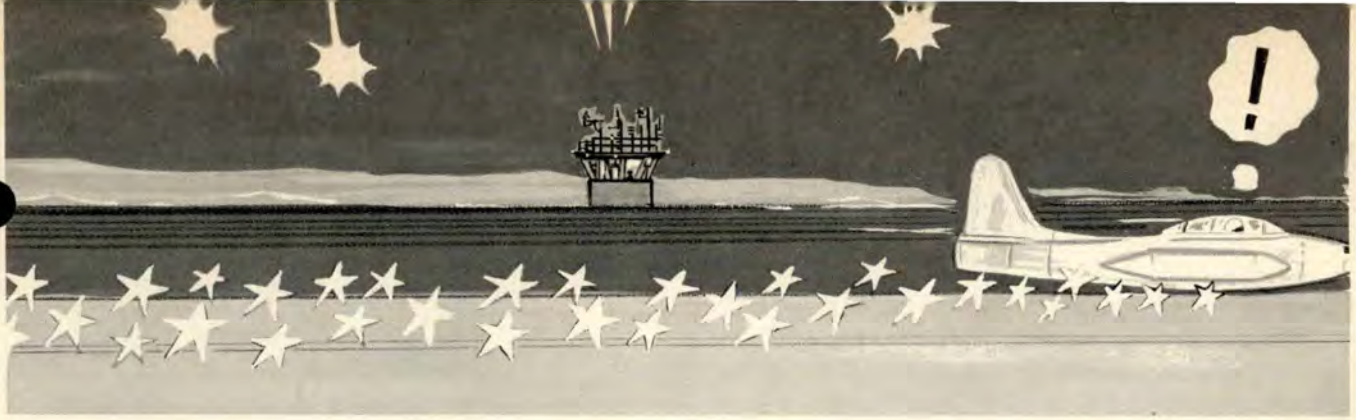
1. Increase thrust
2. Reduce g
3. Lower the nose to trade altitude for airspeed
4. Change configuration.

It is important to realize that compensation for insufficient thrust must be made immediately or thrust required may quickly exceed maximum thrust available. If this happens, and if the configuration cannot be changed by lowering flaps and slats, only two possible corrections remain: Reduce g or decrease altitude. If the aircraft is already at minimum g and altitude, no recovery is possible.

USE OF ANGLE OF ATTACK

From this discussion, it may be seen that the key to avoiding inadvertent flight on the backside of the power curve is control of angle of attack. Examination of the thrust required curves (Figures 1 through 4) shows that by controlling angle of attack, the pilot can compensate for variations in wing sweep, g loading and gross weight, and can readily maintain a safe margin. ★

(General Dynamics *111 Flyer*)



PSYCHED?

The mission was a T-33 ferry trip to the west coast. The pilot had RON'd a couple of hours away from destination. After takeoff on the last leg of the trip, climbing through 3000 feet, the tach went to zero. The engine operated normally and all other instruments indicated properly.

Rather than press on to destination, the pilot elected to stay VFR in the local area to burn off fuel and land. He advised tower and departure control of his problem and his intentions.

After about 20 minutes of flight, the pilot requested a downwind entry and declared an emergency because of his tach problem. About two minutes later he reported on downwind and was cleared to land. Weather at the time was visibility two miles in blowing dust, wind down the runway at 20 gusting to 26.

The pilot called base leg with three green and pressure, and was again cleared to land. He again reported three green with pressure, and tower once more cleared him to land, this time on guard channel. The guard transmission blocked out the pilot's third base leg call, but he subsequently acknowledged his clearance.

When the aircraft was on final, the mobile control officer saw through binoculars that the gear was up and made two transmissions on guard channel advising the T-33 on final to go around. When the T-Bird approached the overrun, mobile fired a red flare, and when the aircraft came over the threshold, mobile fired a second flare.

Personnel in mobile control were convinced the airplane was going to belly in—and they were right, to a point. The bird made contact with the runway, damaging the inboard fairing section of both flaps, grinding down the speed brakes and the main gear doors, scratching the underside of the fuselage and breaking the rotating beacon lens cover.

A go-around was initiated at or shortly before runway contact. The aircraft gained a small amount of altitude, and witnesses observed the gear extending. The pilot evidently felt the acceleration was insufficient for a successful go-around; he transmitted "Going to belly in" on tower frequency, then greased it on, about 4500 feet down the runway, with all three wheels down and locked!

Now the plot gets devious: According to the pilot's statement, on downwind he had all indications of three down and locked, no red light, no horn, normal hydraulic pressure and had performed a "jiggle check." He also stated that he did not hear mobile's transmissions on guard, see either of the red flares or hear the gear warning horn at any time during the approach and landing. He stated further that he did not touch the gear handle after making the "jiggle check" on downwind, that he started his go-around because he sensed that he was too low, and that he hadn't touched the gear handle after initiating go-around because there was insufficient time to do so. (Actually, there was about 20 seconds available; gear extension time is approximately six seconds.)

The airplane was jacked up and the gear was cycled six times. No malfunctions noted. Indicators, light and warning horn checked good. Radios ground checked okay. A continuity check indicated no stray voltage.

What's the real story? Your guess is as good as ours. The best guess we've heard thus far follows the line of reasoning that, preoccupied with an emergency situation, making a pattern entry other than the standard overheard, and faced with deteriorating weather in the form of blowing dust and gusty winds, the pilot's normal habit patterns may have been interrupted. Following this line, he may have placed the gear down, received proper indications, then retracted the gear at that position where he normally would extend it. Tripping further on down that highly speculative path, when the pilot realized he was closer to the runway than normal, he may have initiated his go-around and, instinctively reaching for the gear handle, placed the gear handle down.

Think it couldn't happen? Reflect, for a moment, on some of the dumb things *you've* done in an airplane while preoccupied with something else. (If you've never done anything dumb in an airplane, talk to one of the older heads or wait until you've had some more experience.)

Any emergency brings distractions. It is a time for cool-headed analysis; for fast—but never hasty—action; for checking and double-checking all the matter-of-course things the omission of which can compound problems many times over.

Think. Act. Check and double check. And don't settle for anything less than control of the situation. ★

REX CROSS

APPROACHES AND DEPARTURES. It seems to me that over the years we're developing some rather standard answers to questions about arrival and departure problems. I say something like, "How come we had to hold at the end of the runway for 30 minutes before cleared for takeoff?" Answer, "Well, we've always had a problem here with Center. Thirty minutes is not too bad; some days it's longer." This was hard to accept so we checked with Center. To make a long story short, Center would be happy to discuss the problem and were sure the delays could be reduced. It just so happened that no one bothered to talk to them about it. Sound familiar?

PROGRESS. We know of one base which, after identifying some critical problems in the transient service area, has really gone all out. New paint in Ops, modern snack bar—a real "let's all get together and make this base Number One" attitude. They have a long way to go, but I bet they make it.

IT HAPPENED THE OTHER DAY and it's bad business. Fortunately, it wasn't a critical flight item. A pilot on a not-too critical Ops

RILEY'S COUNTRY NOTES

876-2633 AUTOVON

flight ordered a transient maintenance type to perform some work on his airplane even though the TA troop had no tech data! The data was available, but the pilot would have had to wait about 45 minutes. I wonder if he would have waited had it been a more important item? If you have a maintenance problem, stay out of the working troops' way and let them do it—right.

BELIEVE IT OR NOT we still have a bunch of recip birds flying around. One thing that they are noted for is a healthy appetite for oil. Unfortunately oil trucks are not always available and as a result the crew chief ends up with cases of quart cans pouring one at a time into a 50 gallon reservoir. There's got to be a better way.

TRANSIENT QUESTIONNAIRES. One of the first things I look for when I arrive at Base Ops is the transient questionnaire. If they are not readily available I begin to suspect that no one really cares what the transient crew thinks about their facility. It was a real pleasure the other day when the dispatcher politely asked for my completed questionnaire. When I gave it to him he remarked, "After all, if we don't know what's wrong we can't correct it." How true! !

NCOs. An irritated pilot doesn't need too much coaxing to drop me a line or even pick up the phone. However, I don't hear from nearly enough of you enlisted guys who are plagued with greasy spoons, poor quarters, and lousy support. Let me hear from you—the program is for *all traveling troops.*

APPROACH PROCEDURES. One of the most frustrating phases of flying is the delay involved in getting on the ground. After a two-hour flight at altitude you begin your descent. From that time on, it will take at least another 30 minutes before touchdown, unless a great deal of coordination has taken place among Center, Approach Control and Ops. Take a good look at the approach procedures at your base. Is there any way to expedite traffic? That gas we use milling around out there doesn't come free. Imagine how many bucks we could save if we reduced every sortie by two minutes in the approach pattern. ★

THE

REX RILEY *Transient Services Awar*

LORING AFB	Limestone, Me.
McCLELLAN AFB	Sacramento, Calif.
MAXWELL AFB	Montgomery, Ala.
HAMILTON AFB	Ignacio, Calif.
SCOTT AFB	Belleville, Ill.
RAMEY AFB	Puerto Rico
McCHORD AFB	Tacoma, Wash.
MYRTLE BEACH AFB	Myrtle Beach, S.C.
EGLIN AFB	Valparaiso, Fla.
FORBES AFB	Topeka, Kans.
MATHER AFB	Sacramento, Calif.
LAJES FIELD	Azores
SHEPPARD AFB	Wichita Falls, Tex.
MARCH AFB	Riverside, Calif.
GRISSOM AFB	Peru, Ind.
CANNON AFB	Clovis, N.M.
LUKE AFB	Phoenix, Ariz.
RANDOLPH AFB	San Antonio, Tex.
ROBINS AFB	Warner Robins, Ga.
TINKER AFB	Oklahoma City, Okla.
HILL AFB	Ogden, Utah
YOKOTA AB	Japan
SEYMOUR JOHNSON AFB	Goldsboro, N.C.
ENGLAND AFB	Alexandria, La.
KADENA AB	Okinawa
ELMENDORF AFB	Alaska
PETERSON FIELD	Colorado Springs, Co
RAMSTEIN AB	Germany
SHAW AFB	Sumter, S.C.
LITTLE ROCK AFB	Jacksonville, Ark.
TORREJON AB	Spain
TYNDALL AFB	Panama City, Fla.
OFFUTT AFB	Omaha, Nebr.
McCONNELL AFB	Wichita, Kans.
NORTON AFB	San Bernardino, Cali
BARKSDALE AFB	Shreveport, La.
KIRTLAND AFB	Albuquerque, N.M.
BUCKLEY ANG BASE	Aurora, Colo.
RICHARDS-GEBAUR AFB	Grandview, Mo.
RAF MILDENHALL	U.K.

THE IFC APPROACH

By the USAF INSTRUMENT FLIGHT CENTER
Randolph AFB, Texas, 78148

On 1 May 1972 the USAF Instrument Flight Center (IFC) was established at Randolph AFB, Texas. The Instrument Pilot Instructor School is now one division within the IFC and retains the instructor/flight examiner training function. The Flight Standards Division will concentrate on the regulatory aspect of flight and assist HQ USAF in the development of directives, regulations, manuals, and instrument procedure criteria. The Research and Development Division will continue to participate in the development of the advanced instrument systems, displays, and cockpit procedures.

The Instrument Flight Center will provide a single organization responsive to the training requirements for IFR flight, the directives and publications which govern IFR flight, and the instrument systems which make that flight possible. The goal of the Instrument Flight Center remains the continual improvement of the all-weather capability of the Air Force and the continual reduction in aircraft accidents attributable to instrument-related factors.

TRY THIS QUIZ

1. At what point during a precision approach should you begin looking for the runway environment?

A. At DH, and execute a missed approach if the runway environment is not in sight.

B. Prior to DH, and execute a missed approach at DH if the runway environment is not in sight.

Although covered many times in the past, IFR experience reveals that pilots frequently misunderstand the DH concept. Decision Height is the *lowest altitude* at which a missed approach will be initiated if sufficient visual reference with the runway environment has not been established. Consider DH as the point at which visual assessment of the landing situation must be completed. Therefore, you, the jock, should be performing a systematic scan for the runway environment in your instrument cross-check prior to DH and be ready to execute the missed approach at that altitude. Your correct response should have been B.

2. During a non-precision approach, where should you plan to arrive at the MDA?

A. Prior to the missed approach point.

B. At the missed approach point.

According to the definition of Minimum Descent Altitude (MDA), the pilot will not descend below this specified altitude until visual reference has been established with the runway environment and the aircraft is in a position to execute a normal landing. The Missed Approach Point (MAP) is located along the final approach course at MDA and, according to TERPs, not farther from the final approach fix than the runway threshold or over an on-airport navigational facility. Should you elect to arrive at the MDA and MAP simultaneously, your aircraft will most likely be in a poor position to execute a safe landing. The only solution is to plan your descent to arrive at MDA prior to the MAP and allow for maneuvering to a normal landing approach. The correct response to this question is A.

One of the culprits in developing poor habit patterns is the pilot's failure to be aware of the MDA-MAP relationship during an instrument approach flown for practice. You cannot wait until the MAP to begin looking for the runway environment and expect to be able to make a normal landing. Instructors should make this subject a main point during training sessions. For a detailed discussion of Missed Approach Points, refer to "IPIS Approach" May 1972.

3. You are executing a non-precision straight-in approach to North AFB and you note that PAR minimums are published in the minima block on your approach procedure. The PAR minimums indicate that:

A. Precision radar is available to you upon request.

B. Your approach is being monitored on the precision radar scope.

C. Both A and B are correct.

HQ USAF determined that an operational requirement existed for publication of PAR or ASR landing minima on high altitude non-radar instrument approach procedure charts. Where PAR serves the runway to which the non-radar approach is aligned and straight-in landing minima are published, only PAR information is required for that runway. Where only circling minima are published for the non-radar approach, either PAR or ASR minima may be depicted as required by the operational unit responsible for the procedure. The most complete source of radar minima information remains the IFR Supplement. Ref: Production Specifications for DOD FLIP Terminal High Altitude.

The pilot should know that the PAR minimums are published for his convenience. His non-precision approach may or may not be monitored on the PAR scopes, depending on situations such as local traffic agreements and equipment capability. A precision monitor of a non-precision approach may not be feasible due to final approach alignment. The only approach which can be monitored with any accuracy on a precision scope is an ILS where the center line and glide path are coincidental. The correct response to this question is A. ★

out of everything...except gas

The aero club pilot had filed a VFR flight plan from Travis AFB to Salt Lake City in a Cherokee 180. The first leg of the flight, to Reno, Nevada, was uneventful —weather VMC and no problems. Approaching Reno, however, he had to divert north to avoid an area of cumulus clouds. He passed the clouds, then turned back south toward course, but was confronted with another cumulus area near Reno. Reno FSS reported a 3000 foot ceiling in rain, and the pilot diverted once more to the north.

After passing the weather he swung the Sparks NDB, with the Reno VOR showing him left of course. In the vicinity of Pyramid Lake the layered clouds became a broken condition, and he descended to 7500 feet (about 3000 feet AGL) and began flying "up the valley looking for a VFR route east." After flying up the valley for 20 minutes he spotted an opening in the clouds and circled upward, leveling at 11,500 feet. He tried to get a VOR lock on Lovelock, Hazen and Reno; all were unsuccessful (Hazen VORTAC is notamed "VOR unusable" in the IFR Supplement). He attempted voice contact with both Elko and Reno FSS, with no success. He then decided to descend and navigate by map reading. He descended and climbed repeatedly for the next hour, dodging clouds; then noted that he was down to five gallons of fuel in his left tank and switched to the full right tank.

About 20 minutes later he broke into the clear, but was unable to locate his position. He tried unsuccessfully to contact FSS, then decided to find a ranch and land, to "obtain fuel." Rounding a mountain he found a ranch with a large meadow adjacent. He made a low pass and saw that the meadow was wet and contained numerous cattle, but found a dirt road which seemed to offer a safe landing site.

On short final approach the pilot saw large rocks along the fence next to the road and applied power to go around, but his power application was too late and he touched down. He then pulled off power and continued the landing.

On landing roll the left main gear struck a large rock and sheared off at the wing attach points. Unhurt, the pilot climbed out, walked to the ranch, called FSS to close his flight plan, then called the aero club at home base to break the bad news.

The series of mistakes leading to that rocky backroad included:

• Attempting radio navigation below minimum reception altitude.

• Failure to use basic map-reading techniques (the landing site was 45 degrees off course, 85 NM north).

• Improper fuel monitoring (at landing, the aircraft contained about 22 gallons of fuel—well over two hours at cruise power). ★

UNITED STAT

1971 Safety Trophies

Secretary of the Air Force Safety Trophy

AIR TRAINING COMMAND

Best overall accident prevention program of all commands with 200,000 or more flying hours per calendar year.

ATC's effective accident prevention program reduced the command's flight accident rate by 53 percent to a record low and produced a zero explosives accident rate. The accomplishment of Air Training Command contributed significantly to the all-time low flight accident rate achieved by the U. S. Air Force in 1971.

USAF SOUTHERN COMMAND

Best overall accident prevention program of all commands with less than 200,000 flying hours per calendar year.

The zero major and minor flight accident rates and marked improvements in explosives and ground safety reflect the aggressive accident prevention program developed by USAFSO. In view of the primitive nature and attendant hazards of the operational environment, these accomplishments were exceptionally commendable.

Koren Kolligian, Jr., Trophy

CAPT RAYMOND M. ROSS

The Koren Kolligian, Jr. Trophy is awarded to Captain Raymond M. Ross in recognition of his professional skills in coping with a serious inflight emergency.

During a night combat strike mission, on 19 March 1971, two surface-to-air missiles detonated close to his F-4, inflicting serious damage to the aircraft. The utility hydraulic system and one primary flight control system were disabled. Since friendly forces were known to be in the area, Captain Ross withheld jettison of his bomb load until over open ocean. Despite increased aircraft control difficulties encountered after the landing gear was lowered by emergency methods, he made a successful approach-end barrier engagement at his recovery base.

★ ★ ★ ★ ★

Maj Gen Benjamin D. F
Memorial Award

PACIFIC AIR FOR

Presented to the major com the most effective aircraft acc tion program for the preceding

Strong leadership and a hig professionalism among aircrews personnel produced a record-lo craft accident rate of 3.2, a improvement. This was accom the command was flying re lion hours under the high-ha mental conditions of combat, se and marginal facilities.

ES AIR FORCE

Chief of Staff Individual Safety Trophy

MAJ ROBERT J. PEISHER

As Chief, Safety Education Division, HQ SAC, Major Peisher established the SAC Safety Hotline, a command-wide automatic recording communications system for identifying and correcting serious safety problems. Under his guidance **Combat Crew** magazine disseminated timely accident prevention information. These contributions reflect Major Peisher's dedication and productivity in the safety field.

MAJ CARROLL L. WRIGHT

Major Wright directed and supervised all flying, ground and explosives safety programs as Chief of Safety, 40th Aerospace Rescue and Recovery Wing. The outstanding safety program he initiated and managed contributed immeasurably to the rescue mission of HQ 40th ARRW and 13 subordinate units in seven countries in the European theater.

TSGT WILLIAM H. WEAVER

Sergeant Weaver, a Safety Technician for the 15th Air Base Wing, Hickam AFB, Hawaii, produced significant improvements in traffic and water sport safety. He developed a slide presentation, "Weaver Bird," that has been acclaimed in both the civilian and military communities for its educational importance in stressing defensive driving.

MRS ARLENE M. SIMS

Mrs Sims, safety monitor for the Engine Division, Oklahoma City Air Materiel Area, developed a four-point program that effectively improved safety in the working environment for more than 1800 employees. The significance of her achievements was reflected by a 67 percent reduction in disabling injuries.

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Colombian Trophy

366TH TACTICAL FIGHTER WING

The Colombian Trophy, symbolic of excellence in military aviation safety, is awarded to the 366th Tactical Fighter Wing, APO San Francisco 96337. The wing, equipped with F-4 aircraft, flew more than 15,000 sorties in 30,000 hours without an accident. In setting this record, the wing overcame such hazards as extreme weather, a hostile combat environment and operations where the midair collision potential is unmatched anywhere in the world.

JACKING, LEVELING and WEIGHING THE A-7

D. H. BRAZELTON
Maintainability Engineering Specialist

Recent comments from the field brought about a comprehensive study of jacking and weighing procedures for all A-7 airplanes. Problems had been cited that involved inaccurate CG determinations, leaning jacks, and aircraft falling off jacks. The electronic weighing equipment used in the field appeared to be the key.

A series of weighings was performed with Vought Aeronautics Corporation's floor scales, electronic scales, and combinations of the two. Weighings were also made with the Mobile Electronic Weighing System (MEWS). Care was taken to evaluate the problems noted in service and to review existing procedures.

The results of this testing showed that the aircraft can be weighed satisfactorily on electronic scales (types C-1 and C-2) if the following precautions are observed:

1. The electronic weighing kit must be calibrated and *accurate*.

2. The airplane must be leveled *prior* to engaging the fuselage jack.

3. The airplane must stay level during jacking.

The first condition will have to be satisfied by the friendly troops at PMEL. The folks at Organizational Level can help a great deal by proper handling, storage, and use of the equipment. If the kit has accidentally been mistreated, it must be rechecked for accuracy. Otherwise some pretty wild CG calculations can result.

The second and third precautions are procedural. To assist in this area, the instructions for jacking and for weighing have been rearranged, clarified, and published as a special paragraph in the manual. These are now found in Change 7, dated 15 January 1972, to TO 1A-7D-2-1.

If these are understood and followed, the Maintenance Officer's ulcer will be reduced, along with the per capita consumption of fingernails among jacking crews. The logic of the procedure becomes clear if we understand what goes on when the airplane attitude is changed.

The first view in the illustration shows the A-7 at rest, on its wheels, on the ground. Identification of a few important locations and dimensions is necessary. First, the fuselage and wing jackpoints are shown as points A and B, respectively. A direct line between the two is line AB with a length L. One thing that can be depended on is the fact that length L will not change, regardless of how we move the airplane. The weight of the airplane is always vertical to the level ground, so it will have a "footprint" represented by length W if it is on its wheels or line CD if it is on jacks.

Let's ignore length W for the moment and look at the second view. If the airplane is supported at points A and B and then leveled by lifting point B, the angle of AB increases and the "footprint" gets smaller. The jacks then have to slide or lean to adjust to the new position. Not only is this hard on the nervous system, it can foul up the measurement of the reaction points and build errors into the CG caluculation.

So the trick is to get the airplane level without tipping the jacks. The procedures in the manual provide two methods. Either is good, and both involve leveling the airplane before it is elevated on all three jacks. How these methods work is simple. By leaving the nose or both main wheels free to roll while leveling, points A and B are allowed to move as needed. In view 2 of the illustration, this is accomplished by jacking the wings first. When level, position the fuselage jack and continue the jacking—being careful to maintain the level condition as the airplane is raised.

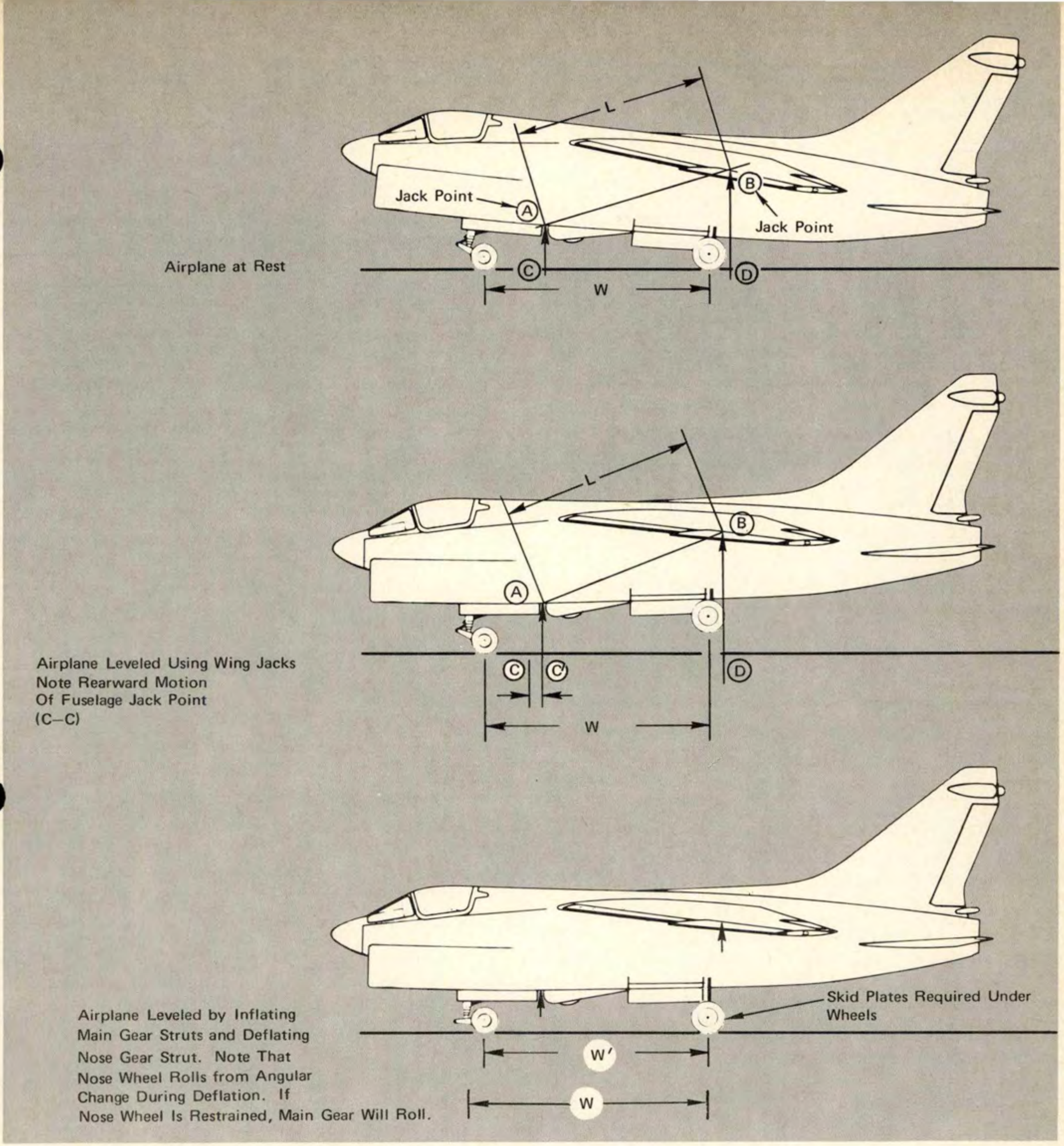
View 3 shows the other method of leveling. Roll the airplane onto skid plates and level by deflating the nose gear strut and inflating the mains. All three wheels are free to roll as "footprint" W changes its length. If the airplane shows a tendency to swap sides of the hangar while you are doing this, a chock at the nosewheel will stop it and the mains will do all the adjusting. Once level, the jacks can be set and the airplane lifted—again remembering to maintain levelness.

How about a few hints to make the job a little smoother?

1. Level the airplane laterally as well as longitudinally. This will keep side-to-side loads off the wing jacks.

2. Tie the nose wheel strut so it can't extend after leveling and the amount of jacking to get clear of the floor will be reduced. (If you use the leveling method shown in view 2, you can deflate the nose strut after the fuselage jack is engaged.)

3. It's important to keep the plane level as you jack. Rather than trying to jack continuously, stop about every inch or so to make necessary adjustments. This way,



errors caused by differences in personnel or jack condition can be corrected before they become too severe.

4. Read the latest change to your -2-1 manual. It's all in there under e heading "Jacking Airplane for Weighing."

In addition to all of this, the Air Force is discussing a larger jack pad. If it comes into being, it will in no way eliminate the necessity for using extreme care in leveling the airplane, in placing the jacks squarely under the jack pads, or in holding that level as you lift the airplane from the floor. In short, the procedures given in the manual are important. To quote out of context a message from 12th Air Force, "—the A-7D aircraft can be safely weighed if all prescribed directives are strictly adhered to—"

This means—leaners count only in horseshoes. ★

(Reprinted from *VAC Field Service Maintenance Digest*)

Ops topics

GROUND CHECKED OKAY!

The C-141 flight engineer was checking the aircraft's flight controls, using the Nr 2 hydraulic system, when the low pressure light for Nr 1 system went out. The FE suspected that pressure from Nr 2 system was somehow escaping into Nr 1 system.

He called Maintenance personnel, who came out to the aircraft and checked the system several times. Finally the symptom disappeared, and they cleared the write-up with the explanation that the Nr 1 system had contained air, which eventually bled out.

After starting Nr 1 and Nr 2 engines, the crew checked the flight controls. No problems. With all four engines running, the crew again checked flight controls. Ops normal. During the final check before takeoff, the crew checked the flight controls once more. This time the control column stuck in the aft position, and could not be moved forward, even after engine shutdown!

Maintenance investigation revealed the Nr 1 system linear actuator was frozen. The elevator control pack was removed and replaced.

A little suspicion can promote prolonged good health!

P-40 "WARHAWK" PILOTS
ASSOCIATION
1ST ANNUAL REUNION
IMPERIAL HOUSE, NORTH
DAYTON, OHIO
SEPTEMBER 15, 16, 17, 1972
For Information Contact:
Herbert O. Fisher, President
Port Authority of NY and NJ
111 Eighth Avenue (Room 1409)
Telephone: (212) 620-8396

TARGET—12 O'CLOCK LEVEL

Aircraft operating within the United States—both military and civil—are prohibited from flying below 10,000 feet at an indicated airspeed above 250 knots. This restriction does not apply, of course, if the minimum safe operating speed is greater than 250 knots.

In addition, the 250-knot limit has been waived for military aircraft operating along high-speed, low-level routes whenever high speed operations are necessary to the accomplishment of operational and training requirements.

Recent reports of near midair collisions involving USAF Aircraft on low-level training missions and general aviation aircraft should serve to remind us of the need to be extraordinarily vigilant while operating in these "high threat" areas.

A review of the near miss reports reveals that many military pilots are under the misconception that civil aircraft have an obligation to remain clear of these low-level routes. This is not the case. There is no restriction on civil aircraft operating in these areas. In addition, the civil pilot tends to consider the airspace below 3000 feet AGL as his personal province (much as we consider PCA ours), and the last thing he expects to see is somebody coming at him at three times his redline speed.

A typical civil trainer cruises at 85 knots. A little reflection makes two conclusions rather obvious:

• In order for a midair to occur, we would just about have to be pointed at him; the reverse is not necessarily true.

• At his speed, even if he sees us, there is little that he can do. Evasion, therefore, is primarily up to us:

Maximum vigilance is a necessity. See and avoid!

YAY!

One of the factors helping to combat the alarming rise in gear up incidents/accidents is certainly the man in the tower. According to information recently released by Air Force Communications Service, controllers prevented 21 aircraft from making gear-up landings in 1971.

There are many factors which can contribute to a sliding arrival—and by now we've probably experienced them all, in one form or another. Habit pattern interruption, the boredom of multiple approaches, distractions (both within the airplane and outside) . . . they've all taken their toll many times over. But one sterling, shining fact remains: in most cases, the gear isn't down because the pilot didn't put it down.

We learned long ago that people—even pilots—are only human, and that they will make mistakes. Given that certainty, the vigilance of tower operators, radar controllers and RSU supervisors will continue to be necessary to reduce the accidental potential of the gear-up landing.

BOO!

On the other hand, tower controllers are human, too, and sometimes don't do all they could to help.

On landing, the F-106 pilot pulled the drag chute handle and nothing happened. Shortly thereafter, tower advised the pilot that he had no chute, then commented that tower had observed something that *might* have been a drag chute fall from the aircraft about a mile and a half out on final.

Now he tells us!

FLIP CHANGES

Clearance Readback: There is no requirement that an ATC clearance be read back as an unsolicited or spontaneous action. Controllers may request that a clearance be read back whenever the complexity of the clearance or any other factors indicate a need. The pilot should read back the clearance if he feels the need for confirmation. He is also expected to request that the clearance be repeated or clarified if he does not understand it.

Hailstone Area: The National Hail Research Experiment (NHRE) will be conducted in northeastern Colorado during the period May through July 1972. Status of the HAILSTONE AREA may be obtained from the appropriate FSS or Denver ARTCC. See Special Notice and Procedures, Section II, under Colorado, FLIP Planning North and South America for details.

slide, herky, slide

The C-130 crew was out on a transition pilot upgrade mission, shooting a series of touch-and-goes. On downwind, the IP called a simulated engine fire in Nr 4. The pilot accomplished all emergency procedures for a simulated engine shutdown. As they rolled out on final, the IP called a simulated obstruction on the runway and the pilot made a three-engine go around, raising the gear and flaps as called for in the Dash-one.

Since the Nr 4 throttle was retarded, the gear warning horn was making one heck of a racket, so it was silenced.

(Aha! you say. Right you are!)

Downwind was extended to gain clearance on another airplane in the pattern which had called for a stop-and-go landing ahead of them. The first airplane stayed on the runway longer than expected, and the crew did not receive clearance to land until they were on short final.

The crew became aware of their "abnormal condition" at touchdown. When they realized that they had inadvertently become the world's largest bobsled, they aborted their touch-and-go and made it full stop.

Landing slide was a little more than 2700 feet. Miraculously, damage was restricted to friction damage only. No fire, and none of the propellers contacted the runway. Maintenance jacked up the aircraft, lowered the gear manually and towed the bird off the runway.

Ops topics
CONTINUED

TIPOFF

Shortly after takeoff the pilot depressed the external stores release button, located on the control stick, and both tip tanks jettisoned. As it turned out, the External Stores Release selector switch had been left in the ON position, rather than turned OFF, as called for in the pilot's preflight checklist.

Checklist discipline is such a simple thing; all it requires is the awareness that checklists are necessary and the willingness to comply with that necessity.

This useless waste cost us $9,000 in materiel. In other circumstances, as over a populated area, or in a situation where the fuel in those tanks is needed, the cost could be far more.

MAINTAIN AIRCRAFT CONTROL

Distraction is one of a pilot's worst enemies. It figures prominently in almost all instances of inadvertent gear-ups, and has played a major role in many loss-of-control mishaps.

Most recently, a student pilot in a T-41 was shooting a series of touch-and-go-landings. On touchdown, the pilot's window sprang open, the student released back pressure, the nose came down and the prop hit the runway. The student went around, recovering from the porpoise entry, and landed without further mishap.

Contributing to the incident was the fact that maintenance had not replaced the self-locking mechanism in the window, but the primary cause was simply that the pilot failed to control his aircraft.

The rule that's been with us for all these years still applies, and can't be emphasized too strongly: In the event of an emergency, maintain aircraft control; analyze the situation; and take proper corrective action. But the first rule is MAINTAIN AIRCRAFT CONTROL!

YES! NO? WELL, JUST MAYBE

"The path to misfortune is paved with opportunities to do the things you wanted—just a little later than you wanted to do them" (ancient Gaelic proverb).

Lead led the flight of two down the GCA final. As planned, on three-mile final Lead went around, leaving Two, a solo student, in position to complete the radar approach and land.

Meanwhile, tower had cleared another aircraft onto the runway for takeoff. Two was aware of the other aircraft, and assumed that the bird on the runway would be rolling in plenty of time.

It didn't work out that way, of course. At decision height (about three-fourths of a mile), Two transmitted that he was going missed approach.

Then the aircraft on the runway started to roll. Two pulled off his power and dived for the end of the runway. The RSU monitor directed a go-around on guard. The student noted airspeed dropping, selected burner and rotated to a landing attitude, but he couldn't prevent the crunching touchdown that followed. The aircraft hit the runway, then bounced high enough to stay airborne. The student pilot completed his go-around, flew a closed pattern with a low approach so that the RSU could check his gear, then flew a second closed pattern to a full stop landing.

A check of the gear after landing disclosed a ten-inch strip broken off the left main gear wheel rim and a bent right main wheel. And it's easy to imagine a hundred worse things that might have happened.

Once committed to a go-around or missed approach, there is only one prudent course of action, regardless of the temptation: continue the missed approach!

CONTROL LINE MODEL?

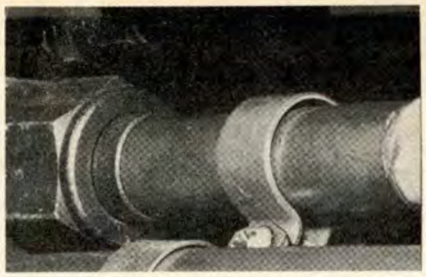
Transient Alert was busy, and the T-39 pilot was in a hurry. He decided to make a battery start while the copilot stood fire guard. The copilot pulled the chocks after the start, boarded the airplane and away they went.

Shortly after takeoff, ATC informed them that they had apparently taken off with a groundwire still attached, and they were requested to return to the departure base.

After landing they found the groundwire plug in the right wing receptacle. No sign of the clip, nor of the 25-50 feet of grounding cable, but they're pretty sure the hardware isn't on the airfield.

Aircrew members have been directed to use TA at enroute stops. Sounds reasonable.

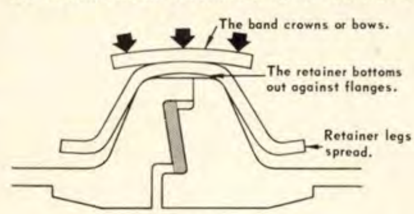
CLAMP SENSE



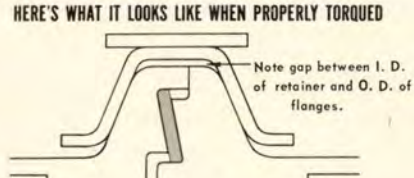
Unserviceable clamps such as this compromise system integrity.

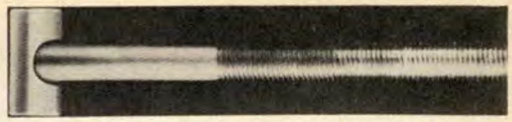
THE EVILS OF OVER-TORQUING!

THIS IS WHAT HAPPENS WHEN A COUPLING IS OVER-TORQUED

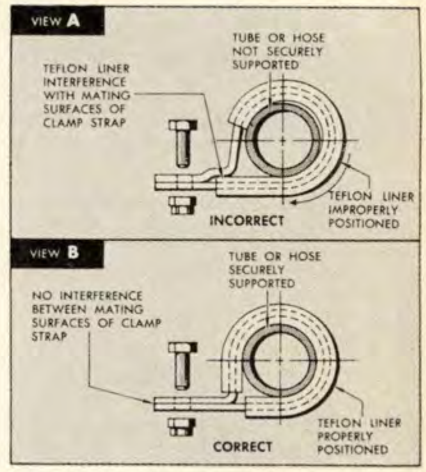


HERE'S WHAT IT LOOKS LIKE WHEN PROPERLY TORQUED





Over torquing can also strip the T-bolt threads. Sometimes so slightly as to be invisible to the naked eye, but enough to cause coupling failure. If you know a coupling has been over-torqued, don't reuse it.



IF PARTICULAR attention is not paid to the position of Teflon covers on J79 (and other) tubing clamps, they may be installed incorrectly, as shown in view A of the illustration. This results in improper clamping, and the tube may not be gripped securely.

Be sure when installing clamps such as these that the cover is not caught between the mating parts of the clamp. View B shows the correct positioning of the cover. ✦

As the saying goes, a chain is only as strong as its weakest link. This could also apply to aircraft system tubing and ducting, which are only as strong as their support or connecting clamps.

Clamps are used to support tubing throughout the aircraft. Improper installation or unserviceable clamps will allow vibration and chafing. Therefore, clamps should be inspected at regular intervals for correct positioning and condition of the liner and overall security condition of the clamp. Here's why:

Thirty minutes after takeoff the right hydraulic system on the KC-135 failed. The pump supply switches were closed and the mission continued. During postflight the forward support clamp on the Nr 4 engine strut hydraulic pressure line had chafed to the point of failure. A phase inspection had been completed the day before, but the individual who performed the look phase in this area failed to detect the chafed condition.

The V-Band clamp (coupling) is used in the utility system of some aircraft. The serviceable condition and proper installation of this type clamp is critical, for if a hot air leak should develop extensive damage can result. Example:

An F-101 was returning from an IRAN facility. Just after takeoff from a transient base, at approximately 225 knots, the right engine fire light came on. The engine was shut down and the aircraft immediately returned to base. During maintenance at the IRAN facility, a V-Band clamp was improperly installed. The clamp came loose allowing 16th stage bleed air to escape into the engine compartment. The excessive heat damaged wire bundles and caused sheet metal warpage in the engine bay and keel skin. Also Nr 3 fuel cell was damaged by the heat and had to be replaced. Although the clamp was incorrectly installed, the supervisor failed to detect the improper installation even though no safety wire was installed as required by tech data.

Here are a few general rules that will prolong the life of the V-Band clamp and increase the reliability of the system in which it is used.

1. First, check the part number to insure that the correct clamp is being installed.

2. Inspect the clamp for twist or distortion. Inspect the V section for spreading at the open end. Check spot weld or rivets for condition and security. Check for cracks. Inspect the T bolt for galling or deformity. A clamp in poor condition should be replaced.

3. Exercise care during handling and installation.

4. Clean the ducting flange mating faces of dirt, grease or corrosion. Use a clean cloth. Never use a wire brush on this surface.

5. Support the weight of the unit during mate up and installation of the clamp.

6. Properly align the mating flange. A poorly fitted joint requires excessive torque and will impose a structural load on the clamp which will cause premature failure. ★

Tech topics

briefs for maintenance techs

C-130 CROSSED WIRES

While the C-130E was climbing through the 1200 feet after takeoff, the Nrs 3 and 4 turbine overheat lights began flashing. Those throttles were retarded and the lights went out. An emergency was declared and the aircraft returned to base.

A turbine section leak was found on Nr 4 engine, so the engine was removed and replaced. During trouble shooting of the turbine overheat warning system, crossed wires were found in the system. Several of the Nr 3 system wires were connected to the Nr 4 system and vice versa, causing both lights to illuminate when an overheat condition existed on either engine.

Review of the aircraft records did not reveal any maintenance on this system; therefore, it could not be determined when the wires were crossed, but is believed to have existed for a considerable time. Cockpit checks would appear normal because continuity was completed even though the system was miswired.

The lesson to be learned here is to use tech data, regardless of how well you know the system. Maintenance errors such as this, which could lead to two engines being shut down unnecessarily—or an engine not being shut down at all—could result in disaster.

TWO WRONGS

After a C-130 aborted takeoff because of low torque on Nr 1 engine, a bolt was found missing from the gimbal throttle pulley ring. This allowed the gimbal ring assembly to slip off the fuel control shaft.

Why was the bolt missing? Because the maintenance people who had worked on this item prior to the flight failed to install the bolt and the inspector didn't do his job! A careless mechanic and an indifferent inspector make a dangerous combination.

NO TORQUE

During scan of the engines on a KC-135 the copilot noticed what appeared to be a loose cowl fastener at the lower mid-section of Nr 4 engine.

Postflight inspection revealed no fasteners loose, but a hole was found burned through the cowl just aft of the surge bleed valve. The igniter plug, which was hanging by the igniter lead, had backed out. This allowed bleed air to escape through the plug hole, burning the cowl.

The aircraft records revealed that this plug and igniter lead had been replaced a couple of days previously. The plug was never torqued as required by tech data.

A maintenance shortcut (such as failure to properly torque an item) is a quick route to disaster. Just suppose that this hot air leak had been directed on fuel or hydraulic lines instead of the cowling skin. We could have been looking at a smoking hole in the ground instead of an incident report.

ALL POINTS BULLETIN

Subject known as Murphy last reported active at a modification facility where he caused wires in radio systems of a KC-135 to be reversed. Apparently reversal took place during TCTO 1C-KC-135-820 (windshield wiper) modification.

Murphy is frequently found in places where technical data are scarce, is seldom known to appear where all maintenance is completed IAW TOs. Subject is extremely dangerous; therefore, recommend vigilance by all personnel.

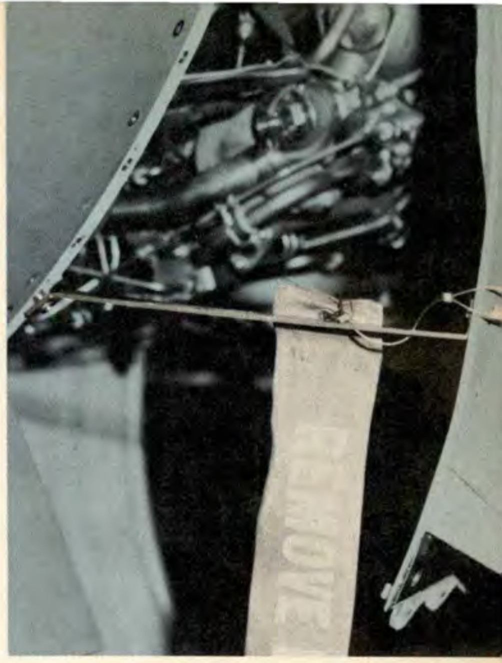
F-111 ENGINE DOOR SUPPORT

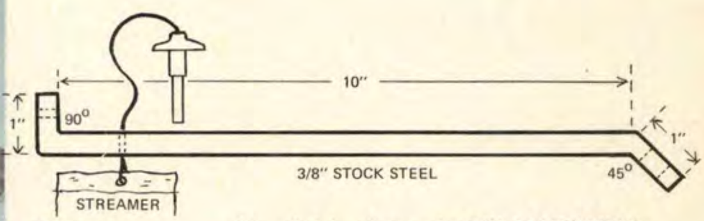
Tech Order 1F-111F-2CL-1 has a note that states, "The mid-engine access doors may be open during maintenance but they must be secured clear of the travel of the horizontal stabilizers."

Sounds good; however, at present there are only two secure positions on these doors, either full open (which is in the path of travel of the stab) or full closed, making it impossible to conduct maintenance.

TSgt Ira H. Snuffer, Mountain Home AFB, Idaho, has come up with a suggestion which will correct this problem.

TSgt Snuffer has devised a door support bracket which will support these doors in the intermediate position, clear of the stabilizer travel and allow access to the engine area. Sergeant Snuffer's suggestion has been approved by TAC and SMAMA and will eventually be picked up in the Air Force Technical Order System.





Width	1"
Length overall	12"
Hole in 90° end	1/4"
Hole in 45° end	3/8"
Hole for cable	5/64"

Quick release pin P/N C1398C2C06D or any suitable substitute with a 1/4" shank no longer than 1".

Cable length 6"

SERVICEABLE ENGINE?

This F-4D was returning to base after completion of a strike mission when number two generator dropped off the line. A quick scan of the instruments indicated number two oil pressure going to zero. The engine was shut down and recovery to home base completed on one engine.

Number three main bearing scavenge hose was found ruptured. An unknown person at an unknown time had installed an unauthorized clamp. The bracket for securing this line during installation was missing and someone had used the unauthorized clamp to secure the scavenge line to an adjacent fuel line.

This unauthorized clamp allowed the scavenge line to chafe to the point of failure. This engine was received on base as serviceable and was installed in the aircraft without any inspection by the receiving unit. Their procedures have since been changed to perform an inspection of all engines received in serviceable condition before being installed in the aircraft.

ONE BRAKE SHORT

The KC-135 was prepared for engine run: three chocks in place on each main gear, with two on the nose, 14,000 lbs of fuel.

The parking brakes were set by the operator in the left seat depressing the brake pedals while an inspector pulled the brake lever from the right seat.

Nr 1 and 2 engines were started and the generators checked. Then Nr 2 throttle was advanced to provide bleed air for starting three and four. During Nr 2 runup, the left main jumped the chocks. The aircraft pivoted right on the right main, the nose skidded 19 feet and hit a load bank, and the Nr 2 engine crashed into the ground start unit.

There were no skid marks on the chock or ramp. When the investigating officer entered the cockpit he found the parking brake lever set. The right brake pedal was depressed but the left was not. Unit engine ground run procedures now call for visual check of brake discs to assure parking brake is set.

Tech topics

$ $ $ $ $

It cost the Air Force just about $30,000 when this J-57 engine was dropped on the hangar floor. Like so many accidents, this one resulted from failure to follow approved procedures (wrong tool used to lift aft end) and less than sterling supervision.

FOUR FAILED

During preflight the crew chief found the aircraft battery charge low so he requested a new battery. While awaiting a replacement he removed the APU battery and installed it in the main aircraft position. Later as the aircraft was holding at the runway for takeoff, the crew heard an explosion. The boom operator reported that the aircraft battery had exploded. All battery circuit breakers were pulled; damage was confined to the battery and case.

Investigation revealed that the battery the crew chief moved from the APU to main aircraft position had not been modified (vented) in accordance with TO 135 (K)A-2-10. Nr 18 cell had shorted causing the gas buildup and rupture of the battery. This unit inspected all batteries installed and in supply channels. Two additional unmodified batteries were discovered in supply and were removed and modified according to the TO.

How does an unmodified battery get in an aircraft without being detected? That's a good question. This one got by at least four people—the battery shop technician, the individual who initially installed it in the APU position, the inspector who signed the forms, and the crew chief who repositioned it.

A LITTLE FOD GOES A LONG WAY

During ACM the F-4 pilot discovered lateral control frozen. The right aileron was down about four inches in flight. The aircraft completed two full rolls before full right rudder brought it back to level flight.

A controllability check revealed that with full right rudder, full right stick pressure, half flaps, and the right engine at idle the aircraft could be controlled down to a minimum of 190 knots. The aircraft was successfully landed with the pilot holding the stick pressure full right with both hands, full right rudder and the WSO operating the throttle on the pilot's directions.

A ground intercom dust cover was found in the lateral control bell crank assembly. The dust cover in the incident aircraft was in place on the comm connector and attached by chain. The origin of the cover lodged in the bell crank is unknown.

Any time an item is missing, regardless of how insignificant it may seem, a thorough search should be conducted to determine its whereabouts. If not found it could turn up in some critical area, as this one did.

SIMPLE TASK

All was normal to level off at 15,000 feet when the T-33 pilot pushed the nose over to descend. The crew heard a pop and noticed what they believed to be engine vibration. An immediate return to base was accomplished.

During postflight inspection the left upper engine access door was found to have 15 dzus fasteners loose. The preflight work cards require that this door be opened during inspection for check inside the compartment. Apparently the door was not secured following the inspection.

In another case a student pilot was unable to lower the nose gear of a T-37. The runway was foamed and the aircraft landed with minimum damage. The nose gear strut was not properly serviced during prior maintenance and hung on the nose gear door hinge.

In both cases, a seemingly simple task was not properly accomplished; strict compliance with tech data would have prevented both. Lots of people spent lots of manhours developing those tech orders. Use them and prevent errors in those seemingly simple tasks.

LOOK OUT BELOW!

The F-105 pilot had completed his proficiency check requirements and was headed home when he detected airframe vibration and saw the left external tank oscillating. Then there was a thump and the tank departed. The aircraft was recovered at home base without incident. The tank was located with the unexpended ejection cartridges in place.

Studies of the recovered tank revealed an outboard pylon cap installed on the inboard pylon and the yaw stabilization pins in the fully retracted position. This incomplete and improper procedure was accomplished during tank installation at the depot. The incident occurred on the first flight after return from the depot.

It took one of our editors about 10 minutes to locate the correct procedure for tank installation in the TO. Maybe this maintenance team saved 10 minutes by not following tech data, but the job was not done correctly.

Think of what could have happened had this tank separated just after the aircraft broke ground. Twenty-seven hundred plus pounds suddenly released from one wing at this critical phase of flight could have been disastrous.

C-130 FLAP DAMAGE

Approach and landing were normal but when the C-130's flaps were retracted during roll out the left flap remained fully extended. No further attempts were made to move the flaps.

Maintenance found that the master link on the left inboard jackscrew chain coupling had come apart, which caused the outboard link to break. The inboard jackscrew chain and one cotter pin were found in the flap well. The cotter pin had not been spread when installed. Vibration caused the cotter pin to fall out, allowing separation of the master link.

Who would think that our highly trained maintenance personnel could make such a mistake as this? Apparently the supervisor who signed off the work didn't or he would have checked the job a little more closely.

TEN-INCH CRESCENT WRENCH

During preflight walk-around of the F-4, the pilot noted that part of the left leading edge center wing flap was riding over, rather than under, the flap fairing.

The bird was turned over to maintenance and they found a ten-inch crescent wrench behind the flap. When the flaps were raised on a prior flight the wrench was forced against the BLC duct; this in turn forced the duct against the fairing causing a bulge and misalignment of the fairing.

Review of the aircraft records indicated no recent maintenance had been performed in this area. The owner of this ten-inch tool could not be located. Can you account for each and every one of your tools on a moment's notice? A professional mechanic could.

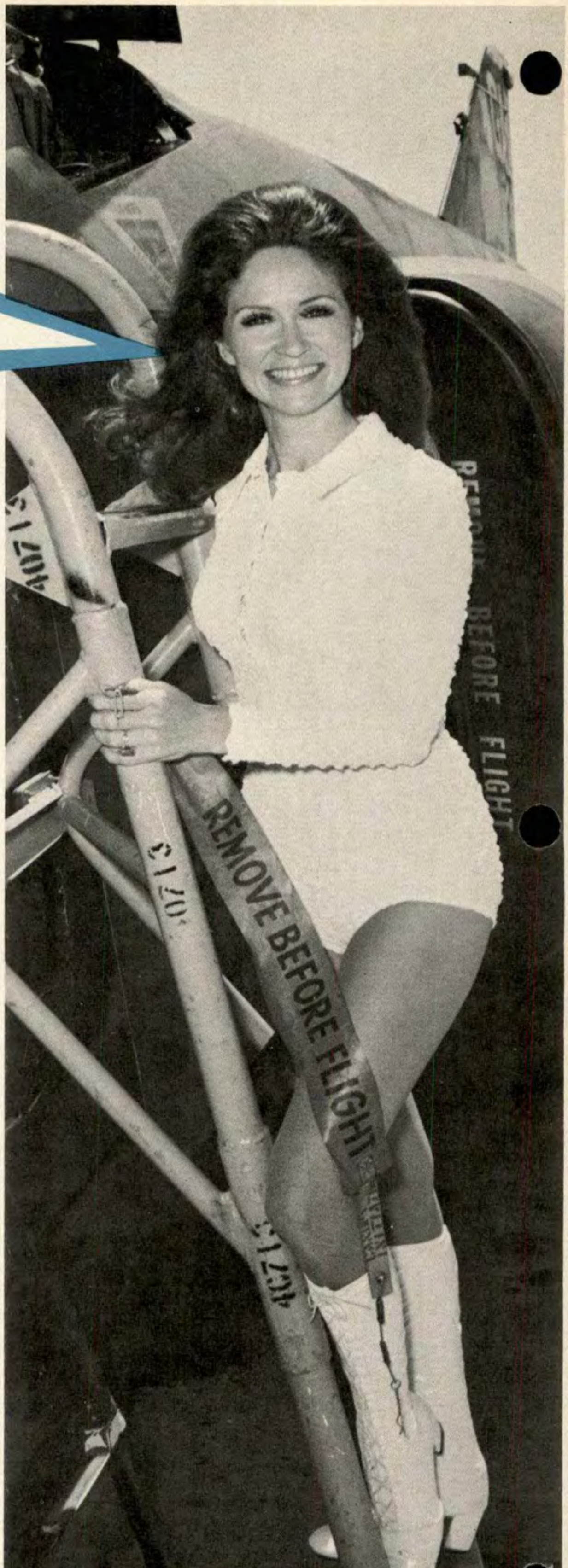
T-BIRD WIRING

On landing roll as the T-33 pilot applied brakes, the right brake felt mushy. Several attempts were made from both cockpits to pump up pressure without result. The aircraft slowed, lost aerodynamic steering and rolled to a stop in the grass without damage.

The cause: The boost pump shielded ground wire separated from its terminal end in the right speed brake well. This wire came in contact with the right brake hydraulic tubing. Arcing burned a pin hole through the tubing.

This unit has added a plastic insulator over the grounding wire and a clamp to secure the wire and prevent chafing. How's this area on your T-Birds? Have you inspected the boost pump wiring lately? Now might be a good time to give it a look-see.

Hello there, I'm Connie Wilhite. You're right, I'm new on the TOOTS page this month. The girl you are used to seeing on this page got married and left town, so I shall try to take over and help you with your maintenance problems. You remember that my name, TOOTS, stands for **T**ech **O**rder coming and going with an **S** on the end for Safety. I'll try to dig up the answers to your questions and also offer helpful hints from time to time. Of course, I need to know what is bothering you, so keep my mailbox filled. Write to: TOOTS, Aerospace Safety Magazine, AFISC/SEDA, Norton AFB, CA 92409.



Toots

Dear TOOTS

Here's a problem I'll bet you've never run across. According to AFM 127-101, paragraph 10-21(d), electronics workers are not supposed to wear metal jewelry, including metal rim glasses when working on energized electrical equipment.

[redacted]

21st AVMS-INS
APO Seattle 98742

Dear Mike

You're right, I've never run across this question before. The answer is—no, this paragraph does not apply during operational check. To clarify, operational check means throwing the switches and operating the system as on an operationally ready aircraft. The moment a discrepancy is discovered and you proceed to open (gain access) to the system, the contents of paragraph 10-21(d) apply.

You can look forward to a change to AFM 127-101 which will delete paragraph 10-21(d). This subject will be covered in paragraph 10-6(a) of the revision.

Toots

Dear TOOTS

Discussion over the intent of TO 00-20-1, Section III, Para 3-10, clearly defines the procedures on how to clear Dangerous Conditions indicated by a Red X or Circled Red X. But another subject has come about that also is an aid in putting quality maintenance into the product and that is the In Process Inspection which is covered in TO 00-20-1, Section IV, Para 4-14.

My question is, TOOTS, if you are on orders to clear Red X and Circled Red X conditions, do you also have to be In Process qualified? Currently, we are at odds here over this in that some of the people believe that an In Process Inspection has to be complied with by the same person who signs off the Red X. Others believe that if an In Process Inspection has been overlooked, a final shakedown by a qualified inspector or supervisor will sign off the Red X.

Since you have helped so many before, we are seeking your advice on this matter for all concerned.

SMSgt Redmond B. Sullivan
APO New York 09223

Dear Red

Nice to hear from you and to know that you over there are concerned about putting quality maintenance in the product.

No, you don't have to be In Process qualified to clear the Red X or Circled Red X. Individuals authorized to perform either inspection (In Process Inspection or Red X "Safety of Flight") should be appointed by the maintenance officer based on their qualifications and authorized on orders. Based on their qualifications, some individuals could appear on either or both lists.

Keep up the good work. I have never seen an OMS supervisor who didn't have a full-time job.

Toots

Dear TOOTS

I maintain the TO file for my section. In the course of my work I have encountered a great deal of what seems to be unnecessary duplication. As an example, the following TOs provide technical information for the equipment indicated:

33A1-8-349-11	RM561A
33A1-13-294-12	RM561A
33A1-13-324-1	561A
33A1-13-387-1	RM561A
33A1-13-399-1	RM561B

I have two questions concerning this group of publications:

1. Are all of them needed to support the 561 series oscilloscopes?

2. If so, why aren't they at least grouped into a single series?

TSgt Peter D. Foster
Forbes, AFB, Kansas

Dear Pete

Yes, all these tech orders are required for those of you who must deal with the 561 equipment. I agree, some of the info is duplicated, but all of these tech orders are necessary, depending on the model and configuration of the equipment.

They are grouped into a single series (the 33A1 series). I think you meant to ask why they aren't grouped into one single tech order. Due to the volume and content of these tech orders, I don't believe it would be feasible to combine them into a single TO. However, if you feel strongly about combining any or all of them, the AFTO Form 22 would be the route for you to follow.

Toots

NUCLEAR SAFETY AID STATION

USING

Recently, the Director of Nuclear Safety received a report involving an F-4 aircraft monitor and control malfunction indication during postload checks. Appropriately, the weapon was downloaded prior to the accomplishment of additional aircraft armament circuitry checks (AN/GWM-4 and MX-6050). These checks did not detect a fault, so another nuclear weapon was loaded and the malfunction did not reappear. The sequence of *download* then *troubleshoot* (including weapon checks, if appropriate) is exactly what a forthcoming change to all bomber/fighter nuclear weapon loading -16 technical orders will require. However, in this case the cause of the original malfunction was not determined and further checks of the aircraft were warranted prior to loading the second weapon. For the F-4, an AN/AWM-13A test and/or a trial loading

REMEMBER LAST YEAR?

1971

Last year there were several Reentry Vehicle Guidance and Control (RV G&C) van mishaps where road and weather conditions were contributing factors. Here are some examples from which we can learn how to prevent repetitions:

• A convoy encountered dense clouds of wind-blown lime which a farmer was spreading in the adjacent field. The driver of the RV G&C van slowed to about seven mph because of the reduced visibility. A civilian vehicle traveling in the opposite direction crossed the centerline and struck the van. The civilian stated he was blinded by the lime, could not see the road, and saw the RV G&C van only when it was too late to avoid a collision.

• A maintenance support van was traveling in a convoy. While braking on an ice-covered portion of the highway, the maintenance van slid off the road onto the shoulder. The shoulder then collapsed and the vehicle tilted on its side, thus becoming disabled.

• A single engine plane was observed crop dusting fields adjacent to a missile site. It became apparent to the convoy commander that the plane would be making low level passes directly over the site and loaded payload transporter. The convoy commander removed one of the "explosives" signs from the payload transport and held it up so the pilot might see it. The pilot either failed to see the sign or ignored it. He proceeded to make several passes about five feet directly over the payload transporter. Fortunately for the convoy personnel, the pilot did not spray as he passed over the site; however, the wind did carry some of the crop dusting agents onto the site. The result of this incident was that base operations personnel took action to coordinate with local federal aviation authorities and missile maintenance controllers to preclude further occurrences.

In all three cases we see indications that the exercise of good judgment by the vehicle operators, both civilian and military and the civilian airplane pilot, was questionable. Road, weather, and man-caused conditions were contributing factors.

In two of the three cases the resulting damage to USAF equipment was minor, but the potential for serious consequences was present in all three cases.

NUCLEAR WEAPONS AS TESTERS

with an appropriate Type 3A trainer could have been performed. This is an improvement over last year's record when we had several cases of trouble shooting using nuclear weapon-loaded aircraft. As a result of last year's record, a *TIG Brief* article and two *Aerospace Safety* magazine AID Station summaries were published. In addition, the -16 loading technical orders for all bomber/fighter aircraft are being changed, as mentioned above, to include a warning on the subject.

We must continue to improve until an acceptable level of safety has been reached. So, if there is any doubt, check it out completely.

WHO LET THEM IN?

Since January 1972 there have been three separate violations of security standards for the logistic movement of nuclear weapons which involved unauthorized entry into no-lone zones. In one case, the aircrew was in the no-lone zone but was not notified that maintenance personnel had entered the area. In the other two cases, maintenance personnel were granted access to logistic aircraft without the courier officer or aircrew members being present for escort.

AFM 207-10 specifies that the weapon courier establishes procedures for authorizing access to the no-lone zone. All major commands currently transporting nuclear weapons instruct the courier to brief the senior security police representative present on authorization procedures. These major commands require that service and support personnel will be cleared for access by only the courier or his designated representative.

In all other cases, strict attention to instructions should have eliminated the violations. Whether the courier gave an inadequate briefing or the security personnel did not understand the instructions, the important point is that the violations occurred. The cooperation of all concerned is necessary to make sure they don't happen again.

IN A HURRY

During a recent aircraft generation exercise, two life support section personnel were permitted unescorted access to a weapon-loaded aircraft. Apparently, the personnel involved were so intent on meeting aircraft generation times that they either forgot or ignored Two-Man Concept requirements. AFM 35-99 requires that personnel not under the Human Reliability Program must *always* be under the escort of two individuals qualified to implement the Two-Man Concept upon their entry into a no-lone zone. Being rushed for time is never justification to violate the Two-Man Concept.

HUMAN RELIABILITY

Several recent reports of Two-Man Concept violations have their origins in failure to properly administer the Human Reliability Program (HRP). Basic to safe peacetime operations involving nuclear weapons is the assumption that evidence of unreliability will be identified and reported. Appropriate measures must be taken to assure the personnel whose reliability is in question are not qualified under the HRP. After-the-fact investigations of recent incidents have proven that the persons involved had shown signs of unreliability before the occurrence. If the symptoms had been detected through continuous HRP monitoring, perhaps the nuclear safety deficiencies could have been prevented and the potential for more serious problems would have been eliminated. You all know that nuclear safety is your job and cannot be left to the commander. If your buddy plays Russian roulette, don't assume that a suicidal friend is more competent than a suicidal stranger. If a guard reports for duty while intoxicated, don't post him to a duty "protecting" nuclear weapons.

Reporting observed unreliable behavior is less distasteful than being found an accessory to a nuclear accident/incident. Unprofessional behavior on the part of a "buddy" is no excuse for similar behavior on your part. HRP is vital to nuclear safety and YOU are vital to the HRP. ★

MAIL CALL

TRANSIENT SERVICES

For a period of six months last year I was assigned as maintenance officer to the Mission Support Branch, which included Transient Maintenance. Month after month, I would read Rex Riley's Cross Country Notes and continually see complaints from pilots concerning different transient services.

I have flown on many cross countries and I can realize why many air crews are unhappy with Transient Alert. After flying a number of hours and especially if you have to make some further destination, you expect immediate service from TA. However, there are many local problems that transient aircrews are not aware of when they land.

Recently the Army Chief of Staff landed at this base. During a one hour period six other general officers landed to be present when the Chief of Staff arrived. That is a total of seven code aircraft in addition to Air Evac which was on the ground.

Immediately prior to the arrival of these aircraft a helicopter landed. It was explained to one crewmember that there would be a delay for fuel until the requirements of the priority aircraft were met. I happened to be in transient to observe the code arrivals, when the entire crew of the chopper came in. At this time I explained that the fuel trucks were standing by for the codes. The aircrew commander said it would only take ten minutes to refuel his aircraft and he could be gone. I again told him the trucks were required to stand by for the codes.

The pilot said he didn't have time to wait and he wanted a power unit. I told him we would get one as soon as we had a tug or truck available. It was approximately five minutes before a tug became available. During this time the chopper started on internal power and departed with an angry flight crew.

If some aircrews would just realize that transient personnel are trying to do a good job and are not trying to give them the runaround, things would flow a lot smoother and people would be a lot happier.

1Lt Donald A. Philpitt
Davis-Monthan AFB, Arizona

You're right. After a good reason has been offered and the pilot is still unreasonable, there's not much you can do. I believe most of our troops are satisfied if you explain your problem.

"$20.65 WHY BOTHER"

I find your article, "$20.65 Why Bother" (April 1972), most interesting. The last paragraph attempts to pound home the point that many major accidents result from trivial incidents and, how true this is. However, before taking the reader to task you should, maybe, insure your own backyard is clean.

To wit—in the second paragraph it states that the T-33 abruptly rolled left to nearly 90 degrees. In the fifth paragraph the article states, "However, when air loads were applied on takeoff the right flap retracted." Most aircraft I have been in would have rolled right. Strange airplane you fly—GI!

Everyone makes mistakes—some just get caught at it during critical moments of flight or during moments of stress—and, some while sitting relaxed at the desk. The wording of your last paragraph really is ironic and deserves rereading—WORD FOR WORD.

Lt Col Darwin L. Robison
Hill AFB, Utah

The split-type flap on the T-Bird has a higher coefficient of drag than a normal flap. As airspeed increases, drag increases at a greater rate than lift. Roll direction with differential flaps depends on the relative magnitudes of rolling moments due to yaw and asymmetrical lift. ★

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UNITED STATES AIR FORCE

WELL DONE AWARD

Presented for outstanding airmanship and professional performance during a hazardous situation and for a significant contribution to the United States Air Force Accident Prevention Program.

Captain RALPH J. LUCZAK

Captain EUGENE L. LARCOM

21st Tactical Air Support Squadron, APO San Francisco 96321

On the morning of 2 November 1971, Captains Luczak and Larcom were scheduled to fly an area orientation mission in an O-2. After two hours of routine flight, the crew heard a loud "bang" and the nose of the aircraft dropped sharply to a 35 degree nose low attitude.

Captain Luczak immediately retarded the throttles to idle and pulled back on the control yoke in an attempt to return the aircraft to level flight, but there was no response to control inputs. Captain Larcom worked at regaining control while Captain Luczak jettisoned the cabin door in preparation for the seemingly inevitable bailout. However, the nose began to rise, due in part to the airspeed which the aircraft had gained in the dive and to Captain Larcom's discovery that the pitch attitude was responsive to inputs on the manual trim wheel. Both crewmembers confirmed the relative effectiveness of the manual trim, and determined that control was sufficient to attempt a landing, although one man could not safely manipulate both flight and power controls. Therefore, Captain Larcom took control of the ailerons, rudders, and elevator trim, while Captain Luczak handled the throttles and assisted Captain Larcom on the aileron and rudder controls.

As Captain Luczak advanced the throttles, the rear engine vibrated severely and the propeller pitch could not be controlled, which forced him to shut down and feather the engine. Having alerted control agencies to the emergency, the crew gently maneuvered to line up on an eight mile final approach. Six miles from the runway at 2700 feet, the crew extended one-third flaps. Having adjusted to this change in configuration, they then extended the landing gear. Their shallow glide path was smooth until approximately 50 feet above the runway. At this time, combined ground effect and power reduction caused the pitch attitude to increase more quickly than the manual trim could counter. The aircraft dropped quickly to the runway, contacting on all three wheels simultaneously. The hard touchdown blew the nose gear tire and bounced the aircraft 25 to 30 feet into the air. The crew regained control of the aircraft and accomplished a smooth touchdown.

Investigation revealed that a counterweight had come off and gouged one blade of the rear prop. This accounted for the severe engine vibration. The counterweight then penetrated the left boom and completely severed the elevator and left rudder cables. Through professional response, superior airmanship and coordination, Captains Luczak and Larcom undoubtedly prevented the loss of a valuable USAF combat aircraft. WELL DONE! ★

SAFETY AWARDS 1971

FLIGHT

17th Tactical Airlift Squadron	AAC
1867th Facility Checking Squadron	AFCS
3500th Pilot Training Wing	ATC
3650th Pilot Training Wing	ATC
3615th Pilot Training Wing	ATC
1st Helicopter Squadron	HQ COMD USAF
89th Military Airlift Wing	MAC
40th Aerospace Rescue and Recovery Wing	MAC
9th Weather Reconnaissance Wing	MAC
3d Aerospace Rescue and Recovery Group	MAC
366th Tactical Fighter Wing	PACAF
23d Tactical Air Support Squadron	PACAF
8th Special Operations Squadron	PACAF
410th Bombardment Wing	SAC
376th Strategic Wing	SAC
23d Tactical Fighter Wing	TAC
316th Tactical Airlift Wing	TAC
26th Tactical Reconnaissance Wing	USAFE
302d Tactical Airlift Wing	AFRES
177th Tactical Fighter Group	ANG

MISSILE

21st Composite Wing	AAC
87th Fighter Interceptor Squadron	ADC
22d Air Defense Missile Squadron	ADC
10th Aerospace Defense Squadron	ADC
Space and Missile Test Center	AFSC
18th Tactical Fighter Wing	PACAF
366th Tactical Fighter Wing	PACAF
68th Bombardment Wing	SAC
341st Strategic Missile Wing	SAC
381st Strategic Missile Wing	SAC
1st Strategic Aerospace Division	SAC
57th Fighter Weapons Wing	TAC
36th Tactical Fighter Wing	USAFE
119th Fighter Group	ANG

EXPLOSIVES

21st Composite Wing	AAC
Air Defense Weapons Center	ADC
56th Special Operations Wing	PACAF
57th Fighter Weapons Wing	TAC
48th Tactical Fighter Wing	USAFE

NUCLEAR

460th Fighter Interceptor Squadron	ADC
87th Fighter Interceptor Squadron	ADC
3097th Aviation Depot Squadron	AFLC
14th Military Airlift Squadron	MAC
91st Strategic Missile Wing	SAC
341st Strategic Missile Wing	SAC
319th Bombardment Wing	SAC
410th Bombardment Wing	SAC
20th Tactical Fighter Wing	USAFE
322d Tactical Airlift Wing	USAFE

PHYSICAL ORIGINAL PAGES

TORN
OR
MISSING