Aerospace SAFETY

UNITED STATES AIR FORCE • SEPTEMBER 1970

COVER PHOTOGRAPH BY KENNETH L. HACKMAN, AEROSPACE AUDIO VISUAL SERVICE.

UNITED STATES AIR FORCE

Aerospace SAFETY

FOR AIRCREWS, MAINTENANCE & SUPPORT TECHNICIANS

SPECIAL FEATURES

REGULAR FEATURES

DEPARTMENT OF THE AIR FORCE • THE INSPECTOR GENERAL, USAF

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ANT COLONY

Remember when you were a kid and how you used to squat down beside an ant hill to watch the activity taking place? The residents were extremely busy, hurrying to and fro on various errands. Perhaps you were struck by the apparent order even though there was no evidence of direction or leadership.

The other day a couple of us saw something that reminded us of a busy ant colony but instead of ants we were seeing radar returns from airplanes scurrying across traffic controllers' scopes. During a visit to the Los Angeles Air Route Traffic Control Center we were shown a time lapse movie of radar scopes covering the Center's area with the several sectors arranged in a mosaic in order to portray the whole. With time lapse photography (the technique used to show a flower blooming within seconds on your TV screen) several hours were condensed into a movie of about 30 minutes. The thing is frightening.

Specks of light travel across the screen in every direction. Most of them move at approximately the same pace but one went zipping across the screen at a much higher speed. An SR-71, we were told. During the movie there were brief minutes in which the number of specks increased significantly. These were the rush hours for arrivals and/or departures from LAX. We were struck also by the channeling effect of the restricted areas that caused, during the busiest times, the specks of light to almost merge into what looked like a river pouring through a gorge. Each of the specks in this stream was an airplane forced into the funnel between two restricted areas.

Believe we came away impressed.

What perhaps is more sobering is that what we saw on the screen was only the returns from transponder equipped aircraft—no raw radar returns from all the others in the sky.

We wish that every Air Force pilot could see that movie made by L.A. Center. There's a message there and we should read it loud and clear.

Every now and then we hear an individual scoff at the idea that air traffic is great enough to really constitute a hazard. He sees relatively few other aircraft as he transits the country so, apparently, he believes that if he doesn't see them they are not there. Perhaps we are lulled by the protection provided in controlled airspace. Everything there is controlled. But what goes up must come down. So sometime during any flight all aircraft must pass through uncontrolled airspace.

Air traffic control provides positive protection only in controlled airspace. Below that floor you are entering a hostile world. True, the controller can see you, if your transponder is working, but he won't necessarily see everybody else that may try to share the same block of air with you. That is your responsibility and that of the other pilot who may find himself on a collision course with you.

Most Air Force flights are IFR and we take pride in precision flying. Fine, but which is more important, having the needles all lined up on a VFR day or making sure that you are not about to collide with someone else? The old head-in-the-cockpit syndrome can be fatal.

Remember this, because you are betting your life on it: ATC provides positive separation only between IFR aircraft properly equipped for radar interrogation. Radar advisories to VFR aircraft are provided on a "can do" basis only and the controller can't always do it. Also, even though they do a sterling job of it, ATC can't guarantee to vector you around all thunderstorms. Their primary job is to protect you from other traffic and they'll throw in the weather also on a "can do" basis.

If you still have any doubts, read up on the midair collisions. If the occupants of those aircraft survived, you can bet they are believers. ★

TICK

TICK

a few seconds

TICK

TICK

TICK

TICK

TICK

SEAT YOURSELF comfortably in a chair and place your watch where you can see the second hand. When the hand reaches a cardinal number, bend over and untie and tie your shoe. Recheck the second hand. Unless you are a real speed demon, the time ought to be six to eight seconds.

This is not a shoe tying contest. The idea is to get you oriented on time and what a few seconds mean. We'll get back to this a little later.

Joe was a better-than-average fighter jock. In fact, he'd been rated outstanding on his last proficiency check and had about 2500 hours in the F-100C. The mission was a piece of cake—about two hours in almost a straight line to his destination. Weather was generally fair enroute with relatively good weather forecast for landing.

The flight went routinely for about two-thirds of the way, then in level cruise at 35,000 smoke began to fill the cockpit. Joe switched to 100 per cent oxygen, dumped the cabin pressure, and declared an emergency with the Center, requesting an immediate descent. He was cleared down. A few minutes later, he again called the Center and said he was at 26,000, would like to remain there and that everything was back to normal. He got another okay and continued the flight.

Twenty minutes later he was talking to the tower and preparing to land. After issuing landing instructions the controller asked Joe if he was having any difficulties and got a negative reply. Apparently at that point Joe had no problems. Three minutes later he was dead.

TO OBSERVERS on the ground the approach seemed to be normal, the aircraft pitched left and Joe was cleared to land. On downwind he lowered the gear and it appears that his problems began at that point. Whether it was the engine that failed or the fuel control could not be positively determined. Investigators established that the engine was not putting out sufficient power to maintain level flight. Normally with the gear and speed brakes down the pilot will advance the throttle to compensate for the increased drag. Witnesses said they did not see the usual puff of smoke that would indicate that power had been increased.

When they dug into the wreckage, investigators found the fuel regulator in "emergency" and the airstart switch on, indicating that Joe had tried to get enough power to get him to the runway. It appeared that he cut the downwind leg short and made a tight, 60 degree bank, turn and lowered the nose. He held this attitude until the aircraft hit the ground a mile off the end of the runway. There was no attempt to eject.

No one will ever know why Joe rode the airplane into the ground. There was no evidence that he was in any way incapacitated, even though he'd had several minutes of unpressurized flight when he'd had to dump cabin pressure. The possibility that the loss of pressurization affected him was not discounted, but the investigating board could not pin down any hard evidence of this and listed it only as a possible contributing factor.

It was agreed that the cause was material failure, probably of the fuel system or the fuel control system. A drift punch was found in the wreckage, indicating that some maintenance man was careless at some time or other, but it could not be proven to have had anything to do with the accident.

As we said, Joe was a very competent pilot with lots of experience in the airplane he was flying. So we don't want to try to second guess him. But a bit of hypothesizing might help some young jock who reads this the first time he gets in a tight, such as the one that got Joe.

With the gear and speed brakes down and an engine that wasn't putting out, Joe was in a real box. He didn't have much time to do anything, but he did have enough time to eject if he acted quickly. By the time he'd switched the fuel to emergency, got the airstart switch on and rolled into the turn, time had just about run out on him. At best, he had but a few seconds to take any action and Joe opted to try to get the engine going.

NOW BACK TO THE shoe-tying bit we started out with. How long it takes one to tie a shoe is not important, but if you tried it you realize that, while it seems but a moment, about seven seconds elapse. The point is that in the time it takes one to tie his shoe an emergency can deteriorate into a catastrophe.

Surely when the emergency occurred, Joe had time to eject and probably enough speed to give himself an up vector. If he had kept going straight ahead he may have had time for an airstart attempt or two and, that failing, still have had time to get out. With the gear and speed brakes down, the steep turn cut his margin even more, even though he had the nose down.

Whether Joe gave any thought to ejecting we don't know. But his fate was the same as that of a dozen others last year who aren't around any more because their decision to eject came too late. How about bending over and tying your shoe? It'll give you some idea of how fast time moves. ★

As the heat of summer wanes, now is the time for some cool thought on preparations for winter

SUMMER HAS JUST ABOUT had it and most of us are looking forward to the pleasures of autumn. If autumn is upon us can winter be far behind? Skiers and other winter sports fans can hardly wait; already the sporting goods stores are featuring skis, parkas, sleds and ice skates. Taking a cue from this, lets turn our attention to the airpatch.

Preparations for cold weather operation begin in the early fall, well before the first snowfall. The cold weather operation plan should be reviewed in light of unresolved problems that existed last year and should include a review of all applicable directives.

Each year accidents occur because aircraft touch down in snow banks, land short, or lose directional control on snow or ice covered runways. This type of accident can be greatly reduced by adequate snow removal and winter weather preparation. Optical illusions resulting from snow drifting over threshold lights or approach lights have been major contributors to mishaps. Runway definition becomes difficult, if not impossible, when the entire countryside is covered with a blanket of snow. Variations in runway condition where snow or ice cover portions of the runway, and melted snow does not drain from the runway, can result in skidding, slipping and hydroplaning.

Since many accidents occur during landing, let us look at the lighting aids. Even during daylight, the lack of contrast of a snow covered runway presents a problem similar to night operations. The runway lights, threshold lights, approach lights, strobes, VASI and runway distance markers are devices used to orient the pilot with the runway and to insure adequate visual reference during approach, landing, and rollout.

WHEN SNOW IS ON THE GROUND, each of the aids listed above contributes more to preventing accidents than at any other time. The runway lighting system may be the only reference to the runway environment during conditions where snow is blowing across the runway. It is imperative that there be no compromise in insuring the availability and optimum performance of these systems.

Prior to the first snowfall each runway light globe and lens should be inspected. Dirty or cracked lenses reduce the intensity of the light emitted from a fixture and degrade the effectiveness of that visual aid. Replace all defective lenses and clean or replace all dirty lenses. Wash and clean all semiflush or flush mounted fixtures as necessary. Clean the lenses and filters of the VASI system as required, and check the intensity of the approach lighting and strobes.

Give priority to maintenance and inspection of snow removal equipment. The operators of this equipment must be checked out prior to the first snowfall. Flight line operation procedures must be detailed and complete. Equipment operators must be intimately familiar with coordination procedures between

Lt Col David L. Elliott, Directorate of Aerospace Safety

themselves, base operations and the control tower.

A runway covered with snow, ice, slush, or water presents problems of directional control and predicting stopping distances. Obtaining a valid RCR in patchy runway conditions where snow, ice, slush and water exist can be difficult. The lack of an accurate RCR precludes the prediction of a realistic stopping distance. The RCR system has proven to be adequate on snow and ice; however, it is grossly inadequate for wet or slush covered runways. Don't fall into the trap of ignoring that portion of the runway where the snow has melted, particularly if the runway is still wet.

WHEN SNOW IS BANKED on each side of the runway, drainage can be a serious problem — standing water can result in hydroplaning and a stopping distance greater than for an ice covered runway. As an example: During the Combat Traction Test in January 1970, an ice covered runway was tested as having a 3.4 to 1 stopping distance ratio (icy to dry). A portion of a runway in Texas was checked in June of 1970 (under both wet and dry conditions) and had a stopping distance ratio of 3.57 to 1 (wet to dry). The problem arises in that RCR will not predict this slickness on the wet portion of the runway. (Your attention is invited to the Combat Traction article on page 10 of the June 70 issue of Aerospace Safety.) Use of thawing agents, such as propanol, should be accompanied with provisions for drainage. Frequent RCRs should be obtained. Patchy conditions should be reported to the pilot particularly if the runway is wet or flooded.

A new Air Force Regulation 55-42, Aircraft Arresting Systems Management and Use, is forthcoming. This regulation will outline cold weather procedures for aircraft arresting systems. The regulation will state that during snow and ice removal, barrier nets and hook cables

Runway lighting system may be the only reference when snow is blowing across the runway.

Adequate preparation, as above, pays off when conditions such as shown below arrive.

"I told you last summer to stop overparking."

THINK COLD

CONTINUED

may be removed from the runway but the arresting system will be returned to operational status as quickly as possible. Enough of the overrun should be cleared to allow an obstacle-free runout of the arresting system plus the length of the arrested aircraft.

When cold weather makes the remote function of the MA-1A net unreliable, the arresting net will be raised manually and left in a cocked position on the departure end of the runway. Arresting systems with below ground installations should not be a significant maintenance problem. However, a surface mounted system will have to be covered in some way so that the retraction motors can be easily started for rewind and cable tensioning purposes. Snow and ice must not be permitted to accumulate in the deck sheaves. And above all, the rewind motor exhaust system must be kept cleared of snow.

Removing snow and ice from the runway and associated facilities and proper maintenance of these systems during hours of snowfall require a continuous effort. Of course, ramps and taxiways and base roads also have to be maintained and cleared of snow. This just adds to the work, but it can't be allowed to detract from the necessary priority of the runway and its facilities. That's where you prevent aircraft accidents. ★

alert

Useful tips from UEIs

Observations noted during Unit Effectiveness Inspections

BAK-9 barrier pit was extremely untidy. Dirty rags were in one corner, there was a hydraulic leak, and drive chains needed cleaning and relubrication.

Wing safety office aircraft accident investigation kit and fire department emergency vehicles contained **obsolete and non-definitive grid maps** which could delay response to an aircraft accident.

Among **deficiencies in tech data compliance** noted at one base were the following: F-4 aircraft parked without canopy safety struts; an igniter being removed from an M32A-60 without use of the TO; specialists working on avionics equipment not using TOs; specialist working on pressure test set without tech data; ditto for tech working on LOX system.

Unsatisfactory inspection and maintenance of life support equipment: periodic inspection of helmets, masks and parachutes not performed, inspection forms not maintained, parachutes overdue inspection not tagged, TO file not correct and TO compliance records not maintained.

Seven mechanics working on an aircraft were **not wearing ear defenders,** although the aircraft jet power unit was running and an engine power check was being run on the aircraft in the next parking spot. Much noise. **Not one of the seven men had ear plugs or muffs in his possession and only one had even been issued ear plugs.**

Fuel system maintenance procedures being performed on an aircraft in a hangar were not in accordance with TO 1-1-3. Two technicians were in the fuel tank **without a safety observer present to observe and act in an emergency.** Flashlights issued to two crews were not explosion proof. All personnel were not wearing white coveralls, caps and boots. Cigarettes, lighters, wrist watches, etc., were lying on a rag near a crew working on a fuel tank. ★

Toots

is interested in your problems. She spends her time researching questions about Tech Orders and directives. Write her c/o Editor (IGDSEA), Dep IG for Insp & Safety, Norton AFB CA 92409

Dear Toots

Please help an old troop clarify to some of our younger airmen a few whys in reference to TO 00-20-5. I believe I know, but it would be nice to read it from an authority such as you.

First of all, TO 00-20A-1 (replaced with TO 00-20-5) required a maintenance officer's signature every 30 days in block "g" of AFTO Form 781B. At first, TO 00-20-5 also contained the requirement, but it has been changed and the reference dropped. However, some commands continue to request it.

Second, block 7 of the AFTO Form 781H requires only one signature for preflight. The way we read TO 00-20-5, page 2-6 para 2-58 sub para (d), all other entries will be printed. I believe I know why but can you explain? We do agree that the preflight signature is needed since it is not entered on the 781A.

MSgt Patrick A. Bowers
Randolph AFB Texas

Dear Pat

The requirement for the maintenance officer to sign the 781B, or current 781J, was dropped from TO 00-20-5 by popular demand of the commands. The primary reason was to free the maintenance officer for more pressing duties.

Now, signatures versus printed names in block 7 of the 781H: The first sentence of paragraph 2-58d of 00-20-5 answers your question. Quote: "This column will be used to record the signature OR printed name of the individual who accomplishes the inspection or maintenance identified by the line entry." In other words, since the inspector is not required to sign his name in block 7 of the 781H when he clears a red cross in the 781A, the crew chief will have to print the inspector's name in block 7 of 781H.

Toots

THE WINDSHIELD WAS FULL OF HILLSIDE — LEAVES AND BRANCHES RIGHT IN FRONT OF THE PROP!

i guess i pressed

During mission planning, the Intell briefer singled out one target for special attention. It was hidden in the trees and photography didn't really show anything but the foliage patterns. But, he said, it was there, all right. If we got it, we'd know. Above-ground ammo storage. It should blow sky-high!

I remember thinking that it's a lot better to get it while it's still in the boxes and crates.

I'd been given two flights of fighters to put on it. With two flights of four I was sure to get it. I was visualizing the fireball and secondary explosions while I flew to the target area.

When I got there, I was glad I had a few minutes before the first fighters would arrive. There had been no difficulty finding the ravine where the target was located; the area looked just like the photos. That was the trouble, it looked *just like* the photos. All trees. Thick foliage. No way of seeing through it to tell what was underneath.

I got down lower than I liked and still couldn't see below the jungle canopy. The Intell guy had said to be prepared for moderate automatic weapons fire. I kept the airplane moving, jinking. But all I could see was treetops.

I climbed back up to a more comfortable position and picked out some landmarks to use in directing the fighters. When the first flight of F-4s checked in, I was waiting for them. I gave them a heading to fly after a couple of hold-downs and ADF cuts. While they were inbound, I described the ravine and the target. By the time we spotted each other, we were ready to go to work. Dropping pairs, they could each make several passes. I didn't see any ground fire so we kept at it, kind of pattern bombing. I started working the east side of the ravine from north to south. As each pair of bombs went off, I expected to see the secondaries I had visualized. But they didn't happen.

Then the F-4 leader called "last pass," and they were gone. I was disappointed. But then the second flight was checking in. I gave them my preliminary spiel of target and terrain information and a heading to fly. They estimated about five minutes out, so I decided to take another close look. Assuming the area covered by the first flight didn't contain the storage area, I had a much smaller area to search.

Right down on the trees this time, I spotted something on the second pass. Couldn't be sure. I pulled up and bent it around and back over the very small clearing in the trees. But on this heading I couldn't see a thing down there. The fighters reported over me and had me in sight. I told them to turn left for a while—I'd be right with them. Then I made another pass up the east slope of the ravine where I'd spotted something below the trees. That was it! There it was! Covered with something black, tarpaulins perhaps. But that was it. If I approached from the west, from the bottom of the ravine, I could see it!

Climbing up to mark, I described in detail the spot I wanted the fighters to hit. Lead said he was pretty sure he knew where I meant, and I rolled in to mark.

It was beautiful. On this heading, the dark forms were obvious below the trees. I watched the marking rocket for a second before I started my pullup. It was headed straight and true. I was ready to call "Hit my smoke."

But when I'd pulled the bird around to where I could see the target over my shoulder, there was no smoke!

Lead called, "No smoke." I knew he was waiting to roll in.

"Okay, I'll mark again real quick." I ruddered the little bird around. "In to mark."

The familiar trees came into my windshield. But I was too far south, slanting up the hill instead of directly toward it. For several moments I couldn't find the black shapes under the trees. Then I saw them.

Nothing happened when I punched the rocket button on the stick. I glanced instinctively at the wing. The rocket was still there. I jabbed viciously at the button again. This time a rocket went. But I didn't have time to watch it. The windshield was full of trees and hillside. I pulled.

The airplane rotated and started up the hill. But the hill was going up, too.

My God! I'm not going to clear it! The leaves and branches are right in front of the prop!

And then I was through them. There had been a jolt, almost as if the airplane stopped for a moment. But it was still flying. Yawing, rolling to the right. Left rudder—

Lots of left rudder and left aileron brought it back under control. Headed up again. The trees fell away beneath me. Climb—

Keep climbing. The engine sounds okay. Gages look good.

"I've got your smoke—Lead's in on your smoke." It sounded far away.

I wasn't concerned with anything but learning if the airplane would fly me home. As I climbed, gingerly feeling out the bird, my confidence returned. The machine was going to hold together. I'd take it up high enough to check it in landing configuration.

Lead called off and Two called in. Then another voice called excitedly, "Hey, the FAC's in trouble—you all right?—you been hit?"

My mouth was dry. I swallowed hard and tried to sound calm.

"Okay now—brushed the trees—overeager—I guess I pressed." ★

HOLES IN THE LIFESAVERS

Robert H. Shannon
Life Support Systems Specialist
Directorate of Aerospace Safety

Despite improvements to ejection systems to enlarge the escape envelope, the USAF ejection success rate decreased sharply last year. Analysis of all ejections indicates a need for further hardware improvements, better maintenance and greater emphasis on aircrew ejection training.

During the four years from 1966 through 1969, the USAF fatality rate in ejections climbed steadily from an all-time low of 12 percent to 21 percent in 1969, the highest in 11 years.

Since this increase occurred despite many modifications in recent years to improve the escape envelope of USAF egress systems, there must be more than one hole in this lifesaver. What are they?

In an attempt to answer this question the Life Sciences Group of the Directorate of Aerospace Safety analyzed all ejections during 1968 and 1969 except those that occurred in Southeast Asia due to enemy action. Also an Egress System Task Group was formed to critically analyze all Air Force escape systems, identify deficiencies and establish programs for corrections.

There were 355 ejections studied of which 66, 19 percent, terminated in fatalities. Of primary interest to us were (1) the phase of ejection in which the injury was incurred, and (2) the specific mechanism of injury. For the purpose of this analysis, the unsuccessful ejections were categorized as "ejection out of the low-level capability of the systems involved" and "other." (Figures 1 and 2.)

The ejections out of the low-level envelope were essentially a function of time; that is, time available for completion of the ejection sequence was less than the time required, due to insufficient terrain clearance, adverse attitude, high sink rate, and sometimes low airspeed. This category accounted for 65 percent of the total fatalities. Although ejections out of the low-level envelope are, by definition, due to deficient low-level capability of existing systems, the single most significant area of concern is the decision factor. *Far too many crewmen delay the decision to eject until such time as the conditions of ejection offer little or no hope for successful recovery.*

In 1969 alone 13 of the 24 reported ejections were initiated out of the low-level envelope when the crewmember delayed the decision to eject. All of these 13 would probably have been successful had an earlier decision to eject been made. Three crewmembers involved had no control of the situation; i.e., one is believed to have delayed in order to avoid a populated area, and the other two may have been injured or incapacitated momentarily as a result of a mid-air collision. Thus, of 24 fatalities attributed to ejection out of the low-level capabilities of the systems involved, 42 percent were definitely preventable. Continued emphasis must be placed on the decision factor in aircrew egress training.

Since the decision to eject rests solely with the crewman, he must have a thorough knowledge of the capabilities of his escape system under all conditions. Training Film Nr SFP 1856, "Ejection Vectors," is an excellent tool for getting this point across and should be an integral part of egress training.

THE "OTHER" CATEGORY includes those misadventures that cause a within-the-envelope ejection to terminate in a fatality. While this is perhaps the most frustrating area, it is the most fruitful in terms of preventable deaths. The 23 fatalities in this category, which accounted for 35 percent of the total, included some very unusual circumstances and injury patterns in addition to those observed in previous analyses.

Three deaths were attributed to seat/man/parachute interference, two of which involved lethal blows to the head by the seat after separation. In one of these, the crewman was struck by the unoccupied seat of the rear crewmember of a tandem aircraft; the other occurred as a result of a system malfunction. The third case involved entanglement of the seat with the parachute, preventing complete inflation of the chute. The crewman was killed on impact with the ground. Efforts to eliminate this hazard are being expedited. Two aircraft, the F-84 and the F-105, incorporate an 8-foot-diameter chute, which is mounted to the underside of the ejection seat and retards the seat after separation. This has been quite effective in eliminating the incidence of seat/man/chute interference in these aircraft. A more positive means of seat-man separation is programmed for incorporation in the F-100, F-102, F-104 and the T-38/F-5. For those aircraft for which no current programs are in being, recommendations have been presented by the Air Force Egress Systems Task Group.

In addition to the above-cited seat-man recontact fatality which was due to system failure, five other fatalities were directly attributable to failure of an egress system component. Two resulted from delayed ignition of the rocket catapult wherein the resultant damage to the seat shell prevented normal separation and the crewmembers impacted in their seats. Subsequently the cause of the delayed ignition of the rocket catapult was discovered. A crash program was immediately started to rework all of the involved catapults to eliminate delayed ignition of the rocket motor. The fix added a booster igniter in the rocket motor to guarantee scheduled ignition.

FIGURE 1

USAF EJECTION EXPERIENCE

1 Jan 1966 - 31 Dec 1969

Year	Total Ejections	Fatal No.	Fatal %
1966	170	20	12
1967	207	29	14
1968	183	30	16
1969	172	36	21
Total	732	115	16

Failure of the ballistic catapult was a factor in another fatality. This was an extremely rare condition in which abnormal stress forces at time of ejection caused structural failure of the seat, thereby reducing the trajectory height of the seat-man mass. The pilot and seat contacted some portion of the aircraft external structure simultaneously with the seat-man separation, which resulted in fatal injuries.

One fatality was due to failure of the force-deployed personnel parachute. Because of a defective primer, the cartridge which fires the drogue slug did not fire. This was a very low-level ejection and the pilot did not have time to manually deploy his personnel chute. It was determined that the primer was subjected to high temperatures which caused it to become defective. The force-deployed parachute has been temporarily removed from service pending satisfactory solution of the problem. It is anticipated that it will be reinstalled incorporating a template on the deployment gun which will indicate whether or not the gun has been subjected to high temperatures.

Consideration is being given to a redundant system, i.e., incorporation of an automatic actuation feature of the parachute, such as the gold key, in the event of a possible

HOLES IN THE LIFESAVERS

CONTINUED

failure of the deployment gun. These are interim measures, however, and the ultimate solution lies in the development of a primer which will not be adversely affected by high temperatures. A project is currently under way for the development of such a primer.

The final case involved a failure of the lap belt release. This, too, was a low-level ejection with insufficient time to go manual. It was concluded that, due to the conditions of ejection, unusual loads were applied to the belt latching mechanism, causing it to bind. A new lap belt designed to eliminate this problem has been developed, and is now being incorporated on all ejection-seat-equipped aircraft. This new lap belt will also get rid of the long-standing problem of inadvertent opening of the manual lap belt release lever which negates automatic function of the parachute.

Ejection at extremely high speed resulted in three fatalities. In two from the same type aircraft, it was estimated that ejection occurred at about mach 1.1-1.3 (about 670 KIAS) with the aircraft in a 60-70 degree nose down attitude and from an altitude of approximately 10,000 feet above ground level (AGL). One crewmember hit the ground still in the seat and the other separated but did not obtain an operable chute. The lethal threshold of ram air pressure is about 600 knots at sea level. It is quite likely that both crewmembers received fatal injuries from ram air pressure on entry into the airstream. The third case was a classic example of extreme high-speed and chute-opening-shock injuries incurred in an ejection estimated to have occurred at 600 KIAS, from an altitude of 5000 feet, while the aircraft was in a 70-degree dive.

Four crewmembers failed to survive parachute water landings following successful over-water ejection. Two are missing and two were recovered drowned. Both of those recovered sustained nonfatal injuries during some phase of the ejection sequence, which undoubtedly contributed to their inability to survive.

Two pilots died in low-level ejections when they descended into the area of the wreckage fireball. In one of these the chute was severely burned, rendering it inoperable, and the pilot free-fell to his death. In the other, the pilot received fatal burns to 80 percent of his body after parachute landing.

The remaining six fatalities included three due to causes observed with some degree of frequency in past analyses and three due to very unusual conditions. Of the former, one involved inadvertent release of the manual lap belt release lever, which negated automatic function of the chute; one held onto seat actuating controls after automatic operation of the lap belt and impacted in the seat; and one failed to attach the chute arming lanyard to the lap belt.

The three involving unusual conditions were as follows: One pilot ejected without having his chute risers attached to his integrated harness. He was killed on impact following a free fall from about 4000 feet. Another death was attributed to poor ejection posture and very loose restraints. This crewman de-

FIGURE 2

EJECTION FATALITY CAUSES

1968 - 1969

	1968	1969
Ejected Out of Low-Level Envelope	19	24
Other	11	12
Seat/man/chute interference	—	3
System failure	3	2
High "Q"/Chute-opening shock	3	—
Drowned/missing	2	2
Descended into wreckage fireball	1	1
Held onto seat	—	1
Inadvertent opening of lap belt	—	1
Chute risers not attached to harness	—	1
Chute arming lanyard not attached	—	1
Poor position/loose restraints	1	—
Struck canopy bow	1	—
Total	30	36

FIGURE 3

PROPORTION OF FATAL INJURY CAUSES TO TOTAL EJECTIONS

1 Jan 1966 - 31 Dec 1969

	Total Ejections	Out of Envelope		Other	
		No.	%	No.	%
1966	170	11	6	9	5
1967	207	16	8	13	6
1968	183	19	10	11	6
1969	172	24	14	12	7
TOTAL	732	70	10	45	6

scended under a fully developed parachute but died as a result of multiple injuries received during the ejection. In the remaining case, the aircraft was involved in a mid-air collision with another aircraft. The aircraft canopy bow was pushed down and inward during the collision, and when the pilot ejected, his knees and lower torso contacted the deformed canopy bow, inflicting severe injuries to his knees and pelvis, which proved fatal.

In four of these six cases a lack of adequate training is again reflected. Fatalities due to failure to use available equipment, improper position for ejection (particularly when it is a controlled situation), and holding onto seat actuating controls need not ever occur. Training programs must emphasize these conditions to insure that they will not occur in the future.

This analysis did not provide all the answers to the marked increase in the ejection fatality rate; however, it did disclose some very pertinent findings. The proportion of ejections out of the low-level envelope resulting in fatalities showed a definite upward trend. The rate was six percent for 1966, eight percent in 1967, 10 percent in 1968, and 14 percent in 1969.

BASED ON PREVIOUS analyses of ejection escape experience, ejection out of the low-level envelope usually results in about five to ten percent of the total. Obviously more crewmembers are attempting ejection under marginal or impossible conditions. It is also obvious that many of these involved excessive delays in the decision-making process. The reasons for these delays will probably never be known; however, evidence indicates that in some cases the crewmember's decision may have been influenced by the fact that his escape system had recently been modified to improve the escape envelope. Such improvements are made solely for the purpose of giving the crewmember a better chance of survival in marginal situations. They should *never, repeat never,* be used as the basis for delaying the decision to eject. No improvements in ejection systems can prevent fatalities if the aircrew fails to make the necessary decision to use the system within its capabilities.

The proportion of within-the-envelope ejection fatalities was essentially the same for the four-year period 1966-1969 as shown in Fig. 3. Perhaps the most pertinent finding here is the change in the mechanism of injury within the category. For example, there was a sharp decline in the number of drowning deaths, whereas the number attributed to system component failure was unusually high. It is apparent that our egress system improvement programs are not being achieved without additional system complexity. As escape systems become more complex and sophisticated, the maintenance requirements are definitely going to be more demanding. The assignment of egress maintenance personnel to specific systems on a permanent basis may be the answer to this problem. Whatever the ultimate decision is in this regard, experience definitely documents the requirement for increased emphasis on egress system maintenance procedures. Egress system improvement programs are receiving a great deal of high-level attention. The objective is as near 100 percent recovery as possible of all of our aircrews when inflight egress becomes necessary.

Egress system training, egress system maintenance practices and procedures, and quality assurance are receiving high priority attention in the current program of Unit Effectiveness Inspections (UEIs) which are being conducted by the Deputy Inspector General for Inspection and Safety. In the final analysis, the elimination of preventable deaths that result from inflight escape from Air Force aircraft primarily rests with the individual crewmember. He must have the best equipment available and the best training possible. ★

REX RILEY'S CROSS COUNTRY NOTES

SEVERAL YEARS AGO, the pilot of a T-33 was in a dire hurry to get home. His only hangup was an electrical problem that Transient Maintenance had been gnawing on from 0700 until about 1500. The problem finally resolved, the jock climbs into his Lockheed Racer for the one hour trip home. All goes well until the inverters come on—no attitude indicator. Since the weather at home is not too keen, he elects to shut down and switch instruments with the back seat (he's alone anyway). Another start and clearance but the instrument still doesn't work.

Now our boy is really tight jawed. He's been pacing the ramp for almost 12 hours in an attempt to get home. The only thing that stands in his way is an unreliable attitude indicator. He feels his only recourse is to go anyway—he has to get back!

The last transmission by the pilot, heard by Approach Control at home plate, was "I think I'm going to crash." He was dead right. The T-bird was scattered over a quarter of a mile of mountainside. The pilot lost it while attempting a let down through turbulent air, at night, in weather.

What's the moral? There are several buried in this true story. A lot of guys are not around today because of *gethomeitis*. Don't lose your cool. Pilots frequently get impatient with the transient maintenance troops and start blaming them for their troubles. Of course, it may be that they have never seen your type aircraft before. But that doesn't protect them from an irrational, irate jock bent on getting home. All the nasty words accomplish is short tempers and bad torques. Lay off; more often than not, the job will get done quicker and better.

Fatigue and anxiety don't mix with flying airplanes. Aside from the fact that regulations prohibit flying without a full set of gages, partial panel flying is a bit testy even when you've been practicing.

What does all this have to do with Rex? First, I think we all have to agree that everybody is a better pilot when wearing a smile and sporting a full tummy than when giving with a frown and a growl. Transient service throughout the Air Force has a chance to put our traveling

pilots in the proper frame of mind. How much smoother things seem to go when, after a good night's sleep in a quiet VOQ or VAQ, the crew arrives at Ops and finds the 175 (yours) generally filled out, the weather man waiting to brief, a full load of gas and APU plugged in.

Contrast this with "Gee, our forecaster just stepped out," or "We had a problem with our only APU; can you make a battery start?" or "I'm sure we have a west high altitude planning chart somewhere." Ever sit in the cockpit on a hot ramp and hear clearance delivery say "We don't have your flight plan yet?"

What all this tells Rex is that somebody doesn't really care about the image presented to the traveling Air Force. By such actions first impressions are lasting ones and any IG inspector will tell you that if he walks into a shop that's neat, and the NCO has on a clean uniform, chances are the inspection won't go nearly so deep as it would if rubbish is scattered around the floor and the troops working in the shop look as if they just came back from survival school.

In short, super service by TA implies a smooth functioning outfit.

How about improving your transient facility? We know of one base, anxious to get the Rex award, that has a panel composed of all those base agencies responsible for transient services (Approach Control, TA, housing office, tower, POL, etc). They periodically review complaints to correct deficiencies noted on their questionnaires. Efforts like this just can't help but bring good results.

A cheerful smile on the TA chief's face may not improve the situation when he reports an oil leak in your engine but may avoid his getting hit with a loose fire extinguisher. Courtesy doesn't cost anything but if it did the Air Force should buy it by the ton.

Improvement in transient facilities normally occur when the responsible officer or NCO heeds the remarks made by transient crews. An inspection of critical areas may affirm or deny the validity of the crew's statement, but in either case, it has prompted a self-evaluation. The only way our TA is going to get an outstanding rating is by a conscientious effort to give the very best service available.

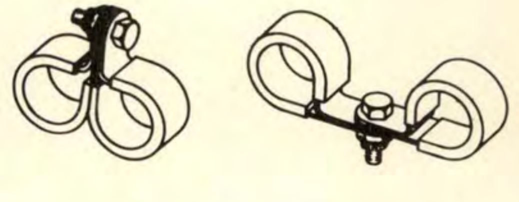
Aircrews can help by being tolerant, wearing a smile and not expecting miracles. A thanks that the TA guys know is sincere will get a jock a lot more cooperation than a growl. ★

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.
PERRIN AFB	Sherman, Tex.
CANNON AFB	Clovis, N.M.
HICKAM AFB	Hawaii
LUKE AFB	Phoenix, Ariz.
RANDOLPH AFB	San Antonio, Tex.
ROBINS AFB	Warner Robins, Ga.
TINKER AFB	Oklahoma City, Okla.
WETHERSFIELD AFB	England
HILL AFB	Ogden, Utah
YOKOTA AB	Japan
SEYMOUR JOHNSON AFB	Goldsboro, N.C.
ENGLAND AFB	Alexandria, La.
MISAWA AB	Japan
KADENA AB	Okinawa
ELMENDORF AFB	Alaska
PETERSON FIELD	Colorado Springs, Col
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.
ITAZUKE AB	Japan
ANDREWS AFB	Washington, D.C.
McCONNELL AFB	Wichita, Kans.
NORTON AFB	San Bernardino, Cali
BARKSDALE AFB	Shreveport, La.
HOMESTEAD AFB	Homestead, Fla.
CHANUTE AFB	Rantoul, Ill.

CLAMP SENSE



Installation of an Adel clamp to secure a wire bundle or a flexible line carrying fluid has always been difficult. Ask any old timer.

After you have asked the old timer, check with a young modern mechanic and you will find the same problems still exist and, if anything, are more acute today because of the more complex equipment and higher temperatures we encounter. Obtaining clamps that will withstand the heat has occasionally been difficult but, with few exceptions, the maintenance man has brought this problem down on himself.

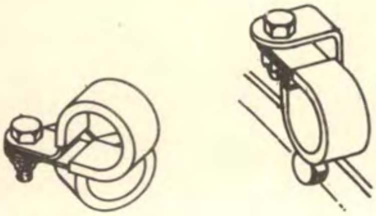
To illustrate why maintenance has at times been the cause of clamp shortage, take the case of a mechanic replacing clamps in the hot section of an engine. The clamp he removed was designed to take the heat, but the replacement was not. This could have happened because the mech didn't specify the right type, or supply issued the wrong clamp, or the maintenance man picked up the wrong clamp from bench stock. Later, when the installation of the wrong clamp is detected, maintenance looks around and finds many more such low temp clamps installed in hot sections. Then their replacement causes a sudden drain on the supply of high temp clamps.

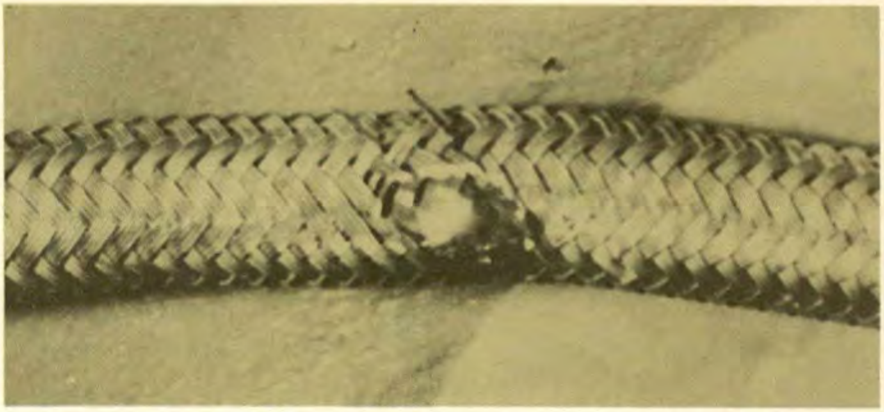
This situation could have been averted had the mechanic checked the part number on the replacement.

There is evidence that some maintenance personnel may not know what we are talking about when reference is made to the part number on the clamp. So what follows is a brief description of what can be found in most all clamp part numbers.

Letters make up some of the part number and these letters indicate what the clamp and the clamp cushion is made of. For instance, take part number MS21919-DG4. The "D" indicates it's made of aluminum alloy, the "G" that it is nonfuel resistant. However, take the same part number and substitute the letters FW. The letter "F" indicates fuel resistant. The letter "W" indicates wedge shaped cushion. No doubt you mechs will say, "I know that." But did you know that this same fuel resistant clamp was intended for use in areas where fuel or fuel vapors are the normal thing and not for general use, because air causes the cushion of the clamp to deteriorate? If you desire more specific information on a particular clamp, consult the military standards for the part number you have in mind.

Obtaining the right clamp is only a small part of the problem. Im-



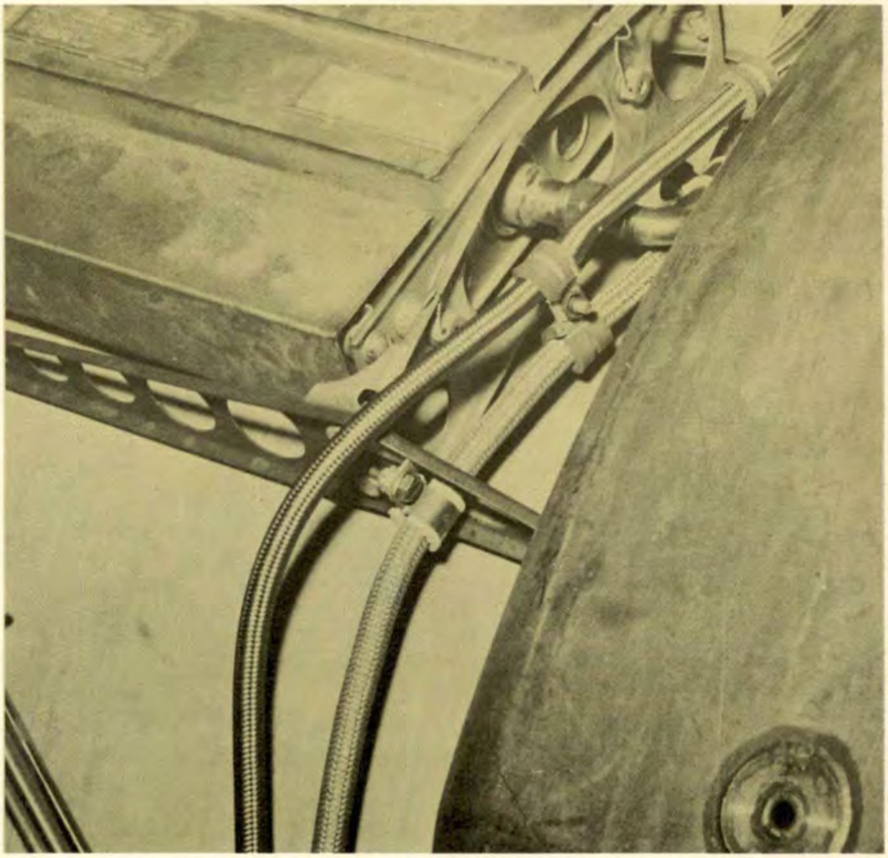


Results of improper clamping. Refer to TO 42E1-1-1 for limits of hose damage.

properly installed clamps or not enough clamps have caused many problems such as those in the three examples listed below.

Shortly after takeoff, while passing through 10,000 feet, the pilot of an F-101 noticed indicated airspeed decreasing. By the time he had reached 15,000 the gage was reading "O", his true airspeed was normal but altitude and vertical velocity indications were erratic. After he descended to traffic pattern altitude, all indications were back to normal again. Investigation revealed a broken static airline in the cockpit area. The break was caused by an improperly installed Adel clamp which produced excessive rigidity in the line. Vibration caused the line to fail.

Another problem bugging the experts is improper clamping of the flexible hose portion of the afterburner on-off signal line installed on the J79-15/17 engine. Several incidents have been reported where this line has failed, one of which was on an F-4 on takeoff. At 100 knots the left fire warning light came on and stayed on until the aircraft had taxied off the departure end of the runway after the pilot aborted the takeoff. Maintenance found a pin hole in the flexible portion of the on-off A/B signal hose.



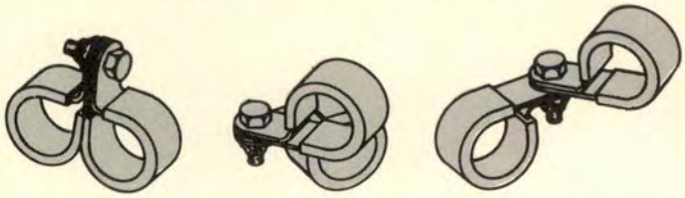
Conduit improperly clamped.

Another F-4 incident occurred immediately after takeoff while the engines were still in A/B. The Nr 2 engine fire warning light came on but went out as soon as the throttle was moved out of A/B. Investigation revealed the oil scavenger hose had chafed a hole in the flexible A/B line. While the engine was in A/B, fuel sprayed from the hole in the flex line and ignited causing minor fire damage.

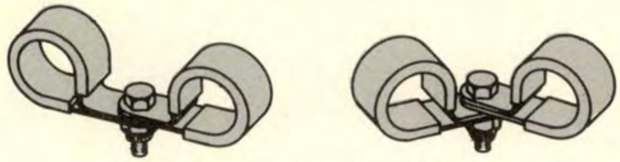
A review board was convened to investigate the causes of the two F-4 fires cited here as well as a rash of similar fires. The board decided on three prime reasons for the fires: (1) Design deficiency; (2) inadequate tech data; and (3) improper installation of clamps that secure the lines and hoses that are failing. Nr 2 in many cases could be the cause of Nr 3 in that the TO did not furnish clear cut guidance on how and where a line should be clamped. Many of the TOs have since been revised and are very clear on these points. As for number one, engineers (aircraft designers) are working on improved designs for routing electrical leads, hydraulic hoses, etc. Future aircraft engine bays will not be used as a routing place for any lines except those essential for engine operation, such as the fuel line.

For the present, however, we must do the best we can with what we have, which means maintenance must be doubly sure that all lines are properly clamped. Improper clamping can put a flight crew in a very dangerous situation. Use the TO that covers the equipment you're working on for proper clamping procedures and don't be the one to box the aircrew in a corner. ★

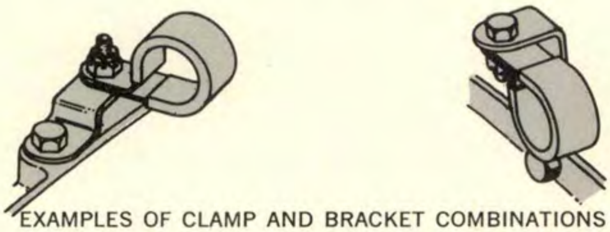
TYPICAL CLAMP INSTALLATION



EXAMPLES OF "BACK-TO-BACK" CLAMPING



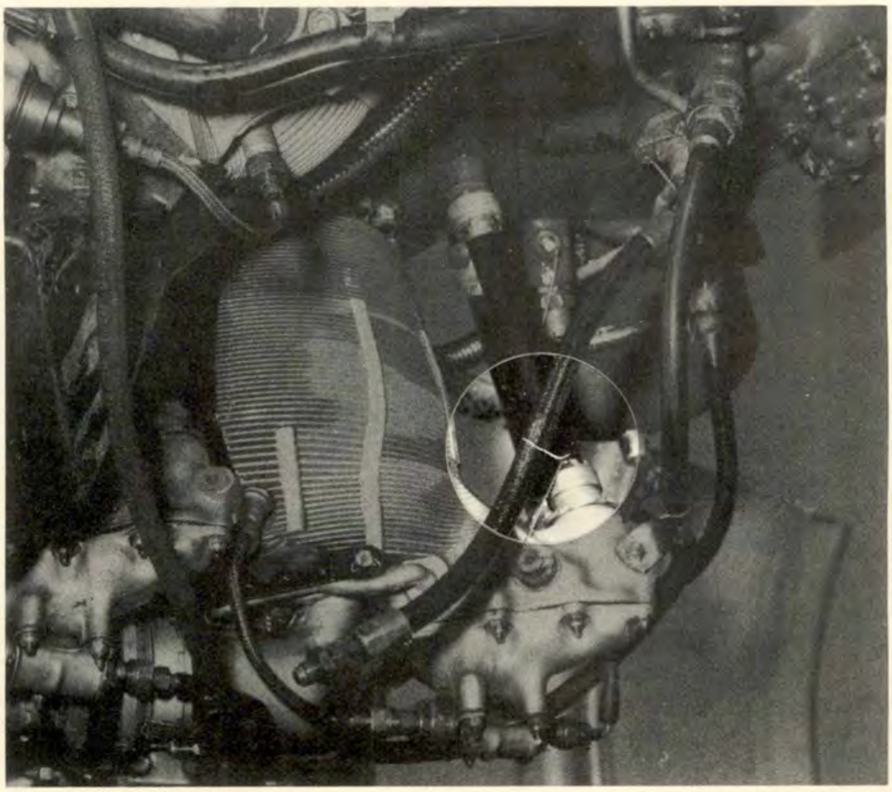
EXAMPLES OF "BUTTERFLY" CLAMPING



EXAMPLES OF CLAMP AND BRACKET COMBINATIONS

Conduits such as this one must be clamped.

Drain line secured to push rod with safety wire.

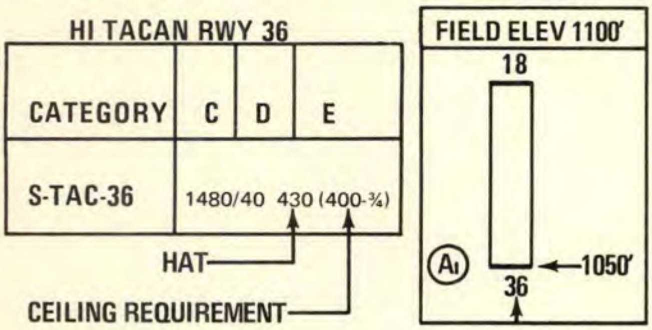


THE I.P.I.S. APPROACH

By the USAF Instrument Pilot Instructor School, (ATC) Randolph AFB, Texas

HAT

Q The March 1970 "IPIS Approach" article pointed out that Height Above Touchdown (HAT) is now used for straight-in approaches and that Height Above Airport (HAA) is used for circling approaches. If I find the following approach which lists the HAT as 430′ and requires a 400′ ceiling, is it legal? If so, how can I expect to break out?



A The HAT and ceiling requirements shown above are correct. The example shows an MDA of 1480′, touchdown zone elevation of 1050′, and a field elevation of 1100′. The HAT is:

1480′ MDA	HAA would be:
—1050′ Touchdown Zone Elevation	1480′ MDA
430′ HAT	—1100′ Field Elevation
	380′ HAA

The ceiling is determined by using the *HAA* rounded to the *next higher* 100′. In this case, the HAA is 380′ and the ceiling would be 400′. Although the HAT is 430′, there should be no problem breaking out because weather is reported above field elevation. A 400′ ceiling would be approximately 1500′ MSL (see March 1970 "Approach" article) and since the MDA is 1480′, you should be below it. The visibility requirement is computed separately and takes into consideration lighting available.

TEARDROP PENETRATION

Q AFM 51-37 states, "Descend from the altitude specified for completion of penetration turn when *on* the *inbound course*." The question that comes up on this is, "What do you mean by *on* the inbound course?"

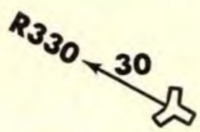
A The IPIS considers within ±5° of the inbound course (and will remain within ±5°) to be *on* the inbound course for the teardrop penetration. A ±5° tolerance will keep you within the airspace where obstacle clearance is provided.

POINT TO PONDER

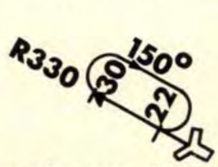
Holding, when necessary, will usually occur at the initial approach fix from which the approach will be commenced. There is usually a complete depiction in the terminal chart, and most pilots will have no difficulty relating the verbal instructions from the controller with the depiction in the book. How about copying and complying with verbal instructions where no pattern is depicted? Consider the following TACAN holding instructions: "Hold southeast of the 30 DME fix Podunk TACAN 330 radial 8 mile legs." Can you copy, visualize, and correctly enter this pattern?

If you are a little shaky on visualizing the pattern, the following technique is nearly foolproof.

Compare the direction of holding (which is the first item given in the verbal instructions) to the old familiar wind arrow we learned about in weather courses. A wind arrow shows the direction *from* which the wind comes. A north wind is drawn (↓); a southeast wind (↖). Since our holding direction was southeast, draw a southeast arrow (↖). On the head of the wind arrow, place the second item given in the holding instruction, the DME fix. Now we have (↖**30**). Since the 330 radial was specified, the TACAN station can be drawn on our depiction.



The only items remaining are the right turn at the holding fix (a standard right hand pattern in absence of specific instructions to make left turns) and the leg length. The complete depiction looks like this:



With a little practice you should be able to rapidly draw any pattern as the instructions are received. Have a buddy leaf through a terminal book and give you holding instructions from any TACAN approach chart —try your hand at copying some. ★

GROUND SAFETY AWARDS

PRESENTED BY THE NATIONAL SAFETY COUNCIL FOR

1969

National Safety Council Award of Honor was received by the Air Force in recognition of a 17.72 per cent reduction in ground accident rates during 1969 as compared to the 1967-68 average.

AWARD OF HONOR

This is the Safety Council's highest award and is given in recognition of having achieved 10 per cent (or greater) reduction in ground accident rates when compared to the average of the previous two years. 1969's recipients are:

COMMANDS:

Air Force Logistics Command
Air Training Command
Air University
Headquarters Command USAF
Military Airlift Command
Strategic Air Command
Tactical Air Command
United States Air Forces in Europe

NUMBERED AIR FORCES:

3 Air Force (CINCUSAFE)
12 Air Force (TAC)
13 Air Force (CINCPACAF)
15 Air Force (SAC)

WINGS:

1 Composite Wing (HQ COMD USAF)
1 Special Operations Wing (TAC)
50 Tactical Fighter Wing (CINCUSAFE)
1605 Air Base Wing (MAC)
3525 Pilot Training Wing (ATC)
3800 Air Base Wing (AU)
4600 Air Base Wing (ADC)
6921 Security Wing (USAFSS)

GROUPS, REGIONS, CENTERS, AREAS, DIVISIONS, SERVICES:

343 Fighter Group (ADC)
Air Weather Service (MAC)
Armament Development and Test Center (AFSC)
Chanute Technical Training Center (ATC)
HQ Tactical Communications Area (AFCS)
Oklahoma City Air Material Area (AFLC)
Pacific Ground Electronics Engineering Installation Agency Region (AFLC)
Southeast Asia Communications Region (AFCS)

BASES:

Francis E. Warren Air Force Base (SAC)
Tachikawa Air Base (CINCPACAF)

AWARD OF MERIT

This is the Safety Council's second highest award and is given in recognition of having achieved a five to ten per cent reduction in ground accident rates when compared to the average of the previous two years. 1969 recipients are:

COMMANDS:
- Alaskan Air Command
- United States Air Force Security Service

NUMBERED AIR FORCES:
- 2 Air Force (SAC)
- 5 Air Force (CINCPACAF)
- 7 Air Force (CINCPACAF)
- 8 Air Force (SAC)
- 9 Air Force (TAC)
- 21 Air Force (MAC)

WINGS:
- 1 Weather Wing (MAC)
- 2 Weather Wing (MAC)
- 3 Weather Wing (MAC)
- 5 Weather Wing (MAC)
- 6 Weather Wing (MAC)
- 7 Weather Wing (MAC)
- 9 Weather Reconnaissance Wing (MAC)
- 15 Tactical Fighter Wing (TAC)
- 17 Bombardment Wing (SAC)
- 23 Tactical Fighter Wing (TAC)
- 33 Tactical Fighter Wing (TAC)
- 41 Aerospace Rescue and Recovery Wing (MAC)
- 55 Strategic Reconnaissance Wing (SAC)
- 58 Tactical Fighter Training Wing (TAC)
- 68 Bombardment Wing (SAC)
- 75 Tactical Reconnaissance Wing (TAC)
- 89 Military Airlift Wing (MAC)
- 313 Tactical Airlift Wing (TAC)
- 317 Tactical Airlift Wing (TAC)
- 320 Bombardment Wing (SAC)
- 322 Tactical Airlift Wing (CINCUSAFE)
- 375 Aeromedical Airlift Wing (MAC)
- 416 Bombardment Wing (SAC)
- 436 Military Airlift Wing (MAC)
- 449 Bombardment Wing (SAC)
- 464 Tactical Airlift Wing (TAC)
- 479 Tactical Fighter Wing (TAC)
- 513 Tactical Airlift Wing (CINCUSAFE)
- 1100 Air Base Wing (HQ COMD USAF)
- 3510 Flying Training Wing (ATC)
- 3550 Pilot Training Wing (ATC)
- 3615 Pilot Training Wing (ATC)
- 3640 Pilot Training Wing (ATC)
- 3646 Pilot Training Wing (ATC)
- 4252 Strategic Wing (SAC)
- 4258 Strategic Wing (SAC)
- 7101 Air Base Wing (CINCUSAFE)

REGIONS, AGENCIES, GROUPS, AREAS, DIVISIONS, CENTERS, SERVICES:
- 1 Combat Evaluation Group (SAC)
- 3 Air Division (SAC)
- 40 Tactical Group (CINCUSAFE)
- 2856 Air Base Group (AFLC)
- 3825 Support Group (AU)
- Aeronautical Systems Division (AFSC)
- Aerospace Medical Division (AFSC)
- Aerospace Rescue and Recovery Service (MAC)
- Air Force Special Weapons Center (AFSC)
- Alaskan Communications Region (AFCS)
- Electronic Systems Division (AFSC)
- Ground Electronics Engineering Installation Agency, Headquarters (AFLC)
- Ogden Air Material Area (AFLC)
- Sacramento Air Material Area (AFLC)
- San Antonio Air Material Area (AFLC)

BASES:
- Barksdale Air Force Base (SAC)
- Cam Ranh Bay Air Base (CINCPACAF)
- Carswell Air Force Base (SAC)
- Davis-Monthan Air Force Base (SAC)
- Dyess Air Force Base (SAC)
- Goose Air Force Base (SAC)
- Kadena Air Base (CINCPACAF)
- K. I. Sawyer Air Force Base (SAC)
- Little Rock Air Force Base (SAC)
- Loring Air Force Base (SAC)
- March Air Force Base (SAC)
- Minot Air Force Base (SAC)
- Misawa Air Base (CINCPACAF)
- Tuy Hoa Air Base, Vietnam (CINCPACAF)
- Westover Air Force Base (SAC)
- Wurtsmith Air Force Base (SAC)

CERTIFICATE OF COMMENDATION

This award is given to small organizations which have achieved a perfect record or have had significant reductions in ground accident rates.

WINGS:
- 6 Strategic Wing (SAC)

GROUPS, SQUADRONS, CENTERS, ORGANIZATIONS, SCHOOLS:
- 708 Aircraft Control and Warning (AAC)
- 709 Aircraft Control and Warning (AAC)
- 717 Aircraft Control and Warning (AAC)
- 748 Aircraft Control and Warning (AAC)
- 926 Tactical Airlift Group (AFRES)
- 928 Tactical Airlift Group (AFRES)
- 1604 Air Base Group (MAC)
- 3826 Command and Control Group (AU)
- 5071 Air Base Squadron (AAC)
- 7122 Broadcasting Squadron (CINCUSAFE)
- 7234 Ammunition Supply Squadron (CINCUSAFE)
- 7350 Support Group (CINCUSAFE)
- Academic Instructor and Allied Officer School (AU)
- Air University Institute Professional Development (AU)
- Arnold Engineering Development Center (AFSC)
- Military Aircraft Storage and Disposition Center (AFLC)
- Space and Missile Systems Organization (AFSC)
- Tactical Air Reconnaissance Center (TAC)

Ops topics

FEATHERED BULLETS

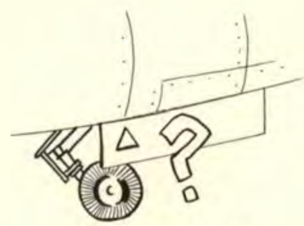
With the fall migration season coming up there are going to be a lot of birds moving around so it would behoove aircrews to be extra alert to them. But this doesn't mean that we can ignore them during the rest of the year between migrations. That birds are everywhere is common knowledge. We were reminded of this the other day when the daily message traffic contained several reports of birdstrikes. A few: From California, a B-52 on takeoff took a bird in the Nr 7 engine. The cost was in excess of $35,000. In Georgia another feathered bullet smacked the right wing leading edge of a C-119 and an eight-foot section had to be replaced. Two RF-4s were hit in South Carolina one receiving only minor damage to the vertical stabilizer, the other much more serious in that the nose cone and practically all of the equipment contained therein had to be replaced. All of these happened at low altitude. Obviously there wasn't anything the pilots could do to avoid these encounters. We'd like to offer some effective words of wisdom but about all we can do is remind those who have visors to keep them down in the environment in which birds operate. There's no guarantee with it, but there are jocks flying today who might not be with us if it hadn't been for that bit of plastic.

BROTHER'S KEEPER

Someone had made a hard landing after the wheel was assembled and installed on the T-39. That had been 23 landings ago. On the day that the rim failed, the aircrew had made multiple touch and go landings during a training mission, but none of them were what you'd call hard landings. Actually, they didn't even know the 1½ x 14-inch strip had broken off the right main wheel rim until they parked, deplaned and were making a cursory post flight inspection.

Maintenance inspectors checked the rest of the wheel by Zyglo and ultrasonic methods and found other cracks, confirming that the wheel had seen some pretty rough treatment. They theorized that the strip actually broke away from the rim on the last landing at home base. Probably on roll out from the landing, as a matter of fact, because only the tire bead was holding the tire on the rim across the break, preventing a blow-out.

Fortunately, the rim didn't break at high speed. And fortunately again, the pilots didn't attempt another landing after the wheel had broken. Unfortunately, they came mighty close to a serious accident because another pilot, too proud to admit a minor error, failed to ask for an inspection after he made a hard landing.



GEAR UP?

In the pattern for landing at the end of a mission, the 0-2A pilot lowered the gear handle and found a yellow "in-transit" light staring him in the face. The main gears were down, but the light persisted, even though he moved the gear handle back and forth several times between the DOWN and DOWN-NEUTRAL positions.

Leaving the handle in the DOWN position, he notified Tower that he would be landing with an unsafe indication. He was assuming it was only a faulty indication—that the gears were actually all down and locked.

The assumption was erroneous, as you might expect. Touching down short of the arresting gear cable, he held the nose off until he'd passed the cable, then eased the nose down. And down — — and down. The front prop stopped very suddenly. The airplane came to a stop shortly thereafter.

It wasn't until he was telling his tale of woe to the Ops Officer that the real problem came to light. He had experienced some difficulty with the gear after takeoff. Like the gear handle wouldn't come up past neutral because the nose strut had not fully extended (leaky inflation valve). He solved that by putting some G on the airplane, AND THEN RETRACTED THE GEAR!

PRACTICE

During a complicated, high altitude intercept in weather and turbulence, an F-106 pilot experienced lightheadedness and felt that things around him were unreal. Thinking he might be hypoxic, he started an emergency descent, checked his oxygen pressure and cabin pressurization and then tried to activate his emergency oxygen bottle. But he couldn't locate the green apple!

Passing 10,000 feet in the descent he began to feel better. By the time he was in the traffic pattern the pilot was back to normal and he landed without difficulty. Taxiing in, he held the mask away from his face and felt the flow of oxygen under pressure coming from it. Next he reached for the green apple—and located it without difficulty the first time.

Lesson: Your reach for—and location of—the emergency oxygen bottle green apple must be as sure and automatic as your reach for the ejection handle. When you need either one, you will be under severe stress and possibly partially disabled. The only way to assure that you'll locate these life-saving devices is practice, practice, practice.

THANKS A LOT!

F-4 from another service pulled up alongside of tanker to "thank tanker crew for fuel received". The F-4 was tucked in so close that the tanker navigator had to raise his seat to read the F-4's tail number. Then the F-4 pilot added military power to pull away.

F-4 tail section struck right engine of the tanker, then the radome. Jet exhaust then blew out the tanker windshield, injuring the pilot's and nav's faces. The collision apparently blew the third crewman out the top, along the ECM panel. Tanker pilot and nav bailed out successfully. Third crewman was not found. F-4 diverted and landed at a divert field.

Better recall that man's credit card.

FLIP CHANGES

Effective 20 August 1970, DD Form 175 instructions were revised. Significant changes have been made to the Stopover Flight Plan Procedures. See FLIP Planning Section II, North and South America.

As of 23 July 1970, the Military Training Route Charts in Section IIA will be distributed every 12 weeks. The booklet giving textual descriptions will continue to be revised every four weeks. Additionally, Section IIA has been designated as the primary source document for operation planning for the use of All Weather Low Altitude Routes. Concurrently, narrative information on Oil Burner and Heavy Wagon Routes will be removed from the FAA Airman's Information Manual.

LONG LANDING, SHORT RUNWAY

A C-7 was engaged on routine resupply to an airstrip in Southeast Asia. On the fifth landing of the day at that strip, the aircraft overran the runway and came to rest just beyond an embankment. The left main gear folded; the left engine and propeller were damaged. No materiel deficiencies were found in the propeller reverse or wheel braking systems. The primary cause was pilot factor; pilot used improper procedures which prevented a safe go-around and increased landing distance beyond the available runway.

Sqn Ldr Donald Melvin
Directorate of Aerospace Safety

Ops topics

CONTINUED

FIRE

Five minutes after level-off on a tactical airlift of cargo and passengers in Southeast Asia, a C-7A experienced manifold pressure and rpm fluctuations and noticeable vibration on Nr 2 engine. Zone two and three fire warning illuminated, and the flight mechanic reported flames coming from the engine cowlings. The engine was secured, and both fire bottles were required to cancel the fire warning. The aircraft landed safely 15 minutes later.

Investigation revealed that Nr 2 cylinder was split across the top, releasing the fuel/oil mixture and creating the subsequent fire and damage.

The photograph shows the extent and severity of the fire. This critical situation was controlled by prompt and faultless emergency procedures on the part of the aircraft commander and his crew. Can the same be said about your Dash One procedures?

Sqn Ldr Donald Melvin, RAAF
Directorate of Aerospace Safety

ANOTHER CHANCE

The pilot of this U-3A was scheduled for a 2 + 30 local proficiency flight; however, no specific route, altitude, or maneuvers were assigned. A local VFR flight plan was filed for 2.5 hours with five hours of fuel on board. Preflight and takeoff were normal and the pilot proceeded to fly a round-robin cross-country in the local area. After approximately 1.5 hours the pilot rolled into a 50-60 degree right bank at 150 mph indicated airspeed. During the turn he felt a sharp jolt and the aircraft rolled to near inverted. Before recovery could be completed, the aircraft hit some trees and ricocheted back into the air. The pilot checked for damage and initiated a climb toward the home base where he landed uneventfully about 15 minutes later. Primary cause of the accident was pilot factor.

The investigation revealed the following: the pilot was flying cross-country in the local flying area (150NM radius) without specifying route of flight. The pilot's home town was one of his enroute check points. Accordingly, it is significant to note that a 33 minute discrepancy existed between the time required to fly the route, as reported by the pilot, versus the enroute time determined by the investigating board.

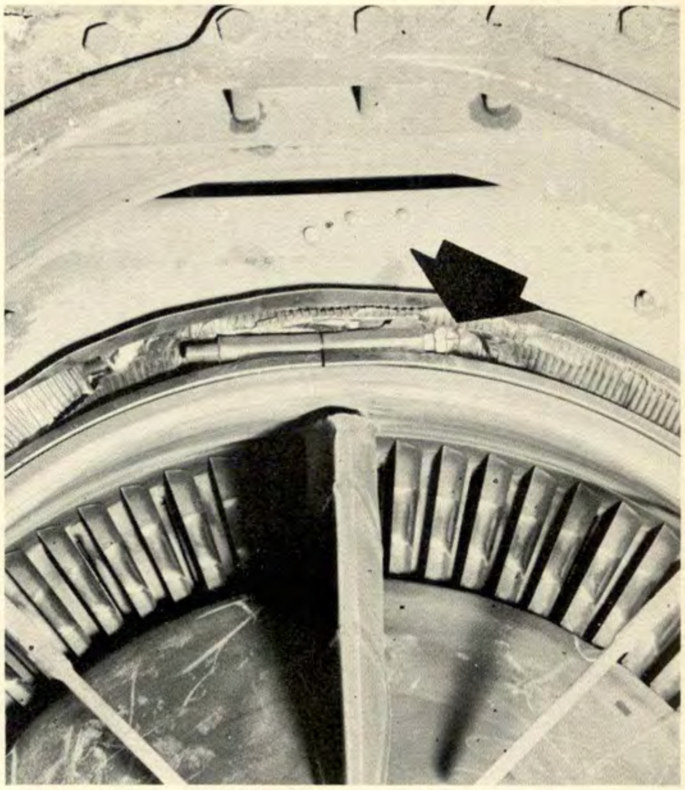
Minimum altitudes on low level navigation flights had not been established. Fuel management was unsatisfactory. Fuel at landing was as follows:
Right main—10 gal, Left main—2.75 gal, Right auxiliary—4.3 gal, Left auxiliary—14 gal.

The impact area could not be located although a thorough search was accomplished in the area specified by the pilot.

LESSON LEARNED—Low level maneuvering of aircraft is *still* dangerous, and adequate supervision of all aircraft operations is necessary.

Lt Col Thurman Lawrence, Jr.
Directorate of Aerospace Safety

the $25,000 nut



Note nut lying on top of bolt.

THE RIGHT WING SMOKING AND MISSING ONE TAILPIPE, THE B-57 CREW SET THEIR BIRD BACK ON THE RUNWAY.

Shortly after takeoff the B-57's Nr 2 engine overheat light started flashing. Then the pilot and navigator heard a loud thump and felt the airplane yaw to the right. When the pilot reduced power on Nr 2, the overheat light went out. He declared an emergency and headed for the ordnance jettison area. Each time he cautiously attempted to advance power on the bad engine, the overheat light came on at 85 percent—he decided to leave it at idle.

The bombs came off clean and the trip back to the pattern was without further incident. But when the pilot lowered the gear, the troublesome overheat light began flashing again. Only seconds from touchdown, and not knowing what had caused the thump and yaw, he decided he might need Nr 2 for directional control during the landing. He left it running until the landing was assured.

On the ground and clear of the runway, the crew shut down and unstrapped. At about the same time ground personnel saw that portions of the right wing were cherry red. The fire department cooled the wing with water so armament people could dearm the weapons.

Then the maintenance folks got a chance to check Nr 2 engine. And right away they found that the tail pipe was missing! Checking further, they found that a self-locking nut on one of the two tailpipe clamps had not been installed during the last engine change. The engine installation had been signed off by a mechanic; the inspection was signed off by a qualified (?) inspector.

Heat damage to the right wing was so extensive and severe that the entire wing had to be replaced—at a cost of $25,000 in manhours alone. ★

AIR AND WATER POLLUTION

What the Air Force is doing to improve our environment

The problems of pollution are not new, but they have recently taken on greater significance to those of us in government service. Last February, President Nixon, recognizing that the Federal Government has become one of the nation's worst polluters, issued an Executive Order to remedy the situation. The new Executive Order expands the scope of the pollution abatement program; the definition of facilities is broadened to include equipment, aircraft, vessels, and other vehicles. It requires identification of potential problems from new materials or processes and control of the resulting pollutants. The President has stated that his basic policy is that the Federal Government will take the lead in abatement procedures.

The new order enjoins federal agencies to avoid or minimize waste; this requirement encompasses the storage and handling of solid fuels, ashes, and petroleum products, as well as the prevention of spillage of pollutants. It encourages activities such as recycling of waste waters and the use of waste heat such as the Air Force is employing in its new electric power plant at Sunnyvale, California. There heat from gas turbines is being used with absorption chillers to produce more than 1,200 tons of air conditioning.

The new Executive Order 11507 requires pollution abatement in both existing and new facilities, with all existing facilities undertaking actions to bring them up to current standards by 31 Dec 1972. If the new facility will generate pollutants, any planning for new facilities must include provisions for abatement procedures, and the cost must be included in the overall cost.

In recent years, the Air Force has had numerous actions and programs dealing with pollution abatement for fixed facilities and in 1966 all Air Force installations were surveyed to determine water and air pollution deficiencies. These deficiencies were translated into a phased program that included not only Military Construction Program (MCP) projects, but also Organization and Maintenance (O&M) efforts.

The water pollution abatement program deals with both sanitary and industrial waste, to include the collection, treatment, and disposal of liquid wastes. The following 5-year program chart gives a good idea of the scope of this abatement program:

WATER POLLUTION ABATEMENT FACILITIES
($ Millions)

Program	FY 67-70	FY 71	FY 72	Total
MCP	19.8	12.8	19.0	51.6
O&M	1.8	0.6	0.5	2.9
Industrial	3.5	0.3	—	3.8
Total	25.1	13.7	19.5	58.3

The money for water pollution abatement has been or will be spent on expanding and improving existing plants, constructing new plants, and providing new or improved collection systems. At the present time, the real property value of our water pollution facilities is approximately $250 million, or two percent of our total real property inventory, an excellent demonstration of increased OSD interest in pollution abatement.

The present air pollution abatement program again deals with fixed facilities, principally heating plants and waste incinerators.

AIR POLLUTION ABATEMENT FACILITIES
($ Millions)

Program	FY 67-70	FY 71	FY 72	Total
MCP	5.3	1.3	25.1	31.7
O&M	1.6	2.3	2.7	6.6
Industrial	1.6	0.4	—	2.0
Total	8.5	4.0	27.8	40.3

The air pollution program is not quite as large as the water pollution program and execution has lagged due to a lack of standards. As standards become more firm, we can anticipate changes in the FY 72 air pollution program.

In addition to the water and air pollution abatement programs described, the Air Force has been active in the following areas: reduction of waste materials, improved disposal of solid wastes, improved operator training and proficiency, increased emphasis on the control and use of herbicides and pesticides, and in research and development of pollution control activities.

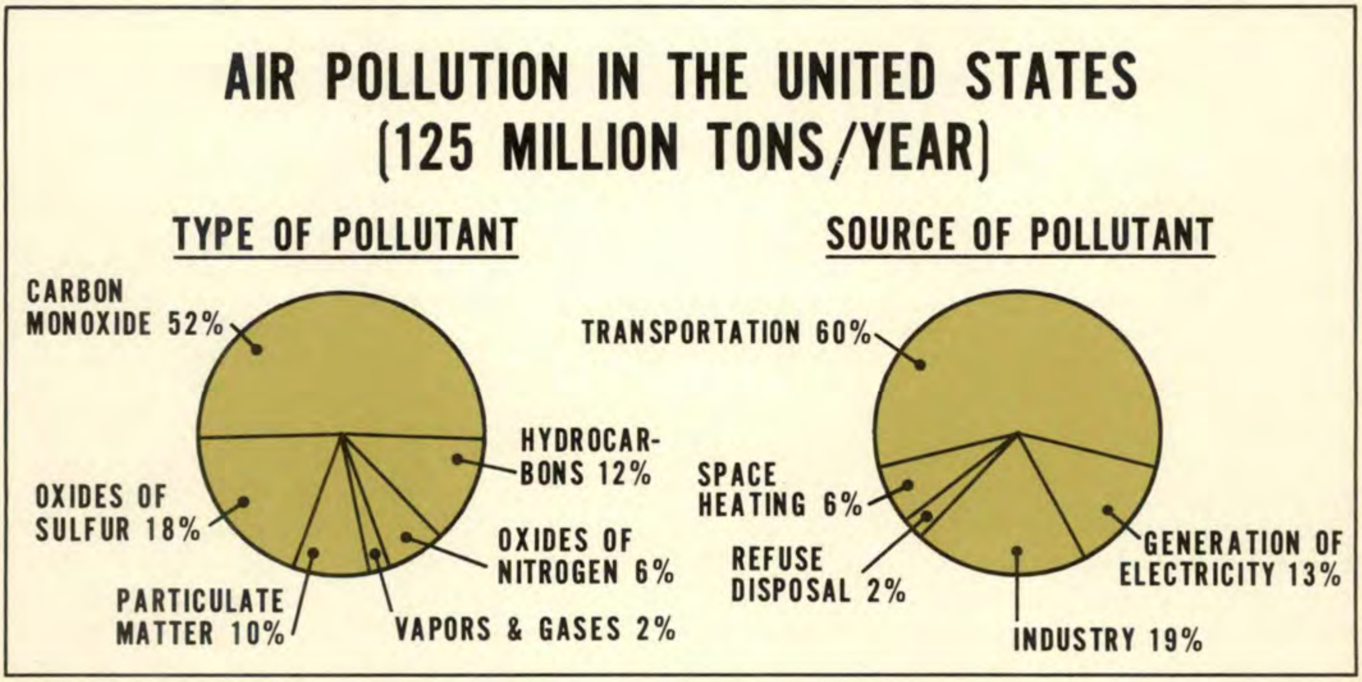
New Air Pollution Areas (Aircraft and Vehicles)

Before discussing the aircraft and vehicle contribution to air pollution, it would be well to review the type and source of air pollutants:

It is readily apparent that the burning of fossil fuels and the transportation industry, with its vast number of internal combustion engines, are the heart of the air pollution problem. Although the pollution from aircraft is only approximately 1% of the transportation contribution, this 1% takes on a more meaningful impact in the immediate areas of military or commercial airfields.

The pollution problem from aircraft has been accentuated by the introduction of jet aircraft engines; therefore, the Air Force must play a leading role in abating jet engine pollution since we possess 60% (32,000) of the nation's jet engine inventory. The jet engine, with its high-temperature combustor, produces nitrogen oxides, hydrocarbons, and other pollutants.

Until recently, adverse public opinion has been mostly in terms of



the aesthetic aspect of the problem; however, the National Emissions Standards Act, introduced by Senator Muskie, extends the coverage of the Clear Air Act to include aircraft and vehicles. Under this Act, the Department of Health, Education, and Welfare will be empowered (in coordination with the Secretary of Transportation for Safety) to establish standards and to enforce them.

In anticipation of this enforcement, the civil aircraft industry is developing engine combustors that do not smoke; the B-1 and F-15 aircraft will not be "smokers." Pratt and Whitney has developed modification kits for the JT8D engine (727, 737, and DC-9 aircraft) for smoke elimination. These modifications, about $4,500/engine, consist of leaning the fuel/air mixture and changing the hole pattern in the forward part of the combustor.

The initial Air Force research and development in pollution abatement from aircraft stemmed from the need to eliminate smoke to reduce detection by the enemy, with emphasis on the J-79 engine (F-4 aircraft) because of its use in Southeast Asia. Fuel additives have been tried, not too successfully. The other approach would be to modify the combustors. The Air Force is currently working with General Electric for design modifications of the J-79 engine that will cost approximately $35 million for fleet conversion, and also an improved combustor design for the TF-39, which powers the C-5 aircraft. The cost of modifying 81 C-5 aircraft for smoke abatement will be approximately $5 million. It should be noted, however, that the present state of technology limits all these modifications to smoke elimination and will not reduce other pollutants that are probably more noxious.

Aircraft engines produce about 1% of the transportation contribution to air pollution. Air Force and industry are working to reduce emissions.

The nation's No 1 air pollution problem, however, is the automobile. There are approximately 83 million automobiles, 17 million trucks and 500,000 buses in the United States; the Air Force has 165,000 motorized vehicles, power generators, and various types of aerospace ground equipment. So, we in the Air Force are only a small part of the nation's vehicle problem. The National Emissions Standards Act covers motor vehicles and charges HEW with developing standards; the development of measurement devices and means of enforcement have been the major factors delaying development of standards. Industry has included positive crank case ventilation in all new cars since 1968 and combustion has been improved through better engine timing. The Air Force is following the lead of industry and is emphasizing proper maintenance as a means of reducing pollution associated with our vehicular fleet.

In terms of research and development, the President's environmental message to Congress said that we must begin research on an unconventionally powered, low pollution automobile by 1975 if we cannot clean up the internal combustion engine. Research by industry is already under way on gas turbine, steam, electric gas, and dual fuel vehicles.

So, we now see that the Air Force is indeed quite concerned about environmental pollution. The policy of the Air Force can be stated as "providing leadership in prevention, control, and abatement of environmental pollution by accelerating corrective measures at Air Force installations and by cooperating with local communities in developing area pollution abatement programs." ★

This article was based on excerpts from a pollution abatement briefing presented to the Air Staff by Brigadier General Reilly, Deputy Director of Civil Engineering. Gen Reilly is now designated as Air Staff coordinator for pollution abatement. —Ed.

LOST and DOWNED

BRIEFS OF RECENT AIRCRAFT ACCIDENTS

OV-10 The pilots of an OV-10 and an RF-4C mutually agreed to an unauthorized post mission rendezvous for some air-to-air photography. Both pilots assumed standard separation criteria would be maintained and did not bother to pre-brief formation procedures. All went well until the OV-10 was positioned directly beneath the RF-4 for some vertical photos. Both pilots lost visual contact with each other and the aircraft collided. The RF-4 recovered with minimum damage; however, the OV-10 pilot had to eject.

F-100D Shortly after making a high gross weight takeoff, Lead made a 30 degree bank turn to avoid a thunderstorm. The wingman failed to see Lead initiate the turn and got out of position. To regain position he had to make a tight turn. To avoid a weather buildup, he continued to tighten the turn until the aircraft stalled. Stall recovery controls were applied and the aircraft entered the clouds. The pilot was unable to regain control and ejected. Pilot failed to maintain visual contact with Lead, stalled the aircraft and was unable to recover from an unusual attitude. Correct flying techniques, at any one of three stages, would have prevented loss of the aircraft.

F-106 Target aircraft was at 49,000 feet as part of a strike force in support of an air division exercise. The F-106 pilot was working with a high gross weight airplane, requiring at least 1.23 mach for normal maneuvering in this environment. The required maneuvers were not normal, his indicator was .93 mach, the stall was sudden, the spin was flat, the ejection was successful.

F-4D Due to altimeter malfunction, the Aircraft Commander executed a missed approach from a GCA. While in a right hand pattern for a second approach, he inadvertently shut off the left engine master switch. The aircraft went into a left bank and the AC ordered bail out but he failed to eject within the safe envelope and was fatally injured. The AC mistakenly turned off the left engine master switch rather than the static pressure correction switch. After inadvertently shutting off the engine, he failed to use correct emergency procedures and lost control. Improper procedures and techniques turned a minor incident into a fatal error.

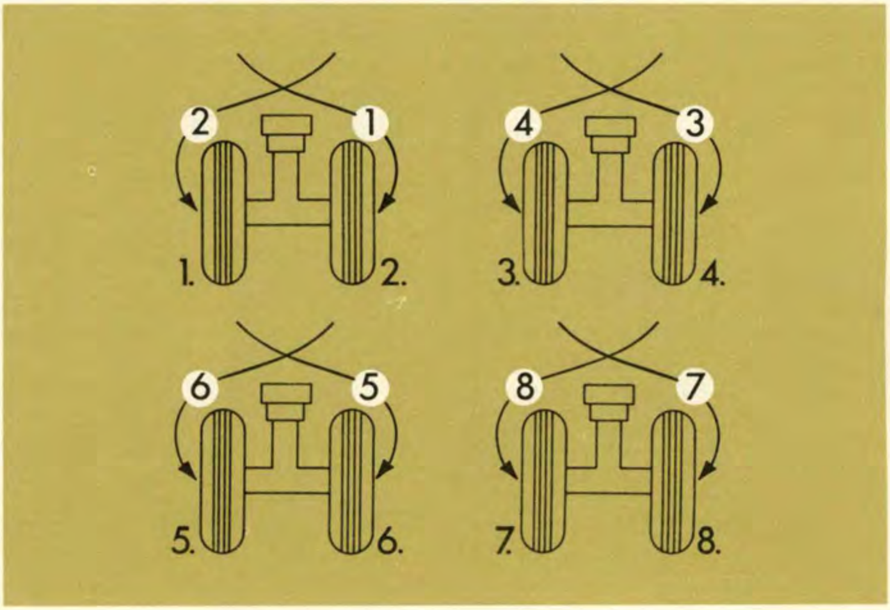
REMINDER

U.S. aerodromes/facilities times of operation reflect Greenwich Mean Time (GMT) expressed as "Z" time. Daylight Saving Time is in effect from 0200 local time the last Sunday in April to 0200 local time the last Sunday in October at all aerodromes in the conterminous U.S. except Arizona and Michigan. During this period, the aerodromes/facilities operate one hour earlier than the "Z" times indicated.

Tech topics

BRIEFS FOR MAINTENANCE TECHS

cross up



YOU HAVE HEARD the old saying, "He got his wires crossed." I'm sure there is at least one B-52 crew that will remember a tale about crossed wires for some time to come.

The big bomber blew a tire on second application of the brakes. This happened with anti-skid on. It subsequently blew three more tires in close succession with the anti-skid still on. With 3000 feet of runway left, the pilot turned the anti-skid off and brought the big bird to a safe stop without further incident.

Investigation revealed that Nr 8 tire had blown first, followed by Nr 1, then 5 and finally Nr 4. Inspection of the anti-skid electrical system revealed the wires crossed at all four main struts. This cross-wiring caused one wheel of paired wheels to respond to the anti-skid detector of its mate. Thus when the anti-skid detected a skid on Nr 1, it would release pressure on its mate, Nr 2, allowing it to run free (unbraked) and feed full pressure to Nr 1. Result: a blowout. Records indicate there had been nine separate maintenance actions performed on the landing gear system, in the prior three months, with no reference to any wiring problems. However, proper tech data procedures could have prevented this incident. ★

flameout

WHILE A STUDENT in a T-37 was performing a pitchout during traffic pattern stall series, the left engine flamed out. A normal restart was accomplished, and they RTB for a landing. However, when the student retarded the throttles for landing, the left engine flamed out again.

The problem turned out to be a clevis pin that was missing from the left throttle in the center throttle quadrant. With this throttle disconnected, the idle stop feature was eliminated and as the student retarded his left throttle to the lower stop, it placed the fuel control in the off position. Further investigation revealed that when TCTO 1T-37-569 was completed, the cotter pin was omitted at the connecting point between the push rod assembly and bell crank.

This is an example of the kind of maintenance goof that can cause a disaster. That's why we have inspectors. Where was the one who should have caught this error? ★

tidy up the office

USUALLY the letters FOD conjure up visions of jet engines gulping tools left in intakes or junk dropped on the ground. And that is serious business. Equally serious is the foreign object left in the cockpit. To illustrate:

• The right engine of a T-37 flamed out at 17,000 feet and couldn't be restarted. The problem: a piece of cotter key left in the cockpit. When it got across terminal studs 3 and 4 on terminal strip 33 behind the IP's seat, it caused a short circuit which closed the fuel valve.

• Another T-37. During a high speed dive recovery the student attempted to retard the throttles to idle but the left throttle had a mechanical block at 80 percent. It would move forward all right, but not back. After landing, the engine was shut down with the fuel T handle. The cause: a loose metal cap had lodged in the left quadrant and restricted throttle movement.

• On three different occasions pilots encountered flight control problems in an F-106. The first two resulted in ground aborts. In one case a binding magnetic damper was replaced and an FCF flown okay. A few days later a pilot ground aborted again with a binding stick. After he cleared the runway he could not duplicate the malfunction. Maintenance replaced the hydraulic elevon pack valve and the artificial feel unit. A successful FCF was flown. The aircraft then flew three sorties with no discrepancies. The third control problem occurred during flare for landing. Fortunately, the pilot was able to land okay and a depot flight control team dug into the airplane. They found a stray ¾ in. bolt under the floorboard was causing the trouble.

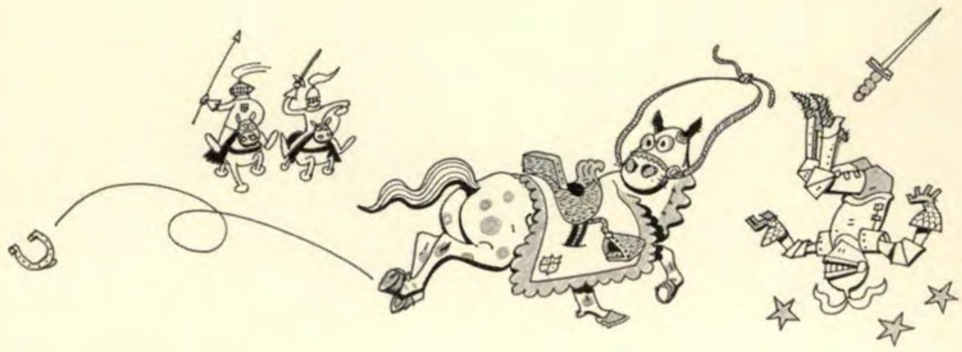
After you fix it up, CLEAN it up! ★

flashing light

AN F-101 PILOT was working a target area when the Number Two engine burner compartment overheat warning light came on. The throttle was reduced to idle, but the light continued to flash. The engine was then shut down, and the pilot made a single engine recovery at an alternate base.

Inspection of the warning system revealed a defective lower aft overheat warning loop. The loop had been recently inspected during other maintenance and apparently had been bent or kinked at that time, causing a reduced resistance in the line. After the defective loop was replaced, the aircraft was flown to its home station without further fire warning problems.

Fire warning systems perform an extremely important function and should be treated with great respect. Do the crew, the Air Force and yourself a service by making sure they are not damaged during other maintenance. If the circuit is damaged inadvertently, get a competent person to inspect and make any necessary repairs.



for want of a nail - - -

WE ALMOST LOST one of our attack aircraft the other day for a strange reason. Would you believe that a voltage regulator could be involved in the chain of events that led to a complete hydraulic failure. It seems that a Dzus fastener was missing from the cover of the regulator. The cover shifted, thus allowing a shock mount screw to chafe against a hydraulic pressure line. It took weeks, but the line finally wore nearly through. When the pilot actuated the speed brake, the pressure demand ruptured the line. The cockpit filled with smoke and fumes, but luckily there was no fire and a successful emergency landing was made. The incident report says that maintenance and supervisory personnel were briefed on this occurrence and that emphasis was placed on quality workmanship and supervisory responsibilities.

Let's hope that the lesson will be remembered as a perfect example of how a seemingly unimportant item nearly caused the loss of an aircraft. Remember the horseshoe nail that lost a war? ★

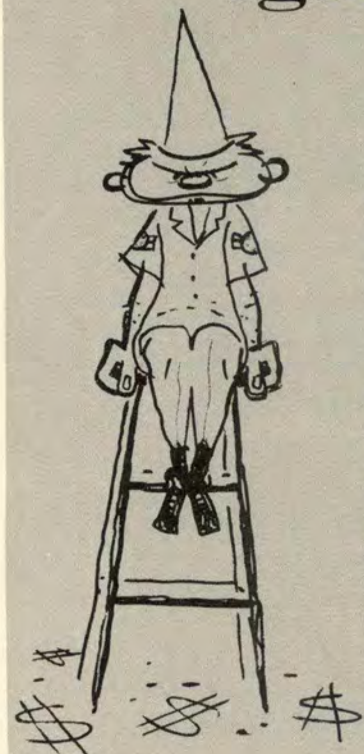
(Lt Col Robert Picht, Directorate of Aerospace Safety)

that sinking feeling -- FOD

While servicing an F-101 landing gear accumulator, a mechanic left a wrench in the intake area. An intake inspection was made but the wrench was overlooked. After about three minutes of engine operation, unusual sounds were heard. The engine was shut down and the wrench was found. Only $30,000 worth of damage had occurred. Only $30,000 for one little wrench!

Too bad all personnel who work in areas where FOD is a potential killer can't experience the sinking feeling that this mechanic must have felt, without going through the actual experience. There would surely be a lot less FOD. ★

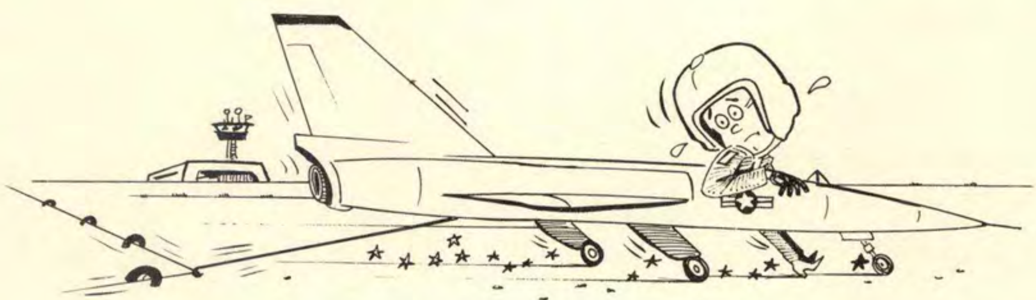
ignorance is costly



DURING A C-141 functional check flight the landing gear system was being checked for proper operation in accordance with TO 1C-141A-6CF-1CL-1. The aircraft configuration was flaps—takeoff and approach, landing gear up and locked. Airspeed was maintained at approximately 160 knots. Upon activation of the emergency extension system for the left main gear, following extension of the right main, the flight engineer in the cargo compartment observed a large quantity of hydraulic fluid on the floor in the vicinity of the Nr 2 hydraulic reservoir and found it had ruptured and the Nr 2 hydraulic system was no longer operable. The nose gear was extended by the emergency extension system, all three gears were pinned down and the aircraft was landed without further mishap.

Someone had placed a threaded metal cap on the hydraulic reservoir relief valve, causing pressure to build up in the reservoir. Since the reservoir was designed for only 28-35 psi, it probably ruptured during gear retraction when it was subjected to overpressure.

Placing a metal cap over the exposed threaded area of the hydraulic reservoir relief valve would be a logical mistake for someone who didn't know what he was doing. But how come we have people working on our multimillion dollar aircraft who don't know what they are doing? ★



look ma -- no brakes

STRAPPED IN and fired up, the F-106 pilot started to taxi out for takeoff. The brakes checked good as he pulled out of the parking spot. About two minutes later, as he tried to slow down, he found that the pedals went all the way to the floor —and the bird didn't slow one bit!

Some good, fast thinking prompted him to call Tower for immediate clearance onto the runway when he saw he couldn't stop in the runup area. Then, going down the runway he did everything he could think of to bring the airplane to a stop; pumped the brake pedals 'till his legs were sore—and then some. Finally, with 2000 feet to go to the BAK-12 arresting gear, he lowered the hook and made an uneventful, ten-knot arrestment.

Unfortunately, the F-106 doesn't have a backup or emergency brake system. And unhappily, the crew chief set this one up (it could just as easily have been a real messy accident) by allowing air to enter the brake system when he serviced it with hydraulic fluid. ★

The Weather Menu

Mediocre Forecast	$ 2.75
Good Forecast	$ 5.00
Good Forecast w/winds — Fcstr checks charts	$ 8.50
Good Forecast w/winds — Fcstr checks w/Shift Chief	$10.00
Good Forecast w/winds — Fcstr checks w/Observer	$12.50
Excellent Forecast	$20.00
Excellent Forecast — Fcstr checks radar set (Additional cost 35¢ every 3 minutes for radar set)	$23.00
Excellent Forecast — Fcstr runs around and screams at Observer for data	$29.95
Excellent Forecast — DETCO looks over Fcstr's shoulder	$33.50
Excellent Forecast — DETCO runs around screams at Observers for data	$40.00
Excellent Forecast — Observer brings data	$?? (No price set as this has never happened)
Superb Forecast — Not available at this Station	

Charges by Distance

Any clearance within the United States — Flat Rate	$19.95
(Special on Local Clearances)	$12.95
Overseas Flights (for first 1000 miles)	$20.00
(Additional charge for each additional 100 miles)	$ 1.50

★ ★ ★ ALL PRICES ABOVE ARE FOR VFR FLIGHTS ★ ★ ★

Add 25% for IFR Flights

★★ ★★ EXTRAS ★★ ★★

Weather — Four hours old or more	$ .95
Weather — Three hours old	$ 1.95
Weather — Two hours old	$ 4.00
Weather — One hour old	$ 6.00
Current Weather	(Price set by forecaster on duty — 10% to observer)
Winds — 10,000 feet from altitude	$ FREE OF CHARGE
Winds — 7,000 feet from altitude	$ 1.50
Winds — 5,000 feet from altitude	$ 3.00
Winds — 3,000 feet from altitude	$ 5.00
Winds — at altitude	$ 7.50

ADDITIONS TO ANY FORECAST (Except Mediocre Forecast)

Observer yelled at by Forecaster	$10.00
Forecaster yelled at by Shift Chief	$15.00
Shift Chief yelled at by DETCO	$25.00

(Ask about our other specials at the Stateside Desk)

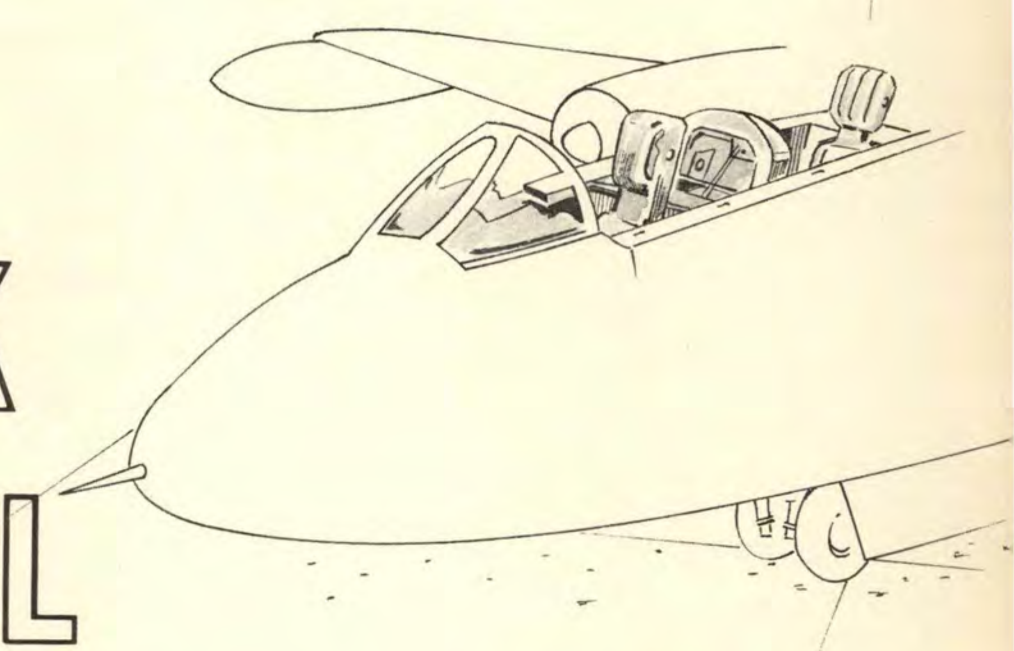
SPECIAL CLEARANCES THROUGH SEVERE WEATHER

AREAS $75.00
(This includes agreement to pay attorney fees for forecaster)

SPECIAL FOR HELICOPTER PILOTS $39.95
(A detailed map of all roofs in 500 mile radius of station where girls and women sunbathe)

The same map is available showing all nudist camps $99.95

Courtesy Det 1, 17th Weather Squadron
Tinker AFB, Oklahoma



JACK OF ALL TRADES

The thing that makes transient maintenance such a demanding job is the great diversity of equipment that you have to work with. Most of us—aircrew types, ground maintenance types or specialists—are associated with only one airplane at a time. After only a short get-acquainted period, we learn the eccentricities and peculiarities of that one bird. We learn where the danger and trouble areas are.

Not so for the Transient Alert types. Parking, servicing and starting many different types of aircraft every day, they quickly learn a cautious approach to business. Their secret to success must be something like: If you don't know it, don't touch it—until you've looked it up and understand it. Until you know a complicated machine like a modern airplane, you have no way of telling what will happen when you pull this little knob or push that little button. Even though you've seen a knob or button just like it on another airplane—and know just what it would do on that other airplane—you have no assurance it will do the same thing on this unfamiliar airplane.

Take a case in point. It's an old story, has happened more times than I'd like to recall, but it just happened again recently.

B-57 had been parked on the transient line for about a day awaiting parts for a radio write-up. A comm-nav troop went to TA looking for the aircraft forms and was told they were in the cockpit of the B-57. Nobody offered to go to the airplane to assist him. When he reached the bird, he found the canopy closed. He found some instructions about the canopy printed on the side of the fuselage and followed them—opened the access panel, grasped the T-handle, unreeled the cable and pulled gently—until the canopy jettisoned!

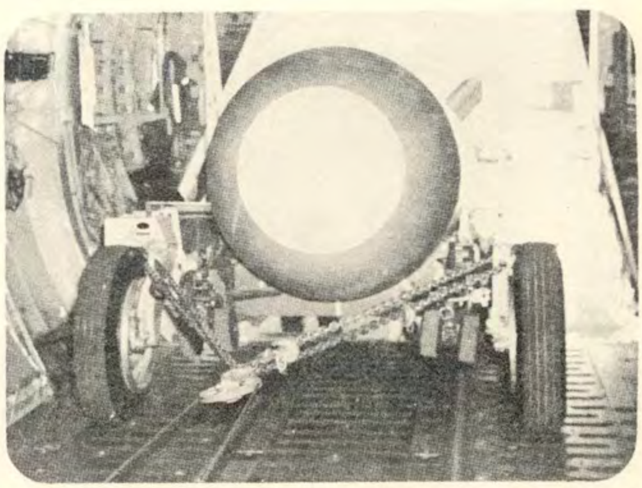
You say he should have known better? He'd never seen a B-57 before. But yes, he should have known better than to touch, open, pull, push or handle anything on that B-57 until he was certain it would do what he wanted it to do.

The Transient Alert troops should have known better, too! When the comm-nav specialist walked in looking for the forms, they should have accompanied him out to the airplane. Hopefully, *they* would not touch, open, pull, push or handle anything on the bird without knowing exactly what it would do. ★

NUCLEAR SAFETY AID STATION

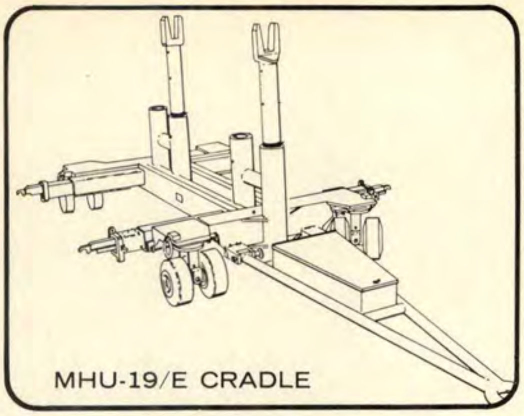
STOP, LOOK, AND LISTEN

During loading and unloading operations on the C-141A, several separate problems have arisen around the winch and associated equipment. In one instance, due to improper repair and maintenance, a winch failed and the winch cable broke while pulling an MHU-7/M trailer loaded with nuclear weapons up the ramp. Proper maintenance and load crew inspection of equipment would have rejected the winch and the cable would not have broken. In another instance, the improper installation of a whiffletree snatch block to the floor resulted in the installation failing during off-loading. In a third case, while pulling an empty MHU-7/M trailer up the ramp to off-load a weapon, the cable came off the track of the whiffletree snatch block and cut the cable severely, requiring a cable change. Proper installation of the whiffletree snatch blocks to the floor attachment devices would have prevented the two latter problems.



HERE WE GO AGAIN

Both break pins sheared when a B43 weapon was lowered by the MJ-1 lift truck prior to release of the F-104 forward trapeze. Apparently, the load crew chief did not verify that all preceding steps had been accomplished prior to proceeding to succeeding steps. Another team was decertified. How many times have you heard —"FOLLOW THE CHECKLIST!"



MHU-19/E CRADLE

BOLSTER BENDS BOMBS

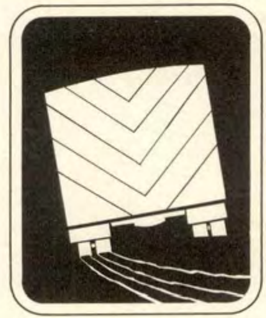
How can a post of an MHU-19/E cradle dent a weapon in an MHU-20/C clip-in? You can probably think of many ways, but one of the most improbable happened recently. After the MHU-20/C was secure in the B-52 bomb bay, the MHU-7/M trailer was lowered until the posts of the cradle cleared the dovetail blocks of the clip-in. At that time, there was sufficient lateral movement of the cradle to allow the aft post to strike a weapon. Why? Because the aircraft was not level with the ramp and misalignment caused side pressures on the trailer arms. This pressure was released as the cradle was lowered and the lateral movement occurred.

The misalignment was probably due to a 5-thousand pound fuel imbalance and the fact that the front wheels were turned at a 45 degree angle. The technical order doesn't say much about fuel imbalance or wheel position, but why not have the best conditions possible? Don't try working in less ideal conditions than are really necessary. You can't control the weather, but maybe you can control aircraft position. When you have to make large corrections on the trailer to get proper alignment of the clip-in with the bomb bay, you may want to take another look at the situation.

UNAUTHORIZED PROCEDURES-BEWARE!

A reentry vehicle (RV) had been demated from the missile and was being prepared for movement to a support base. The Coles crane swung the RV to position it over the RV transporter and in the process hit the support frame assembly of the RV transporter causing damage to the RV ablative shield. The RV team failed to allow adequate clearance between the RV and the transporter support frame assembly. Investigation revealed that the RV handling procedures used were untested and not in consonance with approved TO procedures. Fortunately, no serious damage occurred; however, it cannot be overly emphasized that only USAF-approved procedures should be used when handling RVs. Carelessness coupled with the use of unauthorized procedures can only lead to trouble. BEWARE!

NUCLEAR
SAFETY
AID
STATION



MUDDY ROAD AHEAD, USE CARE!

Two RV vans at two different locations recently had their rear wheels drop off the shoulder of the road into deep mud. Heavy rains had caused the soft road shoulders which normally would not have given away. Had the vans tipped over, the various potential safety hazards are evident. Drivers, when road conditions deteriorate, be *extra* alert, use caution, and exercise to the maximum your expertise in which the USAF has placed its confidence.

TIRED? BE ALERT AND CAUTIOUS

During download of a reentry vehicle from a reentry vehicle/guidance and control van at the storage area, the lightweight spacer attaching brackets were sheared. After downloading, inspection revealed that the spacer adapter ring had not been aligned properly allowing the adapter ring to rest on the lightweight spacer brackets. Result? The attaching brackets were completely sheared. A contributing factor to this incident was probably crew fatigue. The crew had been on continuous duty for 12½ hours. Fatigue and misalignment become blood brothers, given sufficient time. Only alertness and caution to the end of the job will conquer such hazards.

WET FEET

Preparations were made to move a B43 on an H-695A Bomb Handling Truck from the maintenance and inspection building to a storage igloo. The tug had been backed to within approximately two inches of the tow bar preparatory to hookup with the tug's pintle hook. The tug had been stopped on the outside of a slightly elevated lip of concrete at the entrance to the maintenance bay. As the tug driver backed the tug over the concrete lip to hook to the tow bar, it slowed perceptibly, then accelerated backward. The tow bar was shoved to the floor and scraped the weapon as it was pushed aside about 45 degrees. The maintenance team member holding the tow bar injured his knee while attempting to get out of the way. The tug had been outside where it had been raining and the brake pedal and driver's shoes were wet and slippery. While backing over the concrete lip, the driver's foot slipped from the brake to the accelerator, causing the tug to lurch backward at a most inopportune time. Several cases of this type have been reported which resulted from a combination of slippery brake pedals and shoes. In this case, a man was injured and a weapon was damaged. When shoe soles are wet, take special care when driving any vehicle.

MAIL CALL

POMOLA

Reference your February 70 issue, page 5, the POMOLA.

Possibly you will recall that during World War II we used a somewhat similar system, especially effective at night. It consisted of three lights mounted vertically. (Somewhat similar to some of the angle of attack indicators used in some aircraft.) A high approach could see only a yellow light, a low approach could see only red light, while a proper glide slope could see the "GREEN." I enjoyed using it in an area of comparative blackness, such as that found in isolated areas. It should be most usable anywhere in the world at a very low cost—and it is most effective.

B. L. VerSteeg, LtCol (Ret)
SAAMA, Kelly AFB, Texas

POOR CAMOUFLAGE

Though not in the aircrew, maintenance or support area (I'm a ground radio maintenance type), I am an aviation nut and enjoy reading all material on aviation, both military and civilian. I read every copy of your magazine I can find and have been a Rex Riley fan for years.

This may have been brought to your attention already, but I think you should have your illustrator for the "Ops Topics", page 38 of the June 1970 issue, read TO 1-1-4. Camouflaged aircraft do NOT carry the "U.S. AIR FORCE" marking on the side, the "USAF" on the wings, or the full-sized national markings (Star and Bar) on the wings or fuselage, as shown in the drawing of the F-4.

As a plastic scale model builder, I try to make my aircraft as accurate as possible and have found that the aircrews, maintenance technicians and wing/squadron commanders will go out of their way to help you with a model of "their" bird.

Thank you for your time and keep up the excellent work on the magazine.

SSgt George F. Rumple, Jr
APO San Francisco 96326

Okay, eagle-eye, you got us! And I think you're the only one that caught it. At least, yours is the first letter. The extraneous markings on the F-4 just slipped by us. We tried to think of some way to sneak out of it—saying that the shading on the fuselage wasn't camouflage paint, just reflections of the clouds, or something. But let's face it, we goofed.

It's good to know that our readers take that kind of interest in AEROSPACE SAFETY. It makes each month-long panic worthwhile. So thanks very much for writing. And yes, we'll have a short session on aircraft markings with the art guys.

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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.

MAJOR HARRY E. MILLER

964th AEW&C Squadron
McClellan AFB, California

Major Miller and crew were flying from Perrin AFB, Texas, to McClellan AFB at 18,000 feet in a C-121G aircraft when Nr 3 propeller ran away from 2500 to 3650 rpm. The aircraft was slowed from 200 to 150 knots but repeated attempts to feather the engine failed and oil was emerging from stacks and cowl flap area.

The crew advised Air Traffic Control of the situation and, with darkness setting in, thunderstorms and mountainous terrain in the area, they were assigned 12,000 feet and flight routing to Luke AFB, Arizona.

Oil quantity and pressure dropped to zero and seizure procedures were initiated. Nr 4 engine was feathered to avoid losing a second engine when seizure occurred. As engine Nr 4 shut down, the remaining two generators failed resulting in a loss of DC power.

The electrical load was reduced and generator Nr 1 was reset. Generator Nr 2 would not reset. The aircraft descended to 10,500 feet, and Major Miller elected to restart Nr 4 engine in order to regain some altitude and an additional generator. As Nr 4 started, engine Nr 3 seized in the full low pitch position creating maximum propeller drag.

As the flight engineer was advancing Nr 4 throttle, the throttle cable broke between the pilot's and engineer's positions and the manifold pressure stuck at 44 inches. The engineer's throttle would advance only and 2600 rpm, the maximum continuous rpm permitted by the Dash One, had to be maintained on engine Nr 4 for the remainder of the flight to prevent overboosting. Electrical power reduction was continued, and Nr 4 generator was reset.

Major Miller's concern then developed for a previously discovered oil leak in the Nr 1 propeller governor housing. The flight continued via low altitude airways and on short final, Nr 4 was feathered to maintain directional control after landing. The brake selector was placed to emergency and the emergency hydraulic cross-over was used to supply nosewheel steering.

Engine Nr 3 analysis revealed failure of the propeller governor pilot valve bearing followed by breakage of the speeder spring in flyweight assembly. This caused maximum oil pressure to be directed to the low pitch stop causing runaway and the inability to feather. High rpm on engine Nr 3 caused internal failure followed by complete loss of engine oil.

Major Miller's crew which included 1st Lt Bob E. Murphy, copilot; 1st Lt Paul G. Foster, copilot; MSgt Roger W. Hurdle, First Engineer; and SSgt John A. Munk, Second Engineer, exhibited outstanding skill and judgment in an emergency which could have resulted in the loss of life and an expensive aircraft. WELL DONE! ★

BIRD SEASON IS THE REASON...

VISOR DOWN