flying SAFETY

DECEMBER 1989

1980's FLYING SAFETY RETROSPECTIVE

- SIX MINUTES TO ETERNITY
- THE TROUBLE WITH ALCOHOL
- ONE AIRLIFTER'S PERSPECTIVE

THERE I WAS

■ As a young lieutenant, I was taxiing in trail with my flight commander for the flight to the home drome. The weather had improved to 1,500 feet overcast with 3 miles visibility; however, rain showers had left the ramp wet.

While taxiing cautiously, I discovered the perks of attempting to stop on newly paved asphalt. My flight lead stopped for quick check on a narrow taxiway with two cars on one side. As I began braking, my aircraft started to fishtail, with every attempt yielding the same results. Unable to stop, I directed lead to move forward. The urgency in my voice resulted in his moving while the quick check on his jet was still in progress. Fortunately, my aircraft came to a stop before further action was required.

After taxiing my jet for a brake check, we were cleared for takeoff and subsequently taxied into departure position. Twenty seconds after lead released brakes, I began my takeoff roll and once safely airborne, established radar contact. Following squadron standards and as briefed by lead, upon reaching 350 KCAS, I set the power at 850 degrees FTIT and complied with standard radar trail departure procedures. As the saying goes, I was "fat, dumb, and happy" following lead on the published SID (standard instrument departure).

If you haven't figured it out by now, it wasn't my day. Instead of maintaining my situational awareness by closely monitoring our position on the SID, I depended on my radar to follow lead. You guessed it — I lost my radar contact. I informed lead of this while attempting to re-establish radar contact. A glance at my flight instruments revealed my disorientation. My aircraft was passing 3,000 feet MSL in excess of 20-degrees nose high pitch with 190 KCAS, and power set at 700 degrees FTIT. Immediately, I confirmed the unusual attitude and executed recovery procedures. Suffering from a severe case of the "leans," feeling as though I was in about 70 degrees of left bank, it was all I could do to keep my jet in a wings level climb.

Upon reaching VFR conditions, passing through 16,000 feet MSL, I was able to reorient myself and rejoin with lead. The remainder of the flight was uneventful.

In summary, this "nondemanding" mission was truly a learning experience. Hopefully, you already know trail departure procedures do not require the use of a radar. In fact, my dependence on a radar contact resulted in my spatial disorientation and unusual attitude, not to mention the "leans" that followed. The bottom line . . . if my jet had been nose down instead of nose up, you wouldn't be reading this. ■

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page 5

page 8

page 12

SPECIAL FEATURES

REGULAR FEATURES

DEPARTMENT OF THE AIR FORCE • THE INSPECTOR GENERAL, OSAF

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Six Minutes To Eternity

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■ It started as a searing flash. Instantly, an intense explosion of fire erupted throughout the cargo compartment. Fuselage windows ruptured from overpressure, sending projectiles of all shapes and sizes flying throughout the cabin. Sensing an explosive depressurization, the cargo compartment warning horn sounded, and oxygen flow was initiated in the troop oxygen system — the added source of oxygen only serving to fuel the inferno.

Amid complete chaos, screams of agony were barely heard above the blast of outrushing air. The pain was excruciating and rendered the 37 troops completely helpless as the intense heat began to melt interior plastics, disintegrate upholstery, and scorch human flesh.

Stunned from the explosion and dazed with shock, the aircraft commander struggled to reduce the

throttles as his nomex flight suit began to char in the intense heat and his skin melted, exposing nerve endings. Acute impulses of pain streaked throughout his body. Meanwhile, the overspeed warning began to shriek as the stricken Starlifter accelerated toward its maximum design speed and the ground below.

Without reason, the landing gear extended, and the gear doors were immediately torn off by the airstream. The pilot pulled for his life on the yoke in a last, desperate attempt to regain control.

The Aftermath

The shocking reality of the smoldering C-141 hulk was difficult to accept. There it was, the U.S. Air Force's first Class A mishap of the year, a sobering wreck in the far corner of a freshly plowed field. The main fuselage had ruptured in several sections with the flightdeck completely obliterated, virtually compressed against the upward slope of an irrigation canal. There were gaping holes along the entire stretch of the upper fuselage with sections of aluminum structure having disintegrated from the intense heat. Amid the now gutted interior, the stench of burned flesh was overwhelming.

The death toll was too grim to think about. Thirty-seven U.S Army troops and six crewmembers, all dead and now badly burned beyond recognition — except one. A lone survivor had miraculously escaped from the wreckage and now lay in a coma. Perhaps he would hold some clue.

The Investigation

Postflight analyses of the cockpit voice and flight data recorders were uneventful — except for the last 6 minutes of flight. The aircraft was climbing to cruise altitude when there was some garbled talk of leaking cargo from one of the pallets and a request for the no-smoking light.

The lone survivor had stated that he noticed fumes, similar to paint thinner, as he went forward to the lavatory. Shortly after closing the door, a loud explosion occurred, followed by intense heat. Fearful for his life, he had crouched down gasping for fresh air coming from the air conditioning outlet. That's all he could remember prior to regaining conciousness in the hospital.

A statement from one of the troops who had the good fortune of traveling on another aircraft indicated he had helped pack a 5-gallon container of acetone on one of the pallets, along with a spare NICAD battery and a box of day/night flares.

The Regulation

AFR 71-4, Preparation of Hazardous Materials for Military Air Shipment, contains the following information:

"Acetone is classified as a flammable liquid that must be stored in a cool, well-ventilated area and properly packaged in a container that is tightly closed to prevent evaporation. As such, it must not be stored near sources of heat, flames, sparks, combustible materials, or oxidizing agents. (A flammable liquid is any liquid having a flash point below 100 degrees Fahrenheit capable of giving off a vapor in sufficient concentration to form an ignitable mixture with the air near the surface of the liquid.) Furthermore, acetone is identified as a "single-daggered" item which requires *operational necessity approval* and must be transported on *cargo-only aircraft. Passengers are not permitted.*

Electrical storage batteries containing electrolyte acid or alkaline corrosive battery fluid must be completely protected so that short circuits will be prevented and must not be packed with other articles."

All such materials listed in AFR 71-4 must be packed, inspected, and certified safe for air shipment. Furthermore, a red-labeled DD Form 1387-2 (special handling and certification form for hazardous cargo) must be attached when required. This certification must be signed by a formally qualified per-

continued

son with the flight crew making the final determination of acceptance. A review of the required papers at the originating air terminal revealed no such records were on file.

The Report

Applicable excerpts from the mishap investigation report follow:

"The cause of this mishap was the inflight ignition of volatile fluid or vapors that were emitted from an improperly packaged and leaking drum of acetone that never should have been transported. The ensuing explosion and fire quickly engulfed the aircraft interior and rendered both passengers and crew entirely helpless to combat such an inferno . . . Although the exact source of ignition is unknown, it is assumed to have originated from an adjacent NICAD battery, contact with electrical wiring under the flooring, or a source of flame from the passenger smoking section . . . Further investigation revealed the acetone had pooled in the cargo rollers which ran from pallet positions 6 through 13, and apparently had started to saturate segments of the under floor area prior to ignition . . . Impact forces of the crash landing were within human tolerances, but incapacitation or death precluded any type of evacuation.

". . . This is a particularly tragic mishap since it could have been prevented had prescribed regulations simply been adhered to. Furthermore, had the cargo processing personnel applied basic common sense and elementary supervision, this catastrophic loss of 43 lives and a valuable aircraft could have been avoided."

The Frustration

Later, at an impromptu aircrew meeting, an obviously distraught and fanatical safety officer just couldn't hold back anymore.

"It was by far the most horrible thing I've ever seen. Charred figures slumped over in their seats. Near-shapeless forms clumped together around the emergency exits. My primary duty is to prevent this kind of thing, not investigate it. I must not be doing my job right. This absolutely senseless, careless, and ignorant act will now be long remembered as one of the single worst aircraft disasters in Air Force aviation history. And it was so avoidable.

"Doesn't anyone out there read all those safety reports on hazardous cargo? Or have there been so many, all those bright red flags waving in the breeze, that we've all become insensitive to the obvious? This falls into the rationalization that safety is paramount — until it interferes with operational necessity. No sooner do we begin to educate one base than the same stuff shows up on the next flight. And all that business about commitment and mission requirements . . . That's great, but there's a right way to deploy the gear or pick it up at the destination site.

"And as for those reps that sign and certify that no such hazardous cargo has been packed, they're just going through the motions. They really don't know what they have. Batteries, flares, explosives, corrosive and flammable fluids, fully inflated tires, unpurged engines and servicing units, and compressed gases. It goes on and on.

"When are people going to stop trying to sneak stuff through — don't they realize they're endangering themselves? After all, everybody flies on a C-141 some time or another. The whole system of checks and balances just broke down. We really blew it. And even worse, we should have seen such a thing coming."

The Reality

Obviously, the scenario you've just read is fictitious, but could have occurred no less than 16 times in 1986. On 16 occasions last year, Military Airlift Command crews flying C-130s, C-141s, and C-5s were faced with cargo leaks of various forms while airborne, and crews were forced to declare emergencies and make unscheduled landings 50 percent of the time.

Of even greater concern is the number of occurrences of cargo mishandling which go unreported, or were discovered by alert crewmembers and handled prior to takeoff. On one occasion, a C-141 crew receiving a 4-pallet train consisting of helicopter blades, a submarine periscope, and assorted equipment was briefed that the load contained no hazardous materials, and documentation didn't include DD Forms 1387-2 as required by AFR 71-4. A very alert loadmaster discovered a 500-gallon aircraft fuel tank that had been neither drained nor purged buried deep in the train.

On a continental U.S. exercise deposition, another C-141 was forced to divert en route because of fumes originating from a paint can stored in a tool box on a personal possession pallet. An overseas C-5 mission was forced to land because fuel fumes were coming from the wing of a naval bomber which was neither drained nor purged.

Other sources of leaks and fumes included aircraft engines, drones, power units, helicopters, and on two occaisions, fumes from cans punctured by forklifts during loading operations.

The potential of this problem must be emphasized, and it will take the total efforts of aircrews and ground personnel to solve this problem before the fiction becomes reality. ■

50 Below And Nowhere To Go

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■ In all survival situations, you will have to protect yourself from adverse environmental conditions. A shelter is one of the primary protective devices. Several types of shelters work well in most environments, i.e., the A-frame, the lean-to, tepee, etc. But if you find yourself in an arctic or arctic-like environment with temperatures 30, 40, or 50 degrees below zero, thermal shelters will provide the best protection.

The thermal shelter holds heat from at least three different sources: Radiated ground heat, body heat, and heat produced by external combustion, i.e., candle, heat tab, stove, etc.

Heat radiating from the ground varies from place to place. In the interior of Alaska for example, the ground will radiate approximately 18 degrees to 22 degrees Fahrenheit regardless of ambient air temperature. Even sea ice radiates temperatures of 15 degrees Fahrenheit.

I know what some of you are thinking. How can you call 15 degrees Fahrenheit heat? Well, look at it this way; if it's -60 degrees Fahrenheit outside and you can crawl into a place that's +15 degrees Fahrenheit, then you've gained 75 degrees! It still won't be a lot of fun, but it's definitely easier to survive at +15 degrees Fahrenheit than at -60 degrees Fahrenheit.

For the purpose of this discussion, it's radiated ground heat we're trying to contain. We simply have to find a way to encapsulate ourselves next to the ground.

The principles of the thermal shelter apply throughout the arctic and arctic-like areas whether you're down in the tree line, on barren land, or on the sea ice. The basic steps are simple.

The first step in building a thermal shelter is to find an area with adequate resources. In the tree line, locate a spot with plenty of snow for insulation and wood for a frame. On barren land or sea ice, look on the leeward side of hills, mounds, or riverbanks where the snow is deep and wind packed. Always select a shelter site free of natural hazards, i.e., dead standing trees, avalanche areas, open cracks in the sea ice, etc. Additionally, select a site that is flat and level for comfort.

When a suitable site has been found, you can start to work. Be careful, don't overheat; this will cause your inner layer of clothes to become damp. The moisture will decrease the insulation quality of your clothing and increase the likelihood of hypothermia. continued

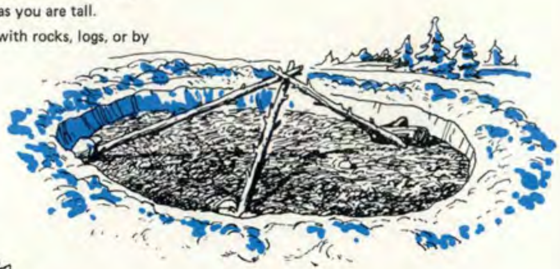
BUILDING A THERMAL A-FRAME SHELTER

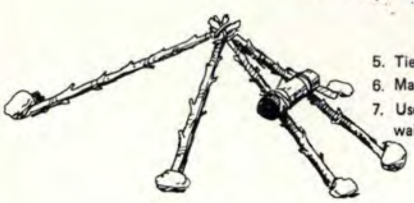
KEY CONSTRUCTION TIPS

1. Select a site safe from hazards of falling rocks, trees, and snow slides, with plenty of trees and snow for building materials nearby. It should be out of the wind, but in a clearing to facilitate spotting by air searches.
2. Make the shelter large enough for you and your equipment. Do not build too large or heating may become a problem. Follow the guidelines given below.
3. Shelter sides should be at a 45^{0} angle or less to hold snow covering.
4. Select main support poles stout enough to handle the weight of 8" of snow covering.

BUILDING INSTRUCTIONS

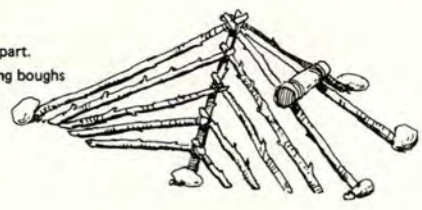
1. Clear snow away to ground level.
2. Make the ridge pole 1 ft longer than your height.
3. Make bipod poles as long as you are tall.
4. Anchor bottoms of poles with rocks, logs, or by seating in depressions.

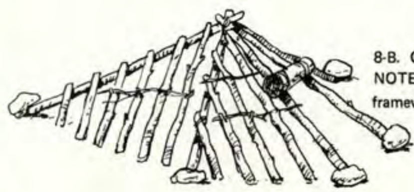




5. Tie joints of poles with parachute cord.
6. Make door poles 1 ft longer than your height.
7. Use 10" diameter log for door top and tie on at waist level.

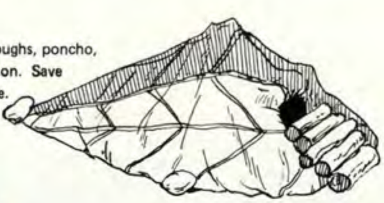
8-A. Place framework poles horizontally 8" apart.
NOTE: This method may be easier for hooking boughs (where available) for added insulation.

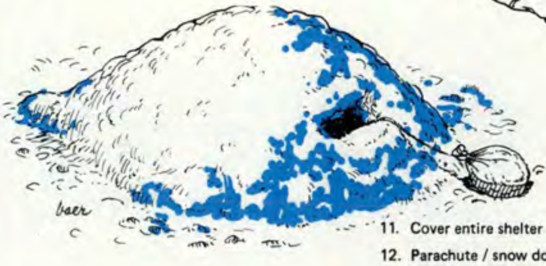




8-B. OR...Place framework poles vertically 8" apart.
NOTE: Smaller branches can be attached horizontally to framework poles for hooking boughs.

9. Add covering to framework using parachute, boughs, poncho, emergency blankets, etc., for additional insulation. Save sufficient amount for floor of shelter, if possible.
10. Stack on lower door logs.





11. Cover entire shelter with snow 8" thick (minimum).
12. Parachute / snow door plug (or other suitable material) inserted from within will seal the shelter.

50 Below And Nowhere To Go

continued

Next, dig down to bare ground or sea ice to expose the primary source of radiating heat. (Keep the snow you shoveled from the shelter site nearby for reuse as insulation.) Then, construct the shelter over the cleared area. The shelter should be small, only large enough for you and your equipment. This allows for less space to be heated and less energy expended during construction. If the shelter is properly constructed, the inside air temperature will warm to within a few degrees of the ground temperature. Body heat, a candle, or a small stove will raise the inside temperature even more.

Warning! Do not use an open flame without adequate ventilation. Carbon monoxide is lethal! Two holes, each about the size of a silver dollar, will provide adequate ventilation. One vent hole should be in the area of the door; the other hole located two-thirds of the way to the top of the shelter.

Snow will provide insulation. Believe it or not, the tiny, dead air spaces between the ice crystals in a layer of snow will provide good insulation. A layer of snow, 8- to 10-inches thick, will provide optimum insulation.

Caution! If the shelter is heated to a temperature above 32 degrees Fahrenheit, the inner layer of snow will melt, freeze, and glaze over with ice. This will reduce the overall insulation quality and increase heat loss.

Next, cut poles for the shelter framework. Cutting poles is easier with the snow saw but a thumb saw or hatchet will work. (If you have no tools, break off what is needed.)

To construct a framed shelter, you'll need a sturdy ridge pole 6- to 8-feet long, 2 sturdy poles about 6-feet long, and several other poles in a variety of sizes.

Lash the 6-foot poles together to form a bipod, spread them apart at about a 45 degree angle, and set your ridge pole in place. You should be able to sit upright underneath the bipod. Position the ridge pole and bipod poles so the doorway is 90 degrees to the prevailing wind. Now lean the other poles in place along the sides and in front of the shelter, at the same angle as the bipod. You'll need 2 good-size poles, about 5 inches in diameter and the same length as the ridge pole, to construct your door frame. Set these poles off the front of the shelter. Tie a door log at least 10 inches in diameter at waist level for the top of the door. Build up the bottom of the door with more logs. Rotten trees will work fine here, saving on energy. Make your door opening as small as possible.

To prevent heat loss, trim off the ends of any poles that stick out more than 3 to 4 inches above the shelter or that may protrude through the snow. Then, cover the shelter with a piece of parachute, boughs, or other available materials. Next, cover the shelter with 8 to 10 inches of snow.

To completely seal the shelter, you must improvise a door plug. Lay a piece of parachute or comparable material on the ground. Fill the center with snow, gather up the edges of the material, and tie off the plug as *tight* as you possibly can. Set the door plug in place so it will harden and conform to the opening. This plug will completely seal the shelter.

On barren land or sea ice, a framed shelter is not feasible. Your support structure and insulation layer are the same in this case. Essentially, you're going to build a snow cave, with the floor of the shelter being bare ground or sea ice.

Tunnel in 2 to 3 feet (90 degrees to the prevailing winds) and then begin excavating the interior to form your living space.

Be sure to form an even, concave surface for your walls and roof. If the roof is too flat, it could cave in on you.

It's a good idea to carve out a sleeping platform a foot or two above ground level. This provides a cold air sump, allowing a place for the cold air to settle. The warm air will rise to the upper level — your sleeping platform.

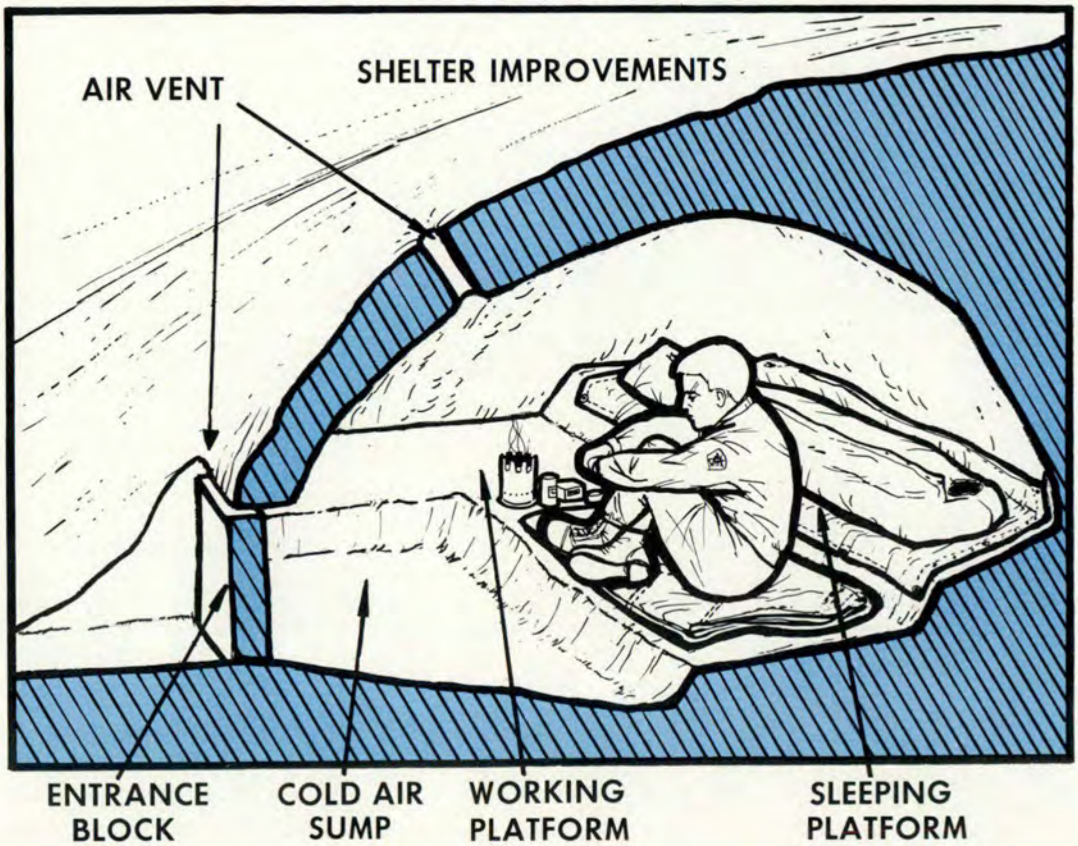
The entrance should be as small as possible. A tight-fitting door plug can be formed from a block of wind packed snow. Remember, a minimum of 8 to 10 inches of snow (insulation) is needed on all points of the shelter.

You should insulate yourself from the ground in any type of shelter, especially in the arctic as the ground temperature is still below freezing. Boughs, parachute material, foam rubber, or several inches of any other material providing dead air space will do.

The shelters discussed here are used only as examples. The construction techniques and final configurations are much less important than the principles involved.

Remember: We've simply put an insulated enclosure over a source of heat; namely, the bare ground. Cold and heat are relative terms. No matter how cold it gets outside, you can stay relatively warm inside a properly constructed thermal shelter. ■

BUILDING A THERMAL SNOW CAVE SHELTER



THE TROUBLE

WITH ALCOHOL

As crewmembers, we must be especially aware of the problems associated with alcohol. Flying performance can be severely degraded by alcohol levels that show no effect on "terra firma."

PEGGY E. HODGE
Assistant Editor

■ As we celebrate the holiday season , we anticipate a time when friends, neighbors, and coworkers offer their holiday greetings with a toast — normally to include alcohol! This is a good time to review the trouble with alcohol as it may affect our ability to perform the mission. The more we understand about this substance, the better off we will be. Let's look at how our body processes alcohol, the potential trouble it may cause us, and some rules to help us out.

The Processing

Absorption Alcohol is one of the few substances that can be absorbed, unchanged, from any place in the gastrointestinal tract. This means that the minute a drink hits our stomach, it starts being absorbed. And once it gets to the intestine, we absorb it rapidly and completely.

Food in the stomach will slow absorption because alcohol is absorbed more slowly in the stomach, and the food keeps it in the stomach longer. Did you know that when your stomach has some food in it, two or three cans of beer or glasses of wine will get you drunk much quicker than two or three mixed drinks? It's true!

This is because the increased amount of liquid in the less potenet drinks will dilute the food, and the stomach will empty quicker. This allows more rapid absorption in the intestine.

Once absorbed, alcohol primarily affects our central nervous system – the brain and spinal cord — until it is eliminated from the body.

Elimination Our bodies eliminate alcohol through two routes: (1) Unchanged through the lungs and kidneys or (2) degradation by the liver. The lungs and kidneys account for *only* 10 percent or less of the total, and the remaining 90 percent or more is handled by the liver.

This is where the problem starts. The liver can break down only a limited amount of alcohol during any given period of time. This means it will take a fixed amount of time to eliminate the alcohol, regardless of how many gallons of coffee we drink or how many cold showers we take.

The Potential Trouble

Alcohol's effects range from alcohol in the blood, but not intoxicated, to acute drunkenness and alcoholism. Few of us will fly while intoxicated, but how many have flown just a little hung over or slightly fatigued?

We know from our mishap records that actual alcohol involvement in aircraft mishaps, as documented by blood tests, is quite minimal. What isn't known, however, is how many mishaps involving faulty perception, slow reaction times, or judgmental mistakes have been caused by the aftereffects of a bout with alcohol.

Hangover Most of us are familiar with the hangover syndrome of loss of appetite, heartburn, thirst, tremors, headache, and fatigue. We also realize there is a compromise in flying safety when any crewmember is below maximum capability because of self-imposed stress.

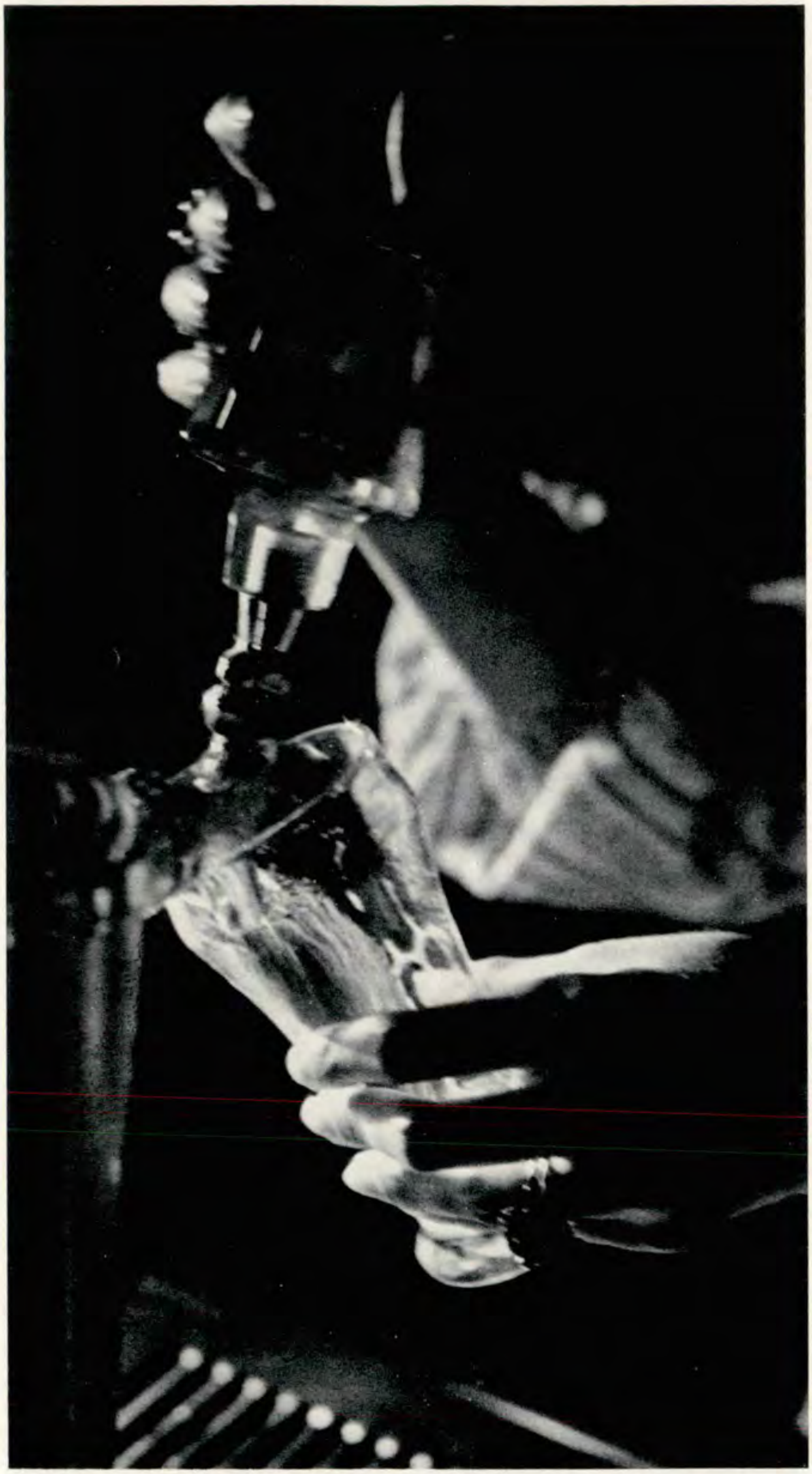
Even if there has been enough time for all the alcohol to be eliminated from the body, a hangover may persist for up to 36 hours. The crewmember who has a hangover may experience more than the usual fatigue and headache. That person may also be compromised in the cockpit with increased susceptibility to spatial disorientation, decreased ability to solve problems, and possibly hypoglycemia.

The cause of hangover has not been determined but is related to substances called congeners. All alcoholic beverages, except vodka, contain congeners, which are assorted mixtures of compounds such as aldehydes, ketones, esters, other alcohols (methanol and others), and fusel oils. These products give different types of alcoholic beverages their different tastes. They also cause breath odor; pure alcohol has no odor.

Some different types of alcohol have been studied for their hangover potency and were ranked in the following order from worst to least: Brandy, red wine, rum, whiskey, white wine, and gin.

Fatigue Perhaps one of the most insidious aftereffects of alcohol is fatigue. It is often endured relatively unconsciously, but it is the most consistently present aftereffect.

One of the reasons for this fatigue is lack of rapid eye movement (REM) or dreaming sleep. Drinking prior to sleeping can decrease or prevent REM sleep. Although research is still being done on the problem, it is fairly well established that deprivation of REM sleep tends to not only contribute to fatigue, but also may impair concentration and memory and produce anxiety and irritability. continued



Before you buy that second drink— **Remember,** if you have an early go, you may be flying with a greatly increased susceptibility to hypoxia, vertigo, and spatial disorientation.

Double Trouble

The effects I have described above can only mean double trouble for us. Flying is a task with an extremely complicated control problem. Consequently, it is clear alcohol can significantly degrade our flight performance at much lower blood alcohol levels than are required to produce equally dangerous results on the ground. As little as one drink can be critical for the flying task.

For us, as crewmembers, there is also an increased susceptibility to hypoxia and vertigo and a decreased ability to track a target while pulling Gs and to perform complicated tasks such as shooting an ILS approach. Also, our field of vision is constricted along with a decreased ability to see under dim lighting.

Another factor which compounds our problems with drinking is atmospheric pressure. As atmospheric pressure decreases, the effect of alcohol increases. For example, at 8,000 feet, one ounce of alcohol exerts the effect of 2 ounces at sea level. (There is 1/2 ounce in a shot of 100 proof.)

Finally, because of the uncertainty of hangover effects, its potential hazards should be emphasized. Also, we must remember blood alcohol levels can exist, and affect performance, even though we may *not* be aware of any effect. During this time, flying performance can be significantly degraded by alcohol levels that show no effect while on the ground .

The Rules

As previously mentioned, alcohol exerts its primary effect on our central nervous system. The effect here is directly related to the blood alcohol level. The blood alcohol level is a result of total alcohol ingested and time available for elimination. By knowing the amount of alcohol ingested and the time since ingestion, we can determine our blood alcohol level and possible effects. Here is an easy way to remember the stages of alcoholic effects.

Remember one mixed drink is

Chart 1

Stages of Alcoholic Effects

Stage	No. of Drinks	Effect
1	0-2	No apparent effect (although some capabilities are already compromised)
2	2-4*	Primarily affects behavior - euphoria, talkativeness, and sociability
3	3-4	Definite changes in coordination and speech
4	12-16 or more	Unconsciousness or death

*This is a very dangerous state because there has been a decrease in coordination and ability to perform.

Chart 2

Length of Time Necessary to Reach 0 Blood Alcohol After A Certain Effect is Noticed

Stage	Effect	Hours
1	No apparent effect	5 to 10
2	Changes in Behavior	10-15
3	Changes in Speech and coordination	In excess of 15
4	Dead	Never

about equal to one beer or one glass of wine.

There are four easy stages to remember: (1) No effect and possibly dangerous, (2) noticeable effects and dangerous, but legal (which may vary from state to state), (3) illegal, and (4) unconsciousness or death.

The first stage occurs with one or two drinks. There will be no noticeable effect although some capabilities are already compromised.

The second stage develops after two to four drinks. This is also a very dangerous stage because there is a decrease in coordination and ability to perform. Due to the effect on behavior and decrease of inhibitions, a person thinks he or she can "do it better" and will try even though it can't be done.

The third stage extends from about three or four drinks on up to lethal quantities. The symptoms include decreasing coordination, decreasing judgment, stupor, unconsciousness, and death after about 12 to 16 drinks.

The charts above may help you remember the symptoms and approximately how long it takes to get rid of the alcohol when those symptoms are present.

If you drink to the first stage where no effect is felt, it will take between 5 and 10 hours to eliminate the alcohol. In the second stage when the first effect is noticed, it takes between 10 and 15 hours. In the third stage, it takes in excess of 15 hours. And in the fourth stage —never!

During the latter part of sobering up from the second and third stage you go back through the first stage. These numbers clearly illustrate the old caveat, "12 hours from bottle to throttle" is without merit.

The Sure Cure

Our inability to compromise with time — the only sure cure for the effects of alcohol — lays the foundation for potential problems. This holiday season, or whenever you drink, remember your guidelines for alcohol use. ■

This person is obviously in no condition to fly, but how long will it take to recover? The answer is — Much longer than you think. Recovery is more than just reaching a zero BAC.

Why

Thumbing through one of the back issues (April 1981) of *TAC Attack*, we came across this "Why Do I Do It?" letter from a maintenance technician, SSgt Stephen M. Moriset, 479th Component Repair Squadron. Although we don't know where Sergeant Moriset is today, we're reprinting his letter because we think both aircraft "operators" and "maintainers" can still appreciate what the author is telling us.

■ Several months ago, I was working on the flight line when I noticed a young lieutenant walking past me, probably towards debrief.

It seemed to be especially hot that day. A few minutes earlier, I had wiped the sweat off my forehead with my hands before I remembered the grease and soot that was all over them. This, of course, left a black smudge on my forehead that had now started to run down my cheeks with a fresh crop of sweat. I'm sure I must have presented quite a sight to the pilot who was proudly wearing his highly shined boots and bright squadron ascot.

The pilot stopped and, in a friendly way, peered into the panel I had removed from the side of the aircraft I was working on. He looked around and gave an approving nod. Then he stretched a bit and squatted down.

It was plain to see that he had something he wanted to say, and I did my best to divide my attention between our casual conversation and the work I was doing.

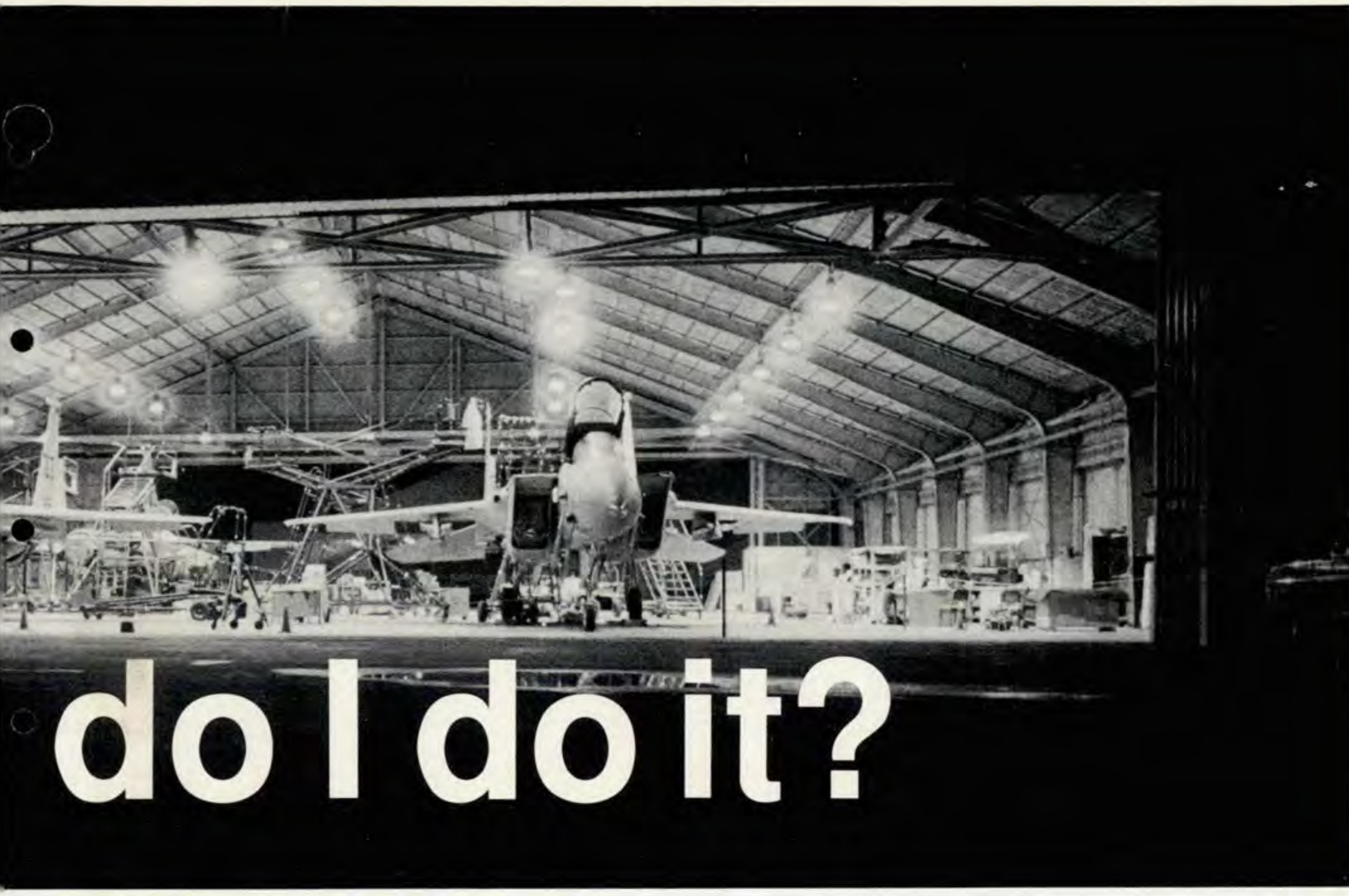
We discussed the weather and the squadron party that was coming up the following weekend. Then he said, "Sarge, can I ask you a question?"

"Sure sir. What is it?" I asked as I began to put my component back into the aircraft.

"Why do you folks do it? What is it that keeps you in the service? Why do you stand out here in the heat or snow or rain or whatever to fix these airplanes at all times of the day and night?" he asked.

I wasn't really sure how to answer his question. As it worked out, that was OK because the shuttle truck came, and the lieutenant jumped up, quickly gathered his helmet and flight case and hustled toward the truck. He poked his head out of the open back doors and hollered, "Sorry, Sarge! Next time."

We watched each other as the truck drove away, until the heat ris-



ing from the ramp caused us to disappear from each other's view.

I thought about the lieutenant and his questions all that night and much of the next day. I finally had formulated an answer to his honest questions and was set for our next unscheduled meeting. I never saw him again. I found out he had been transferred overseas. The following is the answer I think I would have given him, had we ever met again.

I know that I'll never "slip the surly bonds of earth," but I can fix your "laughter silvered wings." I know I'll never strap a fighter on my back or travel those "footless halls of air." But when I walk down the flight line, you come to me to see if you can do those hundreds of things I've never dreamed of. I'll never "soar where neither lark nor eagle dare" but my spirit is with you on each of your flights.

When I go home in the morning and go to bed, when most people are getting up, I sleep well. Screaming children, chatting people, doorbells, and street sweepers do not disturb me in my well-earned rest. However, the distant roar of your engines will wake me from my deepest sleep.

A sure and certain smile comes across my face as I hear and feel your engines push your aircraft skyward. I know that I've done my part, and now it's time for you to do yours. As the sounds of your engine are replaced by the sounds of garbage trucks and school buses, I drift back to sleep; and I dream of the things that you must be doing, not in an envious way, but almost as a flying mechanic.

When you raise the gear handle, you feel a slight change in control pressures; but, in my mind's eye and ear, I see squat switches close and uplocks move; I hear the pumps wind to a halt as the limit switches are engaged. A checklist is run in my sleep and I monitor each gear, cam, seal, and limiter that is tucked away under those panels now securely fastened down.

I've read that you imagine you become a part of your aircraft; that man and machine become one; that your airplane practically reads your mind and seems to react almost before your gloved hand moves the controls. You imagine that steel, aluminum, titanium, and plastic become muscle, bone, nerve, and sinew.

If you can feel the pulse of your aircraft by placing your feet on the rudder pedals, then I'm the surgeon that replaces the cables, valves, motors, and bell cranks that are the imagined strength that moves your living rudder. I'm the specialist that has serviced, topped off, drained, filtered, purged, and pressurized the fluids that you imagine to be the life-blood of your friend. I've tweaked and peaked, tightened, torqued and tuned, milked and measured, routed and rerouted, fitted, fixed, filed, beat, bent, banged, and bucked each vital part of metal and plastic on your companion.

Sir, I am not belittling you for the

continued

things you feel about your airplane, because I feel things about it, too. Most of the time I feel less than happy about the location of a certain part, and I'll call it a "bucket of bolts" or holler at it when it comes home broken and it's my anniversary. I'll gripe and groan and tell it that it's just so many thousands of rivets flying in close formation.

There are, however, those other feelings that can't be explained as you watch a sunset reflected on its polished aluminum skin. I've sat on a tool box and watched the moon rise, twisted and distorted, through its canopy.

There is also a satisfaction I get as I work on or service a part on the airplane you'll never see. Perhaps it's a rivet high on the tail, or a clamp somewhere under your seat or a rib or stringer, a screw or bracket, in places you didn't even know existed. I've seen cables and wires, pressure seals and lines, bulkheads and formers, all painted zinc chromate green. And there are torque tubes and fuses, exciters, relays, bladders, and dry bays. I know where each one goes, what it does, and what will happen if it doesn't do what it is advertised to do.

It's hard for me to imagine that you think of this airplane as being yours when I think of the blood I've left in the engine bay and the skin off my knuckles up in the wheel well. I remember the rib I cracked when I hit the pitot tube the wet morning I fell off of *your airplane*.

My utilities are stained and worn, but they are comfortable. Can you say the same about your flying gear jammed full of maps, charts, clipboards, and a plastic spoon? My underwear may be stained pink from the hydraulic fluid they've soaked up, but I'm cool. Can you say the same about your long-handle, nomex, fire resistant underwear? My hat only weighs a couple of ounces, and it doesn't cause hot spots on my scalp like your helmet. I'm not the one who has to wear an oxygen mask that causes the face to itch and sweat.

As an aircraft mechanic, I don't have to worry about being ejected or passed over or birdstruck or mid-aired. If I get punched out, all I have to worry about is a loose tooth, and the last time I was grounded was when I was 12 years old.

I am happy turning wrenches in our Air Force. I am grateful to be an American and proud to wear the US Air Force blue. You see, sir, I know that in other parts of the world there are enlisted and officers who wear a different uniform than we do, and they work on aircraft that have markings different than ours. Their views on right and wrong, and God and family, are also different than ours. If my having to stand out in the snow once in a while helps to ensure that those men and their aircraft pose no threat to me or my way of life, I will do it gladly.

I know that our airplanes will never be used to start a fight. They are a deterrent force that guards a great way of life. Our country doesn't really ask that much of you and me in exchange for the life we so often take for granted.

So, sir, I promise if you'll keep flying 'em, I'll keep fixing' em. ■

Mechanic's Creed

Upon my honor I swear that I shall hold in a sacred trust the rights and privileges conferred upon me as a certified mechanic. Knowing full well that the safety and lives of others are dependent upon my skill and judgment, I shall never knowingly subject others to risks which I would not be willing to assume for myself, or for those dear to me.

In discharging this trust, I pledge myself never to undertake work or approve work which I feel to be beyond the limits of my knowledge, nor shall I allow any non-certificated superior to persuade me to approve aircraft or equipment as airworthy against my better judgment, nor shall I permit my judgment to be influenced by money or other personal gain, nor shall I pass as airworthy aircraft or equipment about which I am in doubt, either as a result of direct inspection or uncertainty regarding the ability of others who have worked on it to accomplish their work satisfactorily.

I realize the grave responsibility which is mine as a certified airman, to exercise my judgment on the airworthiness of aircraft and equipment. I therefore, pledge unyielding adherence to these precepts for the advancement of aviation and for the dignity of my vocation.

Reprinted from Flight Safety Foundation
Aviation Mechanics Bulletin
Written by Jerome Lederer
Director, Safety Bureau
U.S. Civil Aeronautics Board, 1941

THERE I WAS

■ It's been 12 years, but I'll never forget the scare of my life in the KC-135 — and it could happen again. As a brand new aircraft commander, I was sent to U-Tapao to join the Young Tiger Task Force. I wasn't exactly a new guy with over 1,000 hours in a C-130 and two years in-and-out of SEA. So, although I never was a copilot in the tanker and just moved right in as the AC in the 135, it was no sweat. I knew all about flying "in-country."

On a night refueling mission, we went up to play "Anchor Bingo." The newest tanker flew in high and then let down in the anchor as others offloaded to minimum fuel and headed for home. Sometimes it could take a couple of hours on a slow night, and it was boring!

I had an experienced navigator and an experienced boom operator, but the copilot was "right off the turnip truck." After flying several of these sorties, I knew the action wouldn't start until we got low, so I left the "co" in charge of the store and went back to take a refresher course on navigation.

Now there I was, struggling with the APN-69 when I heard those terrifying words: "Ace, I'm at max power," and we're still losing altitude!" *That* will get your undivided attention! Immediately, I reverted from nav trainee to aircraft commander and jumped in the left seat. Sure enough, the throttles were at max, the firewall even, and we really were losing altitude.

I pushed the nose over and started a large descending spiral. This gave me some time to get a grasp on the situation. Guess what? The "co" had made a small error. He had opened up the wing fuel drain valves to move gas aft for the offload and promptly forgot them. Now we were in trouble!

The CG of the plane was well past any limits Boeing had prescribed. I was up to my ___ in alligators and all because I wanted to play navigator! The Dash 1 says "permanent set" may occur if the aft body tank is overfilled, and we had overfilled by a bunch.

I changed the fuel configuration, called "Tanker Charlie," and got some great advice. He told me to establish landing attitude at FL 200 and see what the trim setting was. Sure enough, the built-in safety system worked, and we had a normal aircraft configuration.

We came back to U-Tapao and made a typical, scared-to-death, cheated-the-grim-reaper landing. The "Tanker Charlie" met me at the plane where I told "the whole truth, nothing but the truth, etc." He had a free shot. Go ahead and show the world how smart he is and how stupid I am. But no, he explained to me about being an aircraft commander and my responsibilities.

It was wise and serious counsel; something I never forgot. I am a better pilot and a lot better officer today because this lieutenant colonel (later a brigadier general) took the time to help an errant young knight.

So, what are the lessons?

- Who is in charge?
- What are your responsibilities?.
- When you make an error, how do you handle it?
- How do you keep this from happening again?

As a brand new squadron commander, I try hard to impress on my young aviators the importance of officership, leadership, and responsibility. Failing to understand this can sometimes be fatal, but in my case, I lived to fight another day.

Two things I remember are to keep in mind what my job is and to never forget we all make mistakes. So, let's minimize the mistakes and accentuate the responsibilities. The Air Force will be better for it and so will the people that work with us. ■

ICE, SNOW, & 10 BELOW

Migrating birds have gone South, or are presently in the process, to wait out the winter. Many retired folks are heading for Florida and Southern California. But we can't pack up and move all our people and planes South, so we had better be prepared for the problems of winter.

■ During final approach, ice accumulated on the wings and left engine of a CT-39. The pilot increased speed to compensate for the aerodynamic effects, but the right wing stalled when the aircraft was about 10 feet above the runway. The aircraft's wing tip struck the ground and was damaged.

Ice on the wings is just one of the annoyances of winter but an important one. No crew, of course, would take off with a load of ice. But it has happened. Frost or snow may be removed but there's no guarantee that the aircraft won't pick up more if fuel is loaded after the wings have been cleaned. The fuel may melt ice and snow but it also may cause condensation on the wing surface and subsequent freezing.

Blowing snow can create ice. Heat from aircraft ahead, or a differential in temperature from a lighted or protected ramp to a cold, windy runway may turn snow or water into ice. The aircraft may leave the ramp clean but engine blast from another aircraft may blow almost invisible particles of snow onto the surfaces of the aircraft behind it. The result may be flight control difficulties from ice formed by freezing of snow or water. Another problem is that snow or ice on wings may adversely affect their aerodynamic properties, lengthening takeoff, or even making it impossible for the aircraft to get off in the runway length available.

Slush picked up during taxiing can freeze and cause gear, flap, or engine inlet icing. Another danger results from frequent applications of high thrust to "break away." The blast may throw ice and snow that can cause damage and injuries, so check six before you boost the power.

Taxi as if you have a load of eggs. Here's a scenario for one reason why. You start to taxi, up comes the power and you begin to move. It's kinda dark and snow and slush make the taxi lines hard to see. You overshot a turn and try to correct. Even though you're moving slowly, the bird slides sideways. If you're not lucky, you may go off the pavement, hit a light standard, a fire cart, some AGE or another airplane. Just keep that possibility in mind. Go very slow; if you can't see the lines, you may have to stop and get a tow. Sloping taxiways are particularly dangerous when slick.

For a clean airplane, takeoff normally doesn't produce trouble; however, standing water, slush, and snow can cause inlet icing problems for some aircraft. Heat may be necessary. Consult your dash one.

During cruise, a major consideration is clear air turbulence. The jet stream has moved South and frequently is very intense. You should concentrate on conditions ahead, including destination weather, whether you'll have to go to an alternate, icing conditions, runway condition, fuel state in case you have to hold.

One problem reported several times last winter was holding or descent early into icing conditions. Icing can be serious at temperatures between 0° and -8°C in cumuloform clouds and freezing precipitation. Remember the rule: Heat before ice, not vice versa.

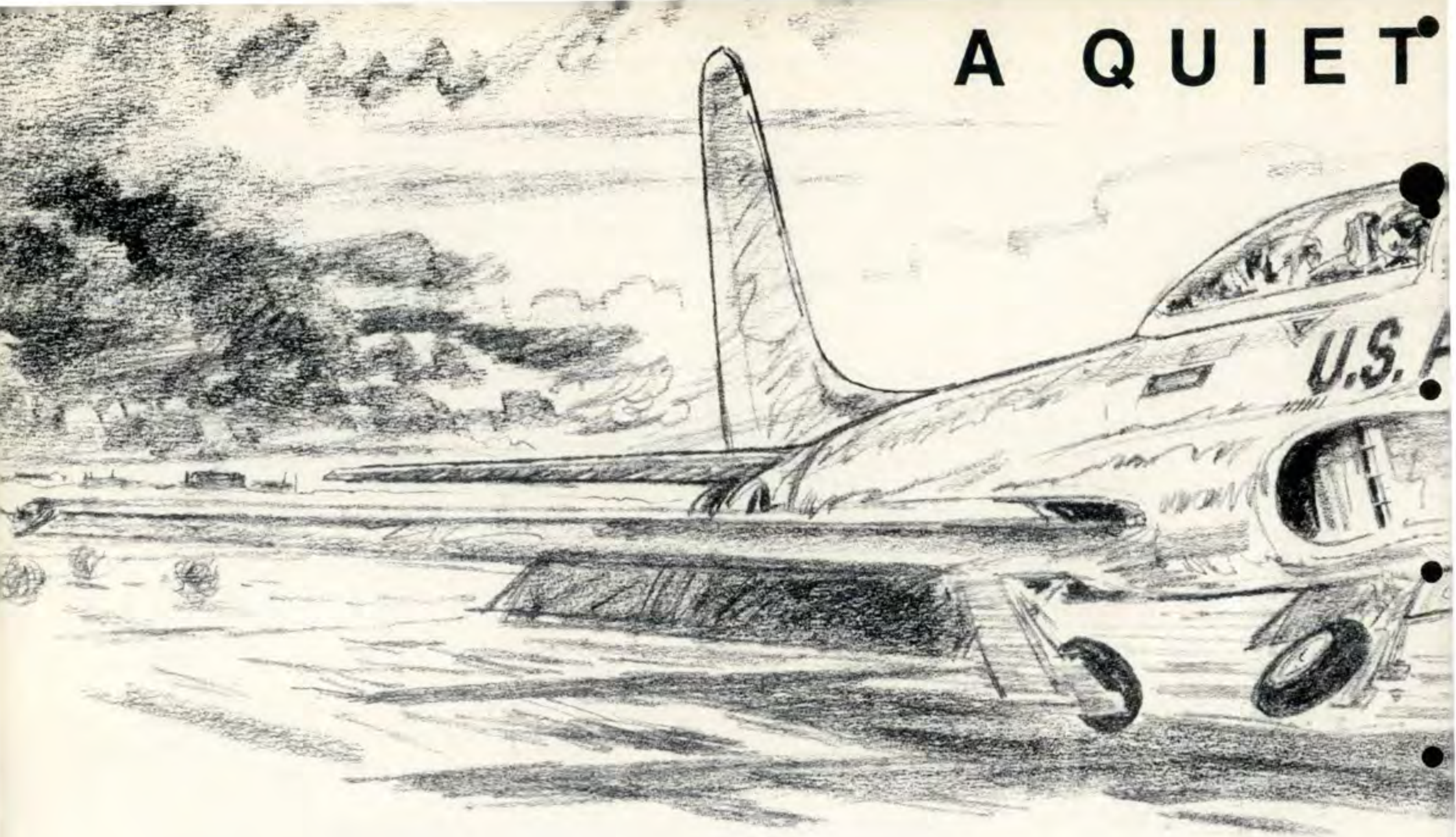
In winter expect more low visibility approaches. You may have to go around. Don't hesitate; it's far better to make a missed approach than to try to salvage a bad one. With low viz and snow covered landscape, illusions are possible. If it doesn't look right, it might not be right. Landings on snow covered overruns can result in some nasty surprises.

Landings can be a real adventure in conditions like these: Slick runway, snow covered overruns, berms placed beside the runway by snow plows, strong crosswind, low visibility approach. This is the time for your best instrument flying—on speed, on glideslope. A nice, firm touchdown—a grease job may start the bird hydroplaning. Remember the rubber and oil deposits on the far end will be slick, so get your speed down in the best part of the runway.

What this all adds up to is an alert crew that plans ahead and is prepared for contingencies such as blowing snow, WX below minimums, a possible missed approach. This crew has an A/C who knows his, the crew's and the aircraft's capabilities — and never exceeds them.

This article is certainly not all inclusive; its purpose is to get your attention. Remember how it was last winter. If you're a new guy on the winter block, learn from the old heads. They can save you a dented bird and maybe your life. ■

A QUIET



This article concerns two pilots who were winging their way back home on a routine flight. Before it was over, it was anything but routine.

■ It was a quiet Sunday afternoon as we were preparing to depart Mountain Home AFB, Idaho. This was to be our second leg of a two hop T-33 return flight to Cold Lake after a quick gas and go at Mountain Home. The aircraft had been performing well and the weather had been good on the first hop, so we had no reason to expect anything different on the second leg.

We were looking forward to just another pleasant Sunday afternoon flight. To further set the scene, we had a T-33 with a travel pod and a full (677 gallons) fuel load. The front seater was an inexperienced T-bird driver with less than 50 hours in the aircraft while the back seater was highly experienced with more than 1,000 T-bird hours.

Since it was a Sunday, there was no weather forecaster on duty at Mountain Home; however, telephone weather briefings were available for aircrew. We filled the telephone briefing square — the only significant weather was a group of isolated thunderstorms approximately 35 miles to the north of the field.

As we walked out to our airplane, however, we noticed a large dust cloud to the west of the field that appeared to be moving in our direction. Afternoon thundershowers and associated dust storms are not at all uncommon in the Mountain Home area, and the normal result is the nuisance of a muddy canopy.

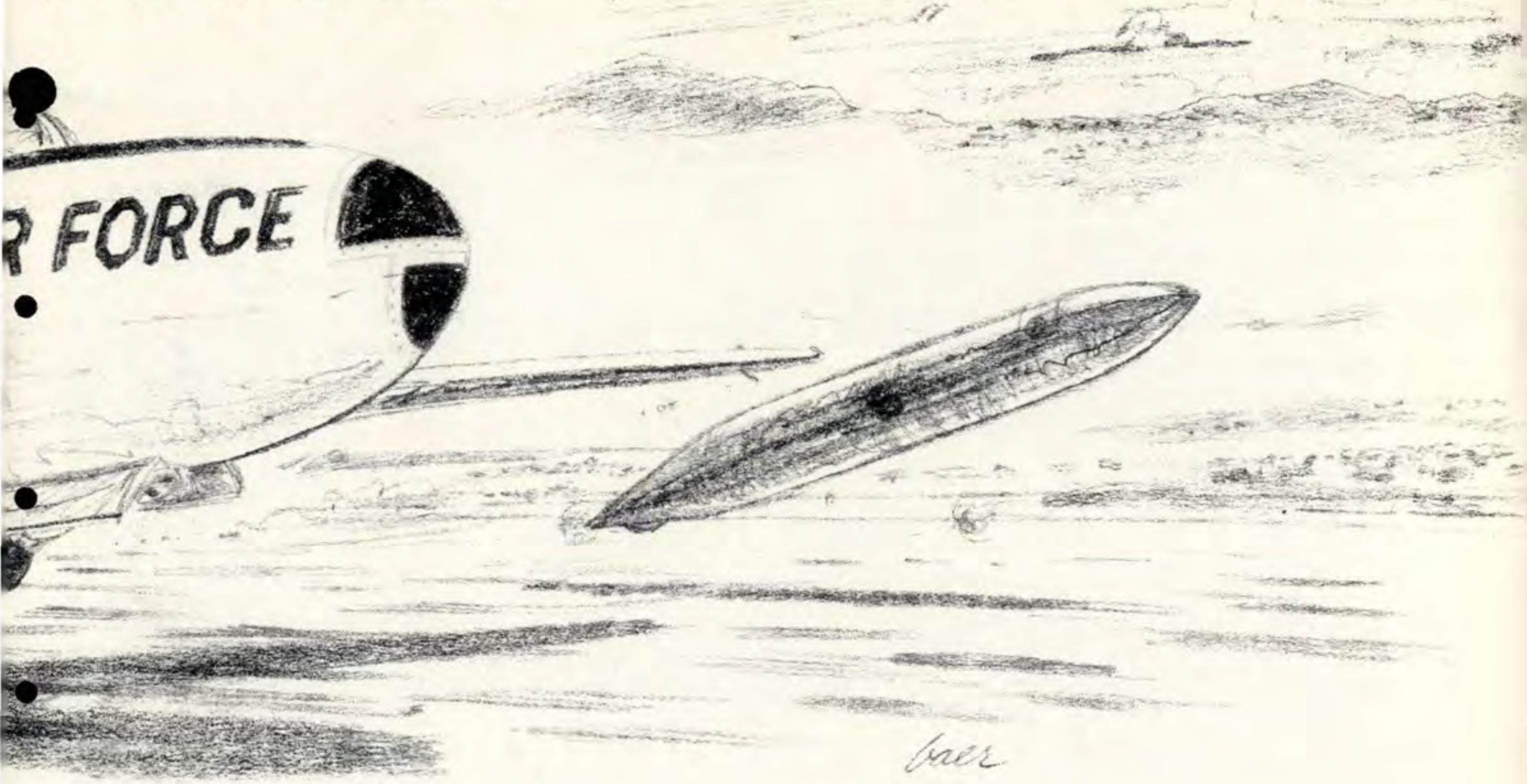
As the transient alert crew was preparing to start us, one of them warned that we'd better expedite if we wanted to beat the rapidly approaching dust storm. We quickly started the engine and called for taxi clearance. Ground control cleared us to taxi and asked if we would accept an intersection takeoff. Since the first 2,000 feet of the active runway was under construction, anything other than an intersection takeoff would require back taxi along the active. There was 7,500 feet remaining at the intersection, and experience on 5,000-foot runways seemed to indicate that 7,500 feet was plenty.

Just to be sure, the back seater took a quick look at the checklist charts and confirmed that an intersection takeoff would give us about 2,000 feet to spare, even with a 20-knot tailwind.

The approaching dust storm was still off to the west of the field, and the windsock was absolutely limp. When we took all of this into consideration, an intersection takeoff looked like a reasonable option, so we accepted it.

We taxied behind a Lockheed Electra and held short while he took the active for takeoff. As the Electra was climbing out shortly after liftoff, the backseater noticed that he lost altitude and then recovered. The Electra was on a VHF frequency so we didn't hear his conversation with tower, but tower

SUNDAY



did relay to us that the Electra had encountered a wind shear after takeoff that decreased his airspeed by about 10 knots, which accounted for his abrupt loss of altitude. As we took the active, we noted that the wind was still calm at the intersection, but the dust storm was now very close.

Before we started our takeoff roll, we talked about the possible impact of a 10-knot decreased performance wind shear after takeoff and decided that we would keep the aircraft on the ground until 10 knots faster than normal takeoff speed. That way, we'd still have flying speed if the airspeed suddenly decreased by up to 10 knots. So far, it still looked like just another quiet Sunday afternoon cross-country.

The initial takeoff roll was normal, and we had about 90 knots with over 3,000 feet of runway remaining. About this time, however, it ceased to be just another quiet Sunday afternoon flight.

Tumbleweeds were rapidly crossing the runway in a right quartering tailwind direction, and our acceleration appeared to slow. The airspeed indicator reached about 95 knots and just didn't seem to want to move anymore. As the 1,000-foot remaining marker went by, all plans to rotate 10 knots faster than normal were abandoned. When the nose seemed slow to rotate, the front seater aggressively rotated the aircraft in an attempt to get airborne prior to the end of runway.

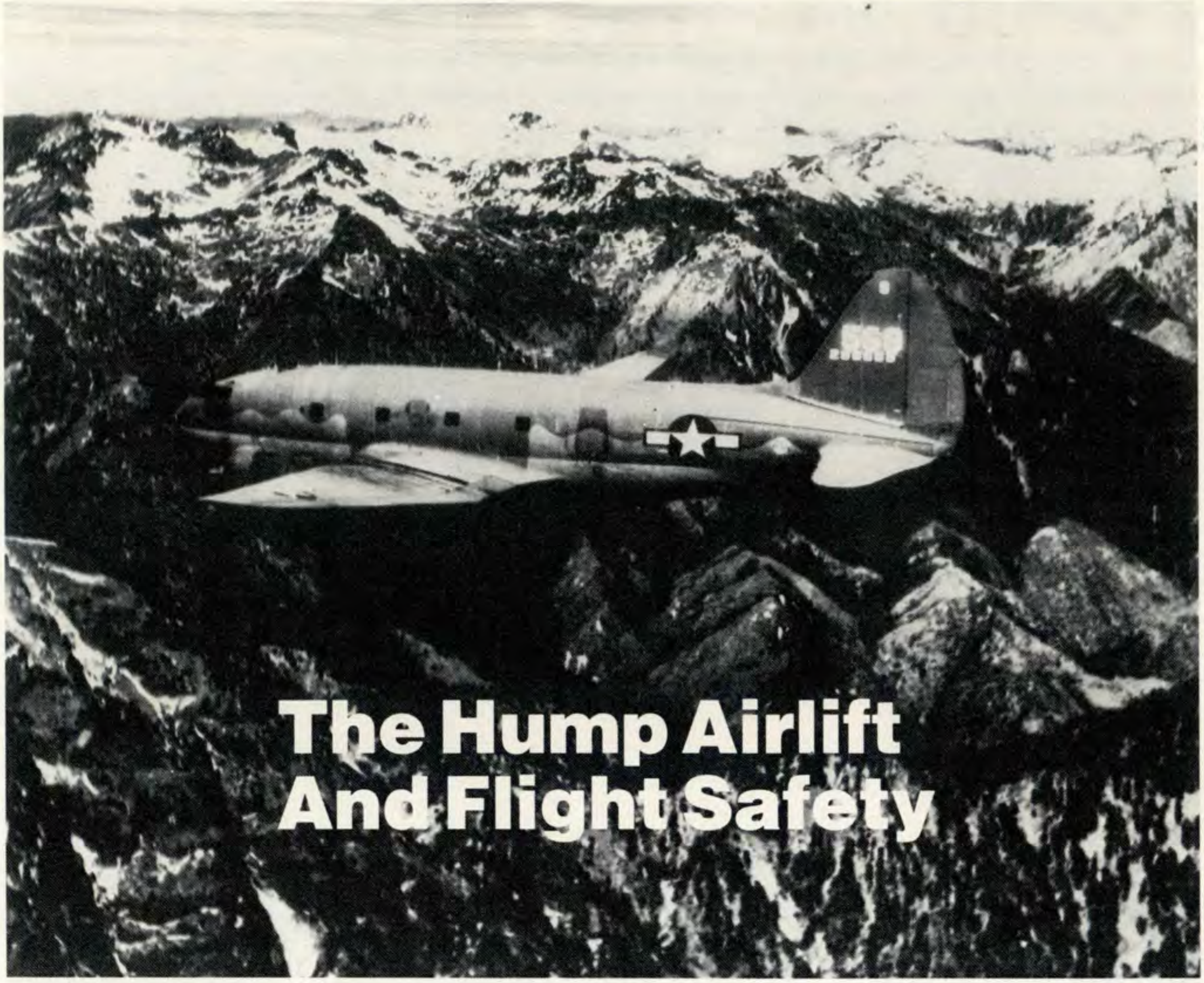
As the aircraft became airborne, the back seater immediately recognized aircraft buffet and decreasing airspeed and jettisoned the tip tanks without any hesitation. His prompt action is probably the only thing that could have kept the airplane flying at this time. It was still an agonizingly long time before the airspeed finally started to increase in level flight at uncomfortably low altitude.

We immediately recovered at Mountain Home, and after ensuring all appropriate actions were taken with respect to flight safety matters and aircraft serviceability, completed our not-so-routine trip back to Cold Lake in three hops and without tip tanks.

There are several things that could be considered as lessons learned from our experience. First, using all available runway probably would have been helpful, especially after we determined that we wanted to take off 10 knots faster than normal (the old adage about runway behind you).

Next, decreased performance wind shear can be a significant factor in any airplane. It's hard to predict, but there were clues such as the prominent dust cloud, the Electra report, and the predicted thunderstorms. The shears can be extremely localized as evidenced by the calm winds at the intersection and the gale at the departure end, so don't ignore the clues just because winds are reported calm.

Finally, be ready to jettison stores immediately if the situation calls for it. The quick action by the back seater in this case almost certainly saved a crew and an aircraft. If the tanks had not been jettisoned, the aircraft might not have been in the air long enough for even an immediate ejection. — Courtesy Flight Comment No. 4 1985 ■



The Hump Airlift And Flight Safety

DR ROGER D. LAUNIUS
AFSC Office of History
Andrews AFB DC

■ The airlift over the Himalayas between India and China during World War II was some of the toughest flying in the world. It all began when the Japanese cut China off from her allies during the spring of 1942. To keep Chiang Kai-Shek's nationalist army in the war, President Franklin D. Roosevelt announced in February 1942: "The Japanese may have cut the Burma Road, but I want to say to the gallant people of China that no matter what advances the Japanese may make, ways will be found to deliver airplanes and munitions to the armies of China."

The way Roosevelt found required the expenditure of enormous resources to airlift equipment, supplies, and personnel from British-held India 500 miles over the Himalayan Mountains into western China. It was the first practical exercise of the possibilities airlift had for military operations and represents an important first step in the development of airlift doctrine.

The Hump, as the airlift was called in what must rank as an understatement of first magnitude, grew slowly at first. But as the Army Air Forces allocated more resources to the operation, tonnage delivered to China increased markedly. By December 1943, airlift forces were delivering more than 10,000 tons per month, and at the end of the war, the figures had risen to more than 50,000 tons by August 1945.

Difficult Safety Conditions

Always this airlift was accomplished under exceptionally difficult conditions. Although most transports operating on the airlift were not attacked by Japanese fighters, several instances of aerial combat have been documented.

On one occasion, a C-47 transport flying the Hump actually scored a victory over an attacking Japanese Zero. When two enemy fighters attacked, the pilot dove between mountain peaks to elude them. The aircraft lost one Zero, but the second stayed with it. "That character must have been trying to ram us because he never swerved," the pilot recalled. He just missed the C-47, but afterward the Zero "kept right on going, and we watched him explode as he hit the side of the mountain."

More important than periodic enemy attacks, the nature of the terrain and the weather made the airlift treacherous. The Himalayan mountains are some of the tallest and most rugged in the world. Peaks commonly reach 15,000 feet, and some of the highest protrude more than 20,000 feet. Most of the transport aircraft of the period were built for cruising altitudes not much higher.

Weather also contributed to the danger. It was not uncommon for sudden winds reaching almost 250 miles per hour to create turbulence so great that a transport aircraft heavy with cargo might flip, roll, or plummet 3,000 feet a minute as if it were a dinghy in a typhoon. Six months out of the year, Hump aircrews contended with monsoons that drenched the countryside, created turbulence, and made operations practically impossible.

Colonel Edward H. Alexander, Commander of the India-China Wing (the unit with overall responsibility for the Hump airlift), wrote to a superior about the weather problem in 1943: "The weather here has been awful. The icing starts at 12,000 feet. Today a C-87 went to 29,000 feet on instruments, was unable to climb higher, and could not get on top. It has rained 7-1/2 inches in the past 5 days. All aircraft are grounded."

The C-47 was a principal aircraft flying the hump. They were forced to fly in nearly impossible conditions with young, inexpe rienced crews. As a result, the early safety record was dismal.

The Losses

In spite of these impediments, the men involved in the Hump airlift demonstrated an ability to accomplish the mission. Steadily throughout the war, tonnage increased, but, unfortunately, so did the loss of aircraft and aircrews. Between June and December 1943, for instance, there were 153 major aircraft accidents on the Hump route, and 168 aircrew fatalities resulted.

Brigadier General Cyrus R. Smith, Deputy Chief of Staff for Air Transport Command (ATC), explained that the price of increased tonnage delivered to China was more accidents. He wrote in December 1943:

"We are paying for it [increased tonnage over the Hump] in men and planes. The kids here are flying over their head — at night and in daytime and they bust up for reasons that sometimes seem silly, however, for we are asking boys to do what would be most difficult for men to accomplish; with the experience level here we are going to pay dearly for the tonnage moved across the Hump."

Improved Safety Efforts

To ensure greater pilot proficiency, ATC immediately instituted more flight checks, a flight safety awareness program, and other safety efforts.

These efforts were moderately successful, especially in building greater safety awareness. Captain Bliss K. Thorne commented on some of the informal safety precautions he witnessed on his very first trip over the Hump in 1943.

As the aircraft reached cruising altitude, the pilot, who was a veteran of the airlift, gave Thorne the controls and went to the cargo compartment to check the 55-gallon fuel drums they were carrying. When he found three drums leaking noticeably (a common problem in the unpressurized aircraft at the high altitude needed to fly over the Himalayas), he jockeyed them back to the cargo door and pushed them out into the jungle below.

The meaning of this incident was not lost on the new arrival. Thorne took elaborate care to ensure his cargo was safely loaded and would remain intact throughout the flight.

In spite of this awareness, sometimes grisly accidents took place. Sergeant Lloyd S. Gray, an engine mechanic and flight engineer working the Hump airlift from Sookerating, India, reported for instance, that a C-47 from his base exploded just after takeoff, killing the entire crew.

Those at the runway, according to Gray, said "She was loaded with gas and ammunition, and the pilot almost refused to take off because he did not think the loading was properly done." Later, Gray added that because of the accident, "Morale is at an all-time low here. The new men especially are practically refusing to fly."

This accident did not stop the airlift, however. Gray probably summarized most of his comrades' feelings when he wrote in his diary, "I don't want to go [over the Hump], but duty is duty. If I had wanted to win the war from behind a desk, I would have stayed in the States".

More Effective Safety Procedures

What accidents such as this, and other similar ones, did was move Hump airlift commanders toward the institution of more effective safety procedures. Brigadier General William H. Tunner, who became commander of the unit

continued

The hump airlift was very costly in both aircraft and crews lost. Unlike this one, most of the crashes were not survivable. Crew morale was very low, and some men were practically refusing to fly.

managing Hump operations on 3 September 1944, forcefully moved to increase flight safety programs.

▪ First, he reviewed the reasons for accidents and sought to institute procedures directed toward their elimination, while at the same time not degrading the airlift's tonnage delivery capability.

▪ Second, he went after larger numbers of personnel and more advanced aircraft that could operate on the route more efficiently and safely. He was successful on both counts, and the acquisition in large numbers of such high-altitude aircraft as the C-54 and C-87 transports (the latter a modified B-24 Liberator) proved especially important in this regard.

▪ Third, General Tunner instituted a much more efficient maintenance program which ensured the aircraft operating on the Hump would suffer from much fewer mechanical difficulties. To increase aircraft reliability while decreasing maintenance time, Tunner introduced production line maintenance (PLM).

This procedure required that aircraft be towed through a succession of seven maintenance stations where specially trained crews performed specific maintenance operations. To make this feasible, each Hump base specialized in one type of aircraft repair; consequently, maintenance operations could be more efficient and effective. At Tezgaon Field, in the Assam province of India, for example, crews specialized in C-54 aircraft and could move each through a comprehensive PLM program in 22 hours.

▪ To ensure the maintenance crews had sufficient spare parts, Tunner also inaugurated an impressive express aerial delivery service that supplied them with required materials from the United States in a matter of days.

Because of such innovations as these, daily utilization rates rose sharply from 7.51 hours per aircraft in April 1945 to 11.65 hours in July 1945.

▪ Finally, Tunner developed a comprehensive safety program. His staff prepared a statistical tracking program to determine the causes of aircraft failures, the airfields where most accidents took place, the type of weather involved, the model of aircraft most prone to an accident, maintenance deficiencies, and a host of other questions. Tunner remarked in his memoirs, "To answer these and many other questions, Captain Kenneth Stiles, the India-China Divisions Flight Safety Officer, set up statistical systems which were certainly the best in effect in any theater at the time, and are still good today."

Putting It All Together

This information, coupled with more rigorous flight checks, aircrew physicals, an efficient safety awareness program, more advanced aircraft, and more effective preventive maintenance all played an important role in reducing the number of accidents on the Hump.

During Tunner's command, the accident rate declined rapidly. Still the Hump airlift had been costly. In almost 4 years of operation, nearly 400 aircraft were lost and more than 1,000 men were killed. General Tunner was able to organize efforts more efficiently, channel activities along certain lines, and thereby create a more efficient safety program toward the end of the war.

The lessons learned on the Hump about flight safety, and airlift in general, have proved themselves repeatedly since 1945. The operation represents an important step forward in understanding how to accomplish an important part of the Air Force mission. ■

EMERGENCY BLOWN TIRE

CMSGT AUGUST W. HARTUNG
Directorate of Aerospace Safety

After the two aircraft depart their parking spots, they taxi to the end-of-runway (EOR) checkpoint. During the maintenance checks, a member of the EOR team notices a low left main tire on one of the jets.

"Excuse me, sir," he interrupts over the ground intercom, "but it looks like this left main tire is really low."

"Gosh, chief!" returns the pilot. "We're already running late, and now it looks like my wingman over there is ready to go. Do you have any suggestions?"

"Well, sir," the crew chief replies, "there's a hi-pac unit nearby. I'll grab the unit, shoot some air into that tire, and get you going on your way!

"Thanks, chief!"

■ Underinflated aircraft tires demand attention, especially at the EOR checkpoint. If air pressure is lost during taxi from the aircraft parking spot to the EOR, it could have resulted from either foreign object damage, such as a nail puncture, or a not-so-obvious defect in the tire. Whatever the cause, the loss could mean danger.

Take a look at the following series of events that led to a deterioration in safety and, ultimately, a blown tire incident at one of our tactical Air Force bases.

While performing his preflight on the morning of the mishap, the aircraft crew chief serviced the left main tire. The aircraft was flown once without incident, then preflighted for a second go. During this preflight, neither the aircrew nor the crew chief noticed any underinflation of the left main tire. All ground operations and taxi to EOR were normal. No problems so far.

During the EOR inspection, maintenance people informed the aircrew the left main tire was low, but they would inflate it to the proper pressure with a nearby hi-pac unit. With the servicing completed, the pilot taxied the aircraft to the runway to line up with his wingman. During the takeoff roll, at approximately 150 knots, the crew felt a large bump followed by a series of heavy vibrations. The crew continued the takeoff and kept the gear and flaps extended. After the wing man visually confirmed the left main tire had blown and separated from the wheel rim, the aircrew in the mishap jet accomplished appropriate checklist procedures and made a successful approach-end arrestment.

So now you're probably saying to yourself, "So what? Just another blown tire mishap. Why would a simple incident like this appear as an article in a safety periodical?"

Let's back up for a minute and review some procedures by the EOR maintenance crew in our mishap story. During the check, the EOR crew chief noticed the left main tire was low and serviced it with the hi-pac. Since the tire was normal prior to taxiing, we assume the tire lost pressure during taxi to EOR. Now, here's the lesson to be learned. Many people think it's OK to service tires at EOR. After all, "It's just a matter of inflating the tire." Read on.

Here's what TO 4T-1-3, "Inspection, Maintenance Inspection, Storage, and Disposition of Aircraft Tires and Inner Tubes" states regarding underinflated tires. "A tire is underinflated when its pressure drops below 95 percent of the required pressure." This same TO further states if an aircraft is taxied or towed with an underinflated tire, the wheel and tire must be condemned. The reason is obvious. Underinflated tires will be exposed to deflections or heat generation they cannot tolerate, resulting in possible tread loss or complete failure.

Investigation of this mishap revealed the EOR crew did not use a tire gauge or servicing checklist, but grabbed the hi-pac and simply shot some air into the tire until it looked about right. Therefore, it's very possible the tire may not have been serviced to the correct pressure. It wasn't long ago when one of our new airmen, performing almost the same procedure, was fatally injured when the tire exploded.

Also, the EOR launch checklist directed tires to be only inspected. The EOR supervisor did not detect the EOR crew chief's unauthorized procedure and failure to comply with the instructions of TO 4T-1-3.

What all this means is a low tire at EOR may be trying to tell us something is wrong. Everyone involved in performing EOR inspections needs to understand the procedures of TO 4T-1-3 regarding underinflated tires, and perhaps include this information in their launch checklist. Also, aircrews who taxi through an EOR checkpoint need to understand the potential hazards associated with operating an aircraft with an improperly inflated tire.

Remember, according to TO 4T-1-3, if an aircraft is taxied with underinflated tires, the wheel and tire assembly must be removed and replaced. Like the aircraft they carry, tires must be properly maintained to operate efficiently. ■

FLIGHT LEADER

LOOKING AFTER YOUR WINGMAN . . . A COMMITMENT

LT COLONEL KENT D. KOSHKO
Editor

■ Early in my Air Force career, I learned a valuable lesson about the importance of commitment and proper teamwork. In pilot training, I saw a great example of the benefits of looking after your wingman. That ageless idea still applies today.

The class of student pilots we replaced started with 75 candidates and graduated 75 fully qualified pilots. **Everyone graduated!**

Their secret was simple—commitment. They pledged to look after each other. When one of them was having trouble with a particular subject or phase of flight, the class **experts** descended upon his home and ensured he received the proper extra study and became proficient. The results were obvious—everyone received their wings, and to boot they had no aircraft mishaps. Quite an accomplishment. Their commitment was indeed impressive. Getting through UPT yourself was tough enough. Sharing time with a fellow student pilot took an extra effort — a commitment to helping a fellow aviator.

Each of us can take a lesson from their positive, can-do attitude of helping accomplish the mission safely. Regardless of our role in flying, our job is to support the mission the best we can. The better we support the team, the more valuable we will become. Enthusiasm is a very contagious and supporting attitude and a very valuable asset to any organization.

I'm sure each of you have seen other good examples of strong commitments that have benefited the Air Force.

One good example of a successful commitment is that over the past 10 years, the Class A mishap rate has dropped from 2.44 in 1980 (81 mishaps) to 1.59 (54 mishaps) in 1989, the third lowest in Air Force history. An admirable trend, but we can do better. In 1980, the cost of Class A mishaps was $340 million. Unfortunately, last year it was $878 million.

This illustrates how important solid safety programs are today. Ask yourself, how can I best help my wing accomplish its mission effectively and safely. Share your thoughts with your peers. And start today to help improve the mishap rate.

Air Force programs studying how human factors affect our aircrews are encouraging. But we need your help, and we need your commitment.

So when you are preparing for a mission, getting an aircraft ready for flight, ordering parts or a myriad of other critical tasks in support of the mission, ask yourself, how can best I help the Air Force team while I do my job safely.

Whether you are a flight leader, maintenance supervisor, supply worker, or anyone else on the aero space team, you are a valuable asset.

BOTTOM LINE: Take care of your wingman—the results can be impressive.

This is the last episode of Flight Leader. It's been fun sharing thoughts on flying safety with you. Best wishes to all you aviators, maintenance specialists, and support personnel. You are all doing a great job! ■

ONE AIRLIFTER'S PERSPECTIVE

MAJOR J.J. LAWRENCE
Directorate of Aerospace Safety

■ Trivia questions seem to be the rage right now. Try this one. What weighs 570,000 pounds at takeoff, flies 6,300 nautical miles (with one aerial refueling), and offloads 172,200 pounds of much needed oversize and outsize material at a 3,000-foot airstrip near the bad guys using only two pilots and one loadmaster? The answer, of course, is that nothing does right now, but as most airlifters out there know, the C-17 is the future answer to this trivia tidbit. The C-17 could be the USAF's remedy to our present shortfalls in big cargo, intratheater airlift.

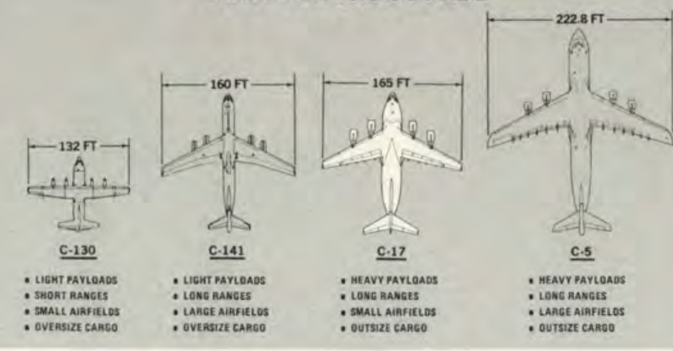
As the Editor of the *Air Force Safety Journal*, I'm always on the lookout for interesting reasons to escape the confines of the Air Force Inspection and Safety Center. I recently had the opportunity for just such a respite from the regular office routine by "horning in" on a trip to McDonnell Douglas Corporation in Long Beach, California. I accompanied the USAF Director of Aerospace Safety and several of my coworkers on a tour of the C-17 beehive of activity.

This article will chronicle my findings during that visit, hopefully telling the story of why we need this aircraft and what it appears we are doing right from a design safety standpoint.

Any new airplane story has to begin with a statement of need, and few needs have gotten as much attention in recent years as the airlift shortfall problem, particularly intratheater airlift. The C-141, C-5, and the Civil Reserve Air Fleet (CRAF) are performance-constrained to operate between what is considered major airfields. Sixty-seven percent of the cargo delivered to the theater needs to be transshipped to other destinations. Fifty percent of this total is outsize and cannot be handled by our C-130 force. The C-X (later becoming the C-17) requirement was to provide a modern, multipurpose airplane to overcome the inefficiency and cost of this transhipment and surface

continued

SMALL ON THE OUTSIDE



movement and to deliver combat equipment directly to its final destination from Army bases in the US.

An additional decision was made to provide the theater commander with necessary operational flexibility by placing a 3,000-foot routine runway operation in the Request For Proposal (RFP). The C-X Task Force Airfield Study surveyed the runways available in the free world. The current strategic airlift force, requiring a 150-foot wide paved runway surface, can operate into some 850 free-world facilities. By setting a requirement of regular operations in and out of a 90-foot wide, 3,000-foot long runway, now 10,000 free-world runways would be within direct CONUS to operating location reach.

The McDonnell Douglas answer to the Air Force RFP was the C-17, a 175-foot long, 165-foot wing-spanned aircraft, which has the same basic dimensions as a C-141 but has a wide body capable of carrying twice the C-141's cargo payload, plus outsize and oversize equipment.

The aircraft has an 18-foot wide cargo compartment with not only side-by-side pallet loading capability (18 pallets), but also side-by-side onloading of cargo vans and large trucks (oversize equipment). One of the primary advantages of the new airlifter then is that while it can handle outsize equipment, it can also double row oversize vehicles which make up the majority of items to be airlifted in a contingency. This results in a reduced number of sorties to complete the move. If the aircraft was designed specifically to carry only outsize cargo, then it would be limited to a single row of oversize equipment.

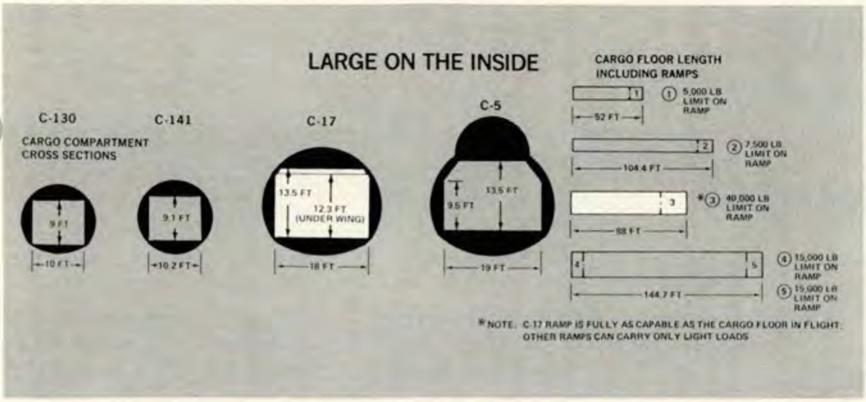
The C-17 also can carry a 40,000-pound load on the cargo ramp (equivalent to the total payload of a C-130) which is big enough to accommodate 4 pallets or two 1/2 ton trucks. The C-5 ramp is limited to 15,000 pounds and the C-141 to 7,500 pounds. The C-17's ramp is an integral part of the loading floor. Built-in ramp toes provide rapid combat offload capability as well as speedier engines running the loads. The design eliminates petal and pressure doors using a simple, single cargo door and thus has no requirement for kneeling of the landing gear. These improvements ensure minimum ground time and improve airdrop capabilities.

The engines also use new technology, tested and proven by the YC-15 earlier test aircraft. The thrust reversers divert exhaust forward and upward so dust and debris are not a problem during landing or rapid ground offload operations. They are designed to operate at zero forward speed without ingestion or overtemperature problems. Semiprepared surfaces are no problem for these thrust reversers. If you saw a C-130 land on an unprepared surface then watched a YC-15, you would see a remarkable difference in visibility and debris generated by the reverse thrust.

The 4 engines themselves are 37,500 pound thrust Pratt and Whitney PW2037s. This engine is another proven performer, having been in commercial service on the Boeing 757 since 1984. By the time the C-17 initial operational capability (IOC), the engine will have logged more than six million hours of flight time. As a result, the C-17 will be powered by a proven power plant with a logistics infrastructure established worldwide.

The propulsive powered-life technology of the C-17 was fully tested on the YC-15 when the DOD sponsored the Advanced Medium STOL Transport Technology Prototype Program. The YC-15 accumulated 800 flight hours and proved the concept of powered lift. Basically, engine exhaust is directed onto and through the flaps, thereby increasing the coefficiency of lift on the wing. A powered-lift aircraft can, therefore, fly at much lower landing/approach speeds and can thus operate into much shorter runways. Using a 5-degree glidepath (twice the normal for transports), a head up display (HUD), and final approach airspeeds of 115 knots at max landing weight, you can see that 3,000-foot runways should pose no problems for the C-17's routine operations.

Inside the cockpit, we find NAVSTAR/GPS backed up by dual INS capability with physical capacity for a third INS and four, full color cathode ray tube (CRT) interchangeable presentations which provide flight, navigation, engine, aircraft subsystem, and mission essential information. Additionally, we see integrated station-keeping data (for IFR airdrops); computer monitoring of engine performance with automatic crew alert; and flexible, mission specific display formats. Currently, efforts are underway with 10 potential suppli-



ers to assure the aircraft has the latest proven avionics attention. And get this, you heavy drivers with aspirations of being fighter pilots, a stick replaces the yoke to go along with the two fully-capable HUDS.

Also of importance is the fact that for the first time in the military aircraft business, we are requiring warranties on the reliability and maintainability of the aircraft. If warranted items and goals are not met, they will be corrected at no increase in cost to the Air Force. Warranties are included for fleet reliability, maintainability, and availability as determined by an Air Force ORE; system performance determined by specifications; structural life with basic aircraft structure warranted for 10 years after delivery; and engine warranties and service policies will be at least as favorable to the government as to "most favored" commercial customers.

The C-17 conceivers and testers have put safety up front in the design of the aircraft and in all its subsystems. Flight controls will use fly by-wire technology with mechanical backup. There will be four independent hydraulic systems with two engine-driven hydraulic pumps for each of these systems. Also included will be multiple hydraulic actuators. All are designed for maximum redundancy and, thus, greater combat survivability. The supercritical wings will be swept 25 degrees and use winglet technology. These characteristics will reduce drag, weight, and fuel consumption.

The electronic engine controllers will provide full-throttle operation without overboosts, auto trimming capability, and engine-out detection prior to normal engine-out indications. All four thrust reversers will be in-flight operable as well as operable on the ground, with upward and forward thrust vectors for safe operation during ground activation. The engines also offer a dual loop fire detection system. This should reduce the number of false fire warnings and, thus, needless inflight engine shutdowns.

The caution and warning system features a continuous monitoring of critical aircraft systems with aircrew alerts in the event of system failure. Also incorporated into the interphone system will be aural tones and voice warnings of critical flight conditions. The aircraft also will use wireless intercom communications and hard wired backup communication control.

The aircraft is designed emphasizing minimization of crew fatigue with reduced engine noise and efficient acoustic insulation which should allow off-headset voice communication between pilots. A self contained avionics cooling system will decrease engine bleed air required. The cargo area and flight deck are designed to be much more comfortable and quieter than what our airlift aircrews are used to today.

The landing gear system contains thermally-sensitive relief plugs to relieve tire pressure from overheated brakes. Wheel well components are limited to only essential gear parts thus lessening the chance of damage from a blown tire. The RFP calls for operation with one flat main landing gear tire. Manual gear lowering sequencing and free fall are also offered as backups to the normal gear extension system.

So what do we have here? A modern airlifter that appears to be a reliable and maintainable aircraft using proven technology with safety built in up front, and a new approach to contractor warranties for government purchases. An aircraft which will help solve both our airlift shortfall concerns and our intratheater materiel movement problems. It should operate into short, semi-prepared airfields and give theater commanders greater flexibility on resupply options as well as hamper enemy interdiction plans. We can have a solid airdrop performer and a follow-on to our aging C-141 and C-130 fleet.

The IOC for the C-17 is now FY92, based on the current DOD-funded contract, with the first flight in 1989. The 1983 SECAF Airlift Master Plan submitted to Congress calls for a total buy of 210 aircraft using the C-17 as the long term airlift solution to future shortfall considerations. In February 1985, the Secretary of Defense signed the Defense System Acquisition Review Council II approval. ■

This visit to McDonnell Douglas Corporation was a rewarding one, especially for a lifelong airlifter who flies C-141s which rolled off the line over 25 years ago. I see lots of solutions to the everyday problems we now encounter and a healthy long term solution to a critical military airlift requirement. I'd like to thank McDonnell Douglas personnel for their hospitality and efforts to answer all questions, big and small. I'd like to particularly recognize Mr. Nicolas Gaspar of the System Safety Division for the time and expertise he shared with us during this visit.

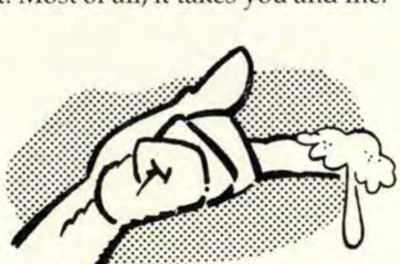
MAINTENANCE MATTERS

PENS ARE FOR WRITING

■ While passing through 31,000 feet on initial climbout, an Eagle pilot heard a hissing sound in the cockpit. Shortly thereafter, he began to pressure breathe. The pilot selected 100-percent oxygen, declared an emergency, and landed the aircraft uneventfully.

Post flight inspection revealed a ballpoint pen was lodged in the aircraft's cockpit pressurization relief valve.

Foreign objects are everyone's problem, and it takes everyone, operational units and the maintenance activities, working together to solve it. Most of all, it takes you and me.



A LITTLE DAB WILL DO YOU

Years ago, a famous hair cream commercial ended with the phrase, "A little dab will do you." Somehow, that phrase might apply when we look at our aircraft lubrication procedures.

While flying at 31,000 feet, a KC-135 crew noticed the ailerons were extremely hard to move. All attempts to free the ailerons, such as turning the autopilot off and pulling system circuit breakers, were fruitless. The crew declared an in flight emergency and, while descending to land, the ailerons returned to normal. Fortunately, the crew made an uneventful landing.

When maintenance closely examined the aileron system, everything from control rigging to the autopilot system checked good. Looking further, they discovered all of the drain holes on the left and right inboard spring cartridges were clogged with grease. There was also approximately a half cup of water in each spring cartridge. Where did the grease and water come from?

During the previous phase inspection, maintenance folks had overlubricated the left and right spring cartridges. There are water drain holes in the bottom of these cartridges. Over a period of time, the grease came off the springs and blocked the drain holes.

When the aircraft spent an extended period of time at altitude, water that had accumulated in the spring cartridges froze and created the binding in the ailerons. As the aircraft descended, the water thawed and the binding decreased. This unit briefed their people on the importance of properly lubricating the spring cartridges in the flight control system. Perhaps there's a lesson here for other units, as well, on the importance of the careful lubrication of aircraft components.

BREAD AND BUTTER

How often have you neglected to submit a materiel deficiency report (MDR) on an item because it was a "known" defect within your unit or because a fix for the component was believed to be "already in the mill?" How frequently, as quality "assurance," have you failed to submit MDRs on components associated with a mishap because you were certain which was the faulty component in the sequence of events?

How many times have aircrews or maintenance people not documented a "one time" or intermittent component failure because they thought it to be no more than a fluke?

Here's one high accident potential that, based upon daily mishap message traffic, seems to occur all too frequently.

During a local mission, a pilot experienced a violent uncommanded nose down pitch. No caution lights were illuminated, and all warning light circuits checked good. He had just declared an emergency when the aircraft again pitched down violently.

Through some skillful flying, the pilot landed uneventfully at home base where the aircraft was immediately impounded.

Like a team of skilled surgeons, a group of maintenance technicians went to work on the aircraft. Using the applicable tech data, the team troubleshot the flight control system extensively and found no less than three pitch control components defective. In addition, they documented every maintenance action in the aircraft forms. But they forgot one thing. They turned all of the faulty parts back into the supply system without any appropriate MDR action.

All too often, we overlook the action of submitting defective components, especially those involved in potential or actual mishaps, through the MDR system. How do you know a component, any component, does not have major defects that would affect all aircraft in our community if you don't allow statistical documentation and followup correction?

The bottom line is to let the engineers determine via MDRs which component was faulty. Let the analysts compile the statistics, flag the high failure items, and give us the feedback.

What's our bread and butter in the mishap prevention business? The proper submission of MDRs.

☆ U.S. GOVERNMENT PRINTING OFFICE: 1989 — 779-017

MAINTENANCE MATTERS

MECHANICS AND SURGEONS

Following an operational flight at a deployed location, a routine basic post flight (BPO) was accomplished on a tanker. During the BPO inspection, a maintenance specialist discovered a locally manufactured tool attached to the aileron control cables in the right wheel well.

The last known maintenance in the wheel well area was the removal and replacement of a frayed flight control cable during the last scheduled phase inspection at Home AFB. The locally manufactured tool, a "phenolic cable block," was used to prevent the control cable from slipping off the control rollers during cable removal and installation.

Although both individuals had signed off the maintenance action in the forms as "complete", neither the specialist no the supervisor inspecting the work saw the "Cableblock" tool during the required visual inspection of the entire cable run. Furthermore, the maintenance specialist failed to ensure all tools in the consolidated tool kit were accounted for.

Even though no damage occurred and flight control problems were not encountered because of the tool, the potential for a serious mishap did exist.

Tool control is a continuous inventory of the equipment, especially those items locally manufactured, we use to perform maintenance. It evolved over time because we proved far too often that tools left inside aircraft after the work is done, contributed to mishaps.

Surgeons have similar control procedures for their equipment. Hopefully, you're not due any surgery. But if you are, the analogy of a surgeon's tool control to your own program becomes more meaningful. Think about it.

HAZARDOUS CARGO SPILLS

What you don't see, unless you read the message traffic every day, are the dozens of flight mishaps involving hazardous cargo spills aboard our cargo aircraft. Often they can lead to bigger and worse happenings. (See "Six Minutes to Eternity," *this issue.*)

The following high accident potential mishap is a classic example. While deployed to another installation, a jet fighter maintenance crew had to send one of their aircraft engines back to home base. After the maintenance folks certified the engine was drained, it was loaded aboard a C-141.

Once airborne with the engine and passengers, the C-141 aircrew discovered the engine they were transporting was leaking fuel and fumes in the cargo compartment. To the best of his ability, the loadmaster absorbed the spill with buckets and absorbent material.

The pilot and flight engineer went on oxygen and ventilated the fumes from the aircraft at maximum air conditioning capacity. Because of the fear of possible fire with mixing of fuel fumes and oxygen, the passengers did not go on oxygen.

After landing, the aircrew and passengers were feeling nauseous. A flight surgeon was on the scene and administered first aid.

So how does this affect aircraft maintainers? Simple.

Since the business of maintaining aircraft is global, many airplane fixers find themselves deployed away from their home units. And it is this same group of people who are often faced with the task of preparing cargo for airlift shipment.

In mobility, tactical, or contingency operations, certification of hazardous materials will be accomplished by the qualified specialist or technician who actually prepares, packs, or inspects the item for air shipment. AFR 71-4, Preparation of Hazardous Materials for Military Air Shipment, requires that currency in hazardous materials preparation will be assured through unit training programs.

If, for whatever reason, we don't have trained technical experts on our deployment team to certify hazardous shipments properly, then we should seek assistance from the host unit.

Whether it be shipping aircraft engines or powered aerospace ground equipment such as hydraulic test stands, all such items have the potential to become hazardous if not properly processed in accordance with the regulation.

The mission of the Air Force requires us to travel all over the world. As the Air Force constitutes a vital security shield for all of us, so, too, can a knowledge of proper safety precautions constitute an important "weapon" in our arsenal — reducing our high accident potential mishaps and further protecting our people.

Knowledge of proper safety precautions concerning shipment of potentially hazardous cargo can bring immense dividends to all of us, especially those who fly aboard our transport aircraft. ■

Enter Our Dumb Humor Caption Contest Thing

Are you a clever person? Are you good at unsolved mysteries? Would you like to collect our secret prize? Then, why not enter our Dumb Caption Contest and be a winner?!

Write your captions on a slip of paper and tape it on a photocopy of this page. DO NOT SEND US THE MAGAZINE PAGE. Use "balloon" captions for each person in the photo or use a caption under the entire page. You may also submit your captions on a plain piece of paper. Entries will be judged by a panel of experts on dumb humor in February 1990. All decisions are relatively final.

Send your entries to: **"Dumb Caption Contest Thing" Flying Safety Magazine. HQ AFISC/SEPP. Norton AFB CA 92409-7001**

Opening the mail and reading the latest submissions to the Dumb Caption Contest Thing are fun. Congratulations, SSgt Roger Palaski. Your neat little prize is in the mail.

. . . AND THE WINNER IS:

SSgt Roger Palaski

405 CRS/MACA
Luke AFB, Arizona

The next five most popular captions are listed in the honorable mention category. Keep those cards and letters coming! We hope you are reading the rest of *Flying Safety* with as much enthusiasm.

Once Again, Thanks For Your Support

Honorable Mentions:

1. O.K., I'll hold it tight, but I still don't think by bending this thing in the middle it will be able to chase targets around corners. MSgt Stephen Maynard, Det #1 DCANG, Andrews AFB, Maryland

2. We told you that habit of putting super glue on your chin would get you in trouble some day. Capt Kim Rich, 405th Equipment Maintenance Squadron, Luke AFB, Arizona

3. L. When they said they were sending us someone short, wethought they meant someone about to be discharged! R. (thinking) The Lakers got Jabbar, we got him. John Abbott, 12 MSSQ/MSIRC,Randolph AFB, Texas

4. Simon Says, "Stick your left foot forward." MSgt Alan B.Crank and TSgt David M. Schmidbauer, 33 AGS/MAAML, Eglin AFB, Florida

5. OK Joe, you can stand up any time now or William and I will let go this time and watch you give the phrase "walking a tightrope" new meaning. Jimmie Earl Brewer, 5202A West Nugget Court, Beale AFB, California