flying

SAFETY

NOVEMBER 1989

Cold Weather Caution!

Complacency...A Deadly Symptom

Fit for Flight

A Great Save

SITUATIONAL AWARENESS

THERE I WAS

■ It was a perfect picture of another day and another AWACS mission from Kadena AB, Okinawa. Everything went normally through departure. The weather was forecast to remain clear and balmy throughout the day. Northwest of Okinawa and en route to the orbit area, I noted an unreported, unforecast, and unremarkable system of cumulus clouds below us, topping out at 12,000 to 14,000 feet. I thought nothing of them, because weather in that area normally moved westward toward China.

As it was our standard operating procedure, we updated the homedrome weather about halfway through the mission to assure we had enough fuel to divert to an offisland airfield if the weather turned sour. However, as expected, the weather report and forecast remained the same. I decided to continue the mission to fruition and departed the orbit area about 2½ hours later.

On the return leg, about an hour out of Kadena, we began to note what appeared to be severe weather in front of us. As we got closer, we confirmed with our aircraft weather radar that massive thunderstorms were beginning to engulf Okinawa. We checked with Kadena Metro to verify the conditions at the field and learned their weather radar was inoperative, as it had been for weeks. They visually confirmed the weather was deteriorating, but not to the extent that it would require us to divert. I then checked in with the squadron on the company frequency while the copilot coordinated with air traffic control (ATC) for our descent into Okinawa. The supervisor of flying confirmed the adverse weather and recommended we land as soon as we could.

As a result of the rapidly deteriorating situation, our ATC clearance was to a holding pattern where we were eighth in line for the approach. We were totally IFR en route to the holding fix when we experienced the worst turbulence I have felt in over 4,300 hours of operational flying and uncounted passenger hours. It felt similar to being tossed about in my O-2, penetrat-

continued on page 2

UNITED STATES AIR FORCE

flying

SAFETY MAGAZINE

AIR FORCE SPECIAL PUBLICATION 127-2 | NOVEMBER 1989 | VOLUME 45, NUMBER 11

CONTRIBUTIONS

Contributions are welcome as are comments and criticism. No payments can be made for manuscripts submitted for publication. Address all correspondence to Editor, *Flying Safety* magazine, Air Force Inspection and Safety Center, Norton Air Force Base, California 92409-7001. The Editor reserves the right to make any editorial changes in manuscripts which he believes will improve the material without altering the intended meaning.

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SPECIAL FEATURES

DEPARTMENT OF THE AIR FORCE • THE INSPECTOR GENERAL, OSAF

PURPOSE — *Flying Safety* is published monthly to promote aircraft mishap prevention. Use of funds for printing the publication has been approved by Headquarters, United States Air Force, Department of Defense, Washington, D.C. Facts, testimony, and conclusions of aircraft mishaps printed herein may not be construed as incriminating under Article 31 of the Uniform Code of Military Justice. All names used in mishap stories are fictitious. The contents of this magazine are nondirective and should not be construed as regulations, technical orders, or directives unless so stated. **SUBSCRIPTIONS** — For sale by the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402. Changes in subscription mailings should be sent to the above address. No back copies of the magazine can be furnished. **REPRINTS** — Air Force organizations may reprint articles from *Flying Safety* without further authorization. Non-Air Force organizations must advise the Editor of the intended use of the material prior to reprinting. Such action will ensure complete accuracy of material amended in light of most recent developments. **DISTRIBUTION** — One copy for each six aircrew members. One copy for each 12 aircrew support and maintenance personnel. Air Force units must contact their base PDO to establish or change requirements. AFSP 127-2 is entered as a publication at the Second-Class rate (USPS No. 586-410) at San Bernardino Postal Service, 1331 South E Street, San Bernardino, CA 92403 and additional entries.

THERE I WAS

continued from inside front cover

ing a line of thunderstorms which had trapped me over Cambodia with no place to land . . . but that's another story.

It shook us so hard I thought I had damaged my teeth. While we were in the holding pattern, I heard the instructor pilot on an E-3 proficiency sortie declare a full-stop landing versus the touch-and-go landing he had planned. I could tell by the tone of his voice the weather had gone from bad to worse. His voice always increased an octave or two when he got excited. Shortly thereafter, we were cleared for descent and approach for our full stop. A weather check with approach control reflected the weather as being a 500-foot ceiling, 1½ miles visibility, and the wind generally down the runway at 25, gusting to 30 knots. About 3 miles on final, we heard a loud crack of thunder and saw a bright flash of lightning as the clouds lit up around us. We continued the approach but had to go missed approach, because at decision height, we saw nothing but darkness and pouring rain (the airfield lighting had been disabled by the lightning).

We received clearance for another approach, and our low fuel state was making me quite *edgy*. When we were reestablished on short final, we rechecked the weather, which was the same; however, the winds had changed to 30, gusting to 37 knots and now 20 degrees off the runway heading — well within the limits of most pilots. At about 500 feet and 1½ miles from touchdown, we visually acquired the runway. The blowing rain confirmed the gusty winds and we continued toward our landing. I established a normal E-3 landing attitude and pulled the throttles to idle. A split-second later, my right wing rose severely. I was terrified, but began racking the aircraft back to a wings-level attitude just in time for the touchdown.

As we taxied back toward our normal parking area, we were directed to shut down and leave the aircraft parked on the taxiway. Because the weather was so intense, the airfield was closed — to include all maintenance activity. The field remained closed for 4 hours, when maintenance personnel finally were able to return to the flight line. During postflight inspection, they found massive scraping on my outboard engine cowling.

The mishap board was convened while I was on emergency leave in the CONUS. From my written statement and interviews with the appropriate witnesses and other personnel, they determined I had done everything in accordance with all guidance and logic, was not at fault for the aircraft damage, and should be declared a hero for not cartwheeling the aircraft in those weather conditions. The Kadena weather station wind measurement equipment recorded a wind change from 20 degrees off of the runway heading to a direct crosswind in excess of 40 knots just as I was landing. The maximum crosswind limit for the aircraft had been more than doubled during the landing.

Lessons learned: During flight, I give pilot reports to base metros when I observe unforecast weather. I make sure I know the status of the station weather radar at my destination, particularly when it is a sole source for adverse weather determination at a remote destination, like Kadena. Additionally, Kadena's radar now gets much higher priority treatment when it needs parts for repair. Finally, I pay greater attention to the details of what is happening around me, because a perfect picture can quickly change with potentially disastrous results. ■

Physiological Incident

■ The mishap pilot was no. 2 of a two-ship F-15 defensive BFM training sortie. During the second engagement, while pulling 8 Gs and looking over his left shoulder, he noted difficulty breathing. The pilot unloaded the Gs and called "knock it off." His breathing difficulty continued, so he checked his oxygen hose. Finding the hose disconnected, he reconnected it and gang-loaded the regulator. No further difficulty was experienced. An emergency was declared, followed by an uneventful landing.

A physiological incident was declared due to the confusion caused by restricted airflow under high Gs. No symptoms of hypoxia were noted. All life support systems were inspected, and no discrepancies were found. Specifically, the CRU-60, which should normally disconnect with a force of 12 to 20 pounds, was successfully tested.

Both life support personnel and flight surgeons should use this incident in their briefings. Emphasis can be placed on carefully checking all connections. ■

Bird Strike...A Shattering Story

LT COLONEL KENT D. KOSHKO
Editor

Last year, bird strikes cost the Air Force over $12.2 million. So far this year, one class B mishap attributed to a bird strike cost the Air Force $200,000.

■ Last spring, what started as a routine B-1B follow-on operational test and evaluation mission sponsored by the Air Force Operational Test and Evaluation Center, turned into a shattering experience. The crew, from Dyess AFB, Texas, was flying terrain avoidance on the IR-165 low-level route in western Texas when tragedy nearly struck.

Traveling at 565 knots groundspeed and just 200 feet AGL, two large birds suddenly appeared in front of the aircraft! There was inadequate time for avoidance. One bird struck the left windscreen with such force it spiderwebbed the outer pane of both the left and right windscreens.

The instructor pilot, Major James F. Long, determined the jet was still flyable and that none of the crew was injured. He then initiated a climb to 7,000 feet MSL and slowed to 300 KIAS.

The instructor offensive systems officer, Major Douglas R. Kincannon, contacted flight service to report the bird strike while the rest of the crew, Captain Vincent M. Uchal, pilot, and Captain Michael S. Butler, defensive systems officer, conducted detailed systems checks. Once the crew determined all aircraft systems were operational, they contacted Fort Worth Center for clearance to Dyess AFB at 13,000 feet MSL. En route to home station, Major Long and Captain Uchal performed a controllability check and confirmed that all flight controls functioned normally.

The problem facing the crew was the severely limited visibility through both forward windscreens. The crew coordinated approach procedures, and the decision was made to fly a precision low approach to determine visibility cues prior to the final landing attempt.

A normal configuration was established, an emergency was declared, and the crew departed the final approach fix with radar vectors to an ILS approach with a PAR backup.

Forward visibility and depth perception proved to be very poor on the low approach; however, good instrument procedures, combined with side window sightings and crew coordination, made descent and runway alignment possible. With their confidence increased, the crew brought the plane around for a landing. Major Long flew the approach while Captain Uchal verified visual cues and monitored the descent rate. Major Kincannon and Captain Butler monitored the approach and called altitude, heading, and airspeed while maintaining communications with the command post. The crew successfully landed the B-1B on the first attempt and maintained runway position by looking out of the side windows.

Through superb airmanship and crew coordination, a hazardous situation was overcome. We send a well-deserved safety warrior's salute to the crew. ■

The crew's challenge was how to land the B-1B with severely limited visibility through both forward windscreens. By superb airmanship and crew coordination, a hazardous situation was overcome and a valuable resource was saved.

COLD WEATHER CAUTION!

PEGGY E. HODGE
Assistant Editor

Frostbite and hypothermia can stop you cold!

■ It was a very cold December evening — the weather dispatcher reported –50 degrees F for this arctic base. The mishap aircraft was one of four tankers preparing to support an RC-135 reconnaissance mission. It had been assigned as the spare aircraft.

Things were shaping up for a smooth mission — the crew reported no aircraft problems during preflight. Due to the extreme cold, portable heaters warmed the cockpit area and engines up to the time engine start was initiated.

From this point on, there was no heat available inside the aircraft due to an inoperative auxiliary power unit.

Suddenly, maintenance problems interrupted what started out to be a smooth mission. These problems delayed departure over 2 hours and resulted in the reassignment of the crew to the spare aircraft.

The tanker crew, now at the spare, requested a portable heater for the cabin. Due to the impending takeoff time, this request was denied, leaving the crew in extremely cold cabin conditions.

Finally, the KC-135 took off and, only 3 minutes later, reported a problem — they were unable to raise the landing gear. The crew requested a right turn to head back to the base. Departure control approved the request. At this point, radio and radar contact were lost.

A search helicopter located the burned wreckage 6 miles from the base. *There were no survivors.*

What Happened?

Investigators concluded the extreme cold was one of the major factors. The extended delay in the extreme cold reduced crew effectiveness to an undetermined, but significant, degree. The temperatures contributed to the crew's delayed judgment and lack of coordination. The crewmembers were cold causing distraction and reducing manual dexterity.

Could this mishap have been prevented through proper guidance in limiting flightcrew exposure to extreme cold temperatures? This article will take a look at the effects of cold climate on crewmembers. What do we need to "watch out for," and what preventive measures can we take?

Crew Performance

Modern day aircraft operate over a wide range of speeds and altitudes, which means they are also exposed to a wide range of temperatures. Aircraft can be exposed to great temperature changes during a single sortie, even if the point of departure is located in a temperate climate. After taking off from an airfield whose ground temperature may be more than 110 degrees F, an aircraft can be flying at an altitude where the outside air temperature is –70 degrees F and over mountains where the temperature on the ground is well below freezing.

If the temperature difference becomes excessive to the point of discomfort, it can interfere with efficient crew performance. Temperature variations to extreme limits can have a detrimental effect on a crewmember's ability to perform a specific task. It is difficult to relate this performance loss to the particular temperature level, but if the temperature deviates significantly from a "comfort zone," a decrement in skilled performance will eventually develop.

When temperatures are excessively cold, and especially if windchill is a factor, a crewmember's performance may be adversely affected during preflight procedures. Cold temperatures and windchill add to the stress of preflight operations. A crewmember may tend to "rush" through his or her checklist because of the extreme cold. Remember to consider the human element during preflight. Don't rush the preflight inspection because of the cold. Aircraft preflight inspections demand

even more attention to detail in cold weather.

Not only does the crewmember face performance problems in cold weather, but to operate and survive in extreme cold conditions, they must be aware of serious physical hazards facing them. They need to be able to recognize and treat these conditions. Some of the more extreme conditions include frostbite and hypothermia. It is also important to realize the effects of windchill on crew performance.*

Frostbite Warnings

Frostbite may occur if a part of the body is exposed to very low temperatures or cool temperatures accompanied by wind. This can occur almost instantaneously if you touch cold metal with your bare hand. In such a situation, the natural closing down of the surface blood vessels is so complete that the circulation stops altogether. The onset of frostbite may be gradual and painless, but in some cases, a feeling of numbness or tingling may provide useful warning signs. In the early stages, the affected part is white and waxy and surrounded by a red zone. Later, it may become more obvious the tissue has been seriously damaged. Severe frostbite may cause loss of body tissue and permanent damage.

The most commonly affected areas are the fingers, toes, ears, and nose; but in severe conditions, any area of skin which is exposed may be equally affected. It is most important to be on the lookout for the onset of this condition. Regular "buddy-system" inspections of areas of exposed skin should be part of your preflight.

Hypothermia Dangers

Hypothermia is the lowering of the body's inner core temperature. Any time a person is improperly dressed and exposed to severe cold weather conditions for a long period, they are going to suffer some degree of hypothermia. Signs of hypothermia include uncontrollable shivering, muscular weaknesses, stiffness of limbs, fatigue, an overpowering drowsiness, dim vision, staggering, falling, and eventually unconsciousness. The respiration and pulse may become almost undetectable. Obviously, you will want to prevent hypothermia or catch it in the early stages.

It is important to note that if cabin or cockpit conditions become excessively cold, frostbite or hypothermia may occur.

Clothe and equip adequately for any en route stops, overflight areas, and your final destination.

Windchill Warnings

In low temperatures, the added effect of windchill can create a serious additional hazard by lowering the effective temperature and increasing the possibility of frostbite. Even when the temperature may not be particularly low, it is still important to remember the danger of windchill. Even short journeys outside should not be made without taking necessary precautions.

A good rule of thumb to remember is when the temperature is above zero, for each mile per hour of wind, subtract one degree of temperature. For example: a +25 degrees F reading and a 20-mile-per-hour wind will give you a temperature reading of 5 degrees F. When the temperature is below zero, double the wind component and subtract it from the temperature for the approximate wind chill. At −10°F and a 20-mph wind, the equivalent windchill is (−10 −[2X20]) = −50°. Note the windchill effects on the following table.

continued

WIND SPEED		COOLING POWER OF WIND EXPRESSED AS "EQUIVALENT CHILL TEMPERATURE"																				
KNOTS	MPH	TEMPERATURE (°F)																				
CALM	CALM	40	35	30	25	20	15	10	5	0	-5	-10	-15	-20	-25	-30	-35	-40	-45	-50	-55	-60
		EQUIVALENT CHILL TEMPERATURE																				
3 - 6	5	35	30	25	20	15	10	5	0	-5	-10	-15	-20	-25	-30	-35	-40	-45	-50	-55	-65	-70
7 - 10	10	30	20	15	10	5	0	-10	-15	-20	-25	-35	-40	-45	-50	-60	-65	-70	-75	-80	-90	-95
11 - 15	15	25	15	10	0	-5	-10	-20	-25	-30	-40	-45	-50	-60	-65	-70	-80	-85	-90	-100	-105	-110
16 - 19	20	20	10	5	0	-10	-15	-25	-30	-35	-45	-50	-60	-65	-75	-80	-85	-95	-100	-110	-115	-120
20 - 23	25	15	10	0	-5	-15	-20	-30	-35	-45	-50	-60	-65	-75	-80	-90	-95	-105	-110	-120	-125	-135
24 - 28	30	10	5	0	-10	-20	-25	-30	-40	-50	-55	-65	-70	-80	-85	-95	-100	-110	-115	-125	-130	-140
29 - 32	35	10	5	-5	-10	-20	-30	-35	-40	-50	-60	-65	-75	-80	-90	-100	-105	-115	-120	-130	-135	-145
33 - 36	40	10	0	-5	-15	-20	-30	-35	-45	-55	-60	-70	-75	-85	-95	-100	-110	-115	-125	-130	-140	-150
WINDS ABOVE 40 HAVE LITTLE ADDITIONAL EFFECT		LITTLE DANGER					INCREASING DANGER (Flesh may freeze within 1 min.)						GREAT DANGER (Flesh may freeze within 30 seconds)									

* Windchill is a measure of heat loss and does not affect equipment.

Cold Weather Caution! continued

Treatment

Frostbite, hypothermia, and excessive windchill are, indeed, serious medical problems crewmembers need to recognize and, when possible, prevent. The following ideas for treating these conditions may prove useful — and may even save your life!

Frostbite

- Use body heat to thaw out the frozen area. If the hands are frozen, take the gloves off and put the hands under the armpit, between your legs, or any part of your body that is warm.
- Don't use your breath to thaw hands. The condensed moisture will ultimately chill instead of warm.
- If ears or feet are affected, use your hands to warm them by using one hand at a time. Remember to put your glove on frequently to warm your hand. Do not rub any area that has frostbite as you can damage the skin.
- The water immersion method to warm feet or hands is also a good procedure. The water should be just above normal body temperature. The recommended temperature is 100 degrees F to 107 degrees F. Caution: Do not use excessively hot water as tissue damage may result.
- A warm room is best. The temperature of the room should be at least 70 degrees F.

Hypothermia

- The ideal treatment is *rapid* warming. The victim has suffered a loss of the body heat reserve, and warmth must be restored immediately to help recovery. Safely rewarm the patient's body as quickly as possible.
- A good treatment is a warm bath and hot liquids such as cocoa or soup. Guard against scalding by being careful not to use excessively hot water.
- If a patient also has frostbite, treat them for hypothermia first.
- Use body heat to warm a person if you are stranded.

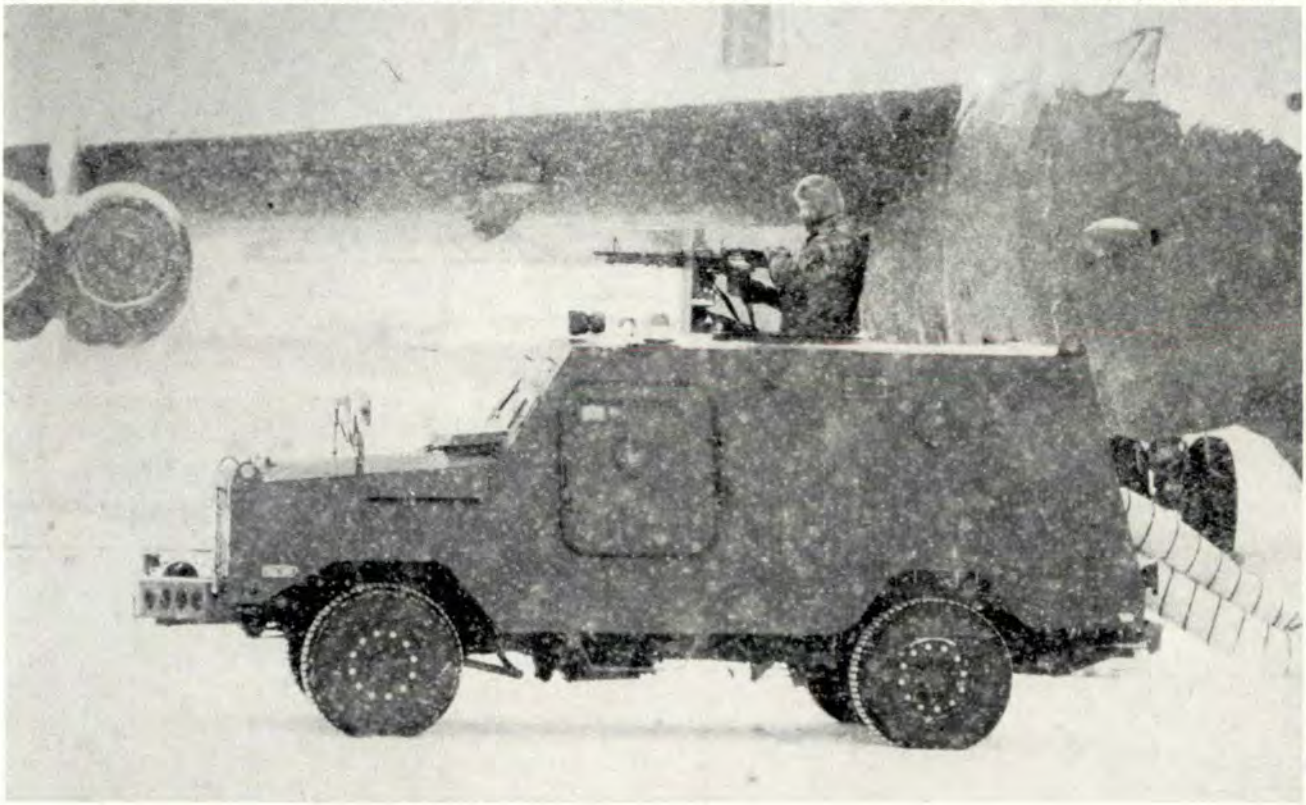
If medical aid is near, always request qualified assistance.

Cold Weather Protection

Protective clothing is the best means to shield our bodies from the cold. Multiple layers of loose-fitting clothing afford the best protection from cold. Layering should provide additional trapped air between layers, which allows moisture to escape and keeps in the warm air. These layers also allow versatility in that they can be added or subtracted to cope with different work rates. Another practical principle in design is to employ a thick, open-weave undergarment as the innermost layer. This will also trap more warm air.

Keep dry. Wet clothing tends to draw heat away from the body.

Security should not be jeopardized in spite of extreme cold temperatures! Be aware of cold weather hazards and proper protection.



Loosen heavy clothing when performing strenuous physical activity to prevent overheating and reduce sweating. Perspiration retained inside heavy clothing causes a loss of the clothing's insulation qualities. Wool is also a great insulator and the best when conditions are wet.

New Fabric

A good undergarment to wear is one made out of polypropylene®. This material, and others like it, takes moisture away from the body and keeps the air layer barrier. Polypropylene undergarments have been approved and are being used by flightcrews at the 343 TFW at Eielson AFB, Alaska, provided the undergarment does not extend outside the Nomex® flight suit. They must wear appropriate aeromed undergarments.

For your information, a new cold weather flying coverall and an anti-exposure coverall made out of Nomex® material are available to aircrew. They are very protective in cold weather.

Avoid wind when possible. Clothing insulation is greatly reduced by either wind or water penetration. An external windproof layer is, therefore, essential for cold protection in windy conditions. Generally, this external layer also serves to keep out rain and snow.

Heads, hands, and feet present special problems in cold weather protection. Heat loss from the head can exceed half the metabolic heat production. Many aircrew generally wear protective flying helmets, but these may be lost during a survival situation. Survival kits should contain additional protection for head, hands, and feet wherever space and weight can allow, e.g., wool hats, wool gloves, and wool socks.

Lead shot is sometimes added to survival kits for light-weight crewmembers. This allows the ejection equipment to function properly and maintain proper balance. In cold risk situations, lead shot should clearly be replaced with additional protective equipment.

For arctic operations, clothing for outside use should include proper head protection. Parka hoods should project well forward of the face and possess a malleable edge to enable them to be shaped around the face. Fur trim improves this protection even further.

Good protection of the hands in the cold is generally incompatible with the maintenance of sufficient sensitivity and dexterity. This poses a difficult problem, and it is usually practical to wear only relatively thin flying gloves with fingerless mittens on top. These are adequate in flight as long as the cabin temperature can be maintained well above the freezing point. For maintenance work, thin contact gloves prevent cold injuries arising from contact with very cold objects such as metal or parachute chord.

The best form of footwear depends on the climatic conditions. In cold, wet environments, footwear must be waterproof and provide adequate insulation. In cold and dry conditions, however, insulation is the more important factor.

Leather on gloves and boots tends to conduct the cold and should be avoided. Also, steel-toed boots are out. Steel conducts the cold quickly. Steel-toed boots should be avoided unless the job dictates otherwise.

Ultimately, whether on the ground or in the air, each crewmember is responsible for their protection against cold weather hazards. Mishaps due to extreme cold temperatures *can* be prevented through proper education and careful planning. Only through knowledge of cold weather problems and proper use of protective devices can we ensure the safety of personnel against the cold facts of winter weather. Know your safety measures and always use them properly. ■

Mishaps due to the extreme cold can be prevented through knowledge of cold weather problems and proper use of protective measures.

AVIATION HERITAGE

Pride in the Past . . . Trust in the Future

NOVEMBER

America has a rich heritage of aviation firsts thanks to the foresight, perseverance, and sacrifice of countless dedicated men and women.

In November, we are proud to salute the anniversaries of these bold pioneers:

11th	1918	World War I ended. Veterans Day honors the many contributions and sacrifices of our military personnel who have died in combat. On 11 November 1942, Medal of Honor recipient, Eddie Rickenbacker, was rescued in the Pacific after 27 days afloat following the crash of his B-17.
11th-12th	1957	General Curtis E. LeMay, USAF Vice Commander, set an unofficial world unrefueled distance record by piloting a KC-135 from Westover AFB, Massachusetts, to Buenos Aires, Argentina . . . 6,322.85 miles in 13 hours, 2 minutes, and 51 seconds.
22d	1952	Major Charles J. Loring, Jr., was leading a flight of four F-80s against enemy artillery units at Sniper Ridge in Korea. In the attack, Loring's plane was hit and badly crippled. Loring then deliberately dived his jet into the Red gun emplacements. For his courage, he was posthumously awarded the Medal of Honor. Loring AFB, Maine, stands as a tribute to his courage.
29th	1951	The USAF announced plans to build the first all-jet heavy bomber, the eight-engined XB-52. First flown in 1952, it is approaching 40 years of service.

These aviation leaders and events have helped shape our service into the greatest Air Force in the world.

FLIGHT LEADER

Air Leadership and Veterans Day

LT COLONEL KENT D. KOSHKO
Editor

■ On 11 November, we celebrate Veterans Day and honor the men and women who have committed themselves to the country, duty, and mission success. Many of today's enduring values and **safety standards** were derived from lessons learned through the leadership of military pioneers during past conflicts and wars.

■ In World War I, Captain Eddie Rickenbacker set the standard for courage and air leadership among American aviators. He was instrumental in developing basic formation and fighter tactics and aerial bombardment procedures.

■ During World War II, day and night precision bombing was improved. General Hap Arnold established the Army Air Corps Safety Program.

■ The "jet age" was ushered in during the Korean War as jet fighters were used by the US in combat.

■ The Vietnam conflict saw the evolution of the laser-guided bomb, improved maintenance training programs, and system safety concepts.

Recently, a friend, reflecting back on World War II, related to me the following personal story about air leadership.

Thoughts of war bring mixed feelings and also sometimes happy endings.

It was the middle of World War II in the Pacific Theater, not usually the place you would expect to see a German cross on the wings of a fighter.

My father was flying an American fighter plane. He was out on patrol, searching for Japanese Zeros, but

what he saw was a German Messerschmitt. Iron crosses were painted on the wings to reinforce the reality.

As Dad was trained to defend his country's territory, his first thought was to engage in aerial combat. Every move he made was instinctively countered by the German pilot with an equally stunning move. The dogfight became quite fierce. As the battle continued, each pilot developed a deep respect for his foe, due, in part, to the superb airmanship each displayed. As they chased one another and exchanged fire, it came as no surprise to either pilot that they finally crippled each other's plane and were forced to abandon them.

Each man parachuted to the same seemingly deserted island, but only my father still had his handgun. Out of the camaraderie among pilots and the respect that each had gained from the aerial battle that had just occurred, they decided to call a temporary truce. They agreed that whichever side they came upon first, they agreed to surrender. And the march began. At night, while one man slept, the other one stood guard.

Luckily, they reached the American lines first, and Dietrich surrendered, not to see Bill again, or so they thought.

Ironically, on a later flight, my father was shot down and captured by the Japanese. Unfortunately, he spent the remainder of the war in a POW camp.

As fate would have it, in 1969, Bill Kirwan walked into a restaurant called Dietrich's in Hermosa Beach, California. He didn't give the name a second thought until he heard the bartender speaking in a German accent.

It *was* Dietrich! They celebrated together and related how airmanship skills and their wartime experiences had played such a large influence on the rest of their lives. What a small world we live in.

On Veterans Day, we pay tribute to the men and women whose many sacrifices have made our Air Force safer, the peace more secure, and America strong. ■

COMPLACENCY IS A DEADLY SYMPTOM

1 LT GABRIEL H. EHRENSTEIN
99 FTS/SE
Williams AFB, Arizona

■ You're on a local instrument training mission, your third event of the day. Your student's class is about to graduate, and he's done an excellent job so far on this mission — he's grown used to the instrument hood, and he's even trying to instruct (he's returning as a T-37 FAIP).

As the warm sun beats down on you and you rest your arms comfortably on the canopy rails, your mind wanders. The student's slightly monotonous voice drones on, and you lean your head against the headrest.

"Let's see, how am I going to resolve that scheduling conflict that developed this afternoon?" you ask yourself. You hear something about being cleared to 11,000 feet, and you subconsciously write it down. "Maybe if I switch Lieutenant A with Captain B I can . . ."

"Eight miles from touchdown, gear should be down," you discern the controller saying. "But will the turn time work for Lieutenant A?" you wonder. "Three green, good pressure, full flaps," the student declares. "Yeah, right, confirm," you mumble, without really looking. Your approach book is on your leg, but you aren't focusing (you've been here a hundred times!). You just remember Captain B is DNIF as your student initiates the missed approach.

Complacency

Is the above a safe situation? Most of us would agree it isn't. The IP's mind is clearly not in the same jet as his body. We would all berate the hapless IP for not concentrating, feeling very self-justified. But we shouldn't be so hypocritical because the same thing could happen to any of us. We listen to our safety officers warn of the perils of complacency, nod our heads in agreement, and then promptly forget the message.

But does complacency always involve a pilot who just doesn't pay attention and knows it? No. I believe there are two types of complacency — purposeful and accidental. He who is purposefully complacent while flying is foolish and can't be helped no matter how many essays he or she reads. It's the accidentally complacent pilot I wish to speak to.

But this is not another "Don't be complacent" soapbox. I have realized accidental complacency can't be helped at times. The key is to treat it as soon as it's recognized.

We're all familiar with the effects

on our awareness of sleep deprivation, a routine mission, personal matters, and performance of a good student. Obviously, they all tend to deaden our senses and present a high threat of complacency — accidental complacency. I will offer several techniques to prevent this from becoming disastrous.

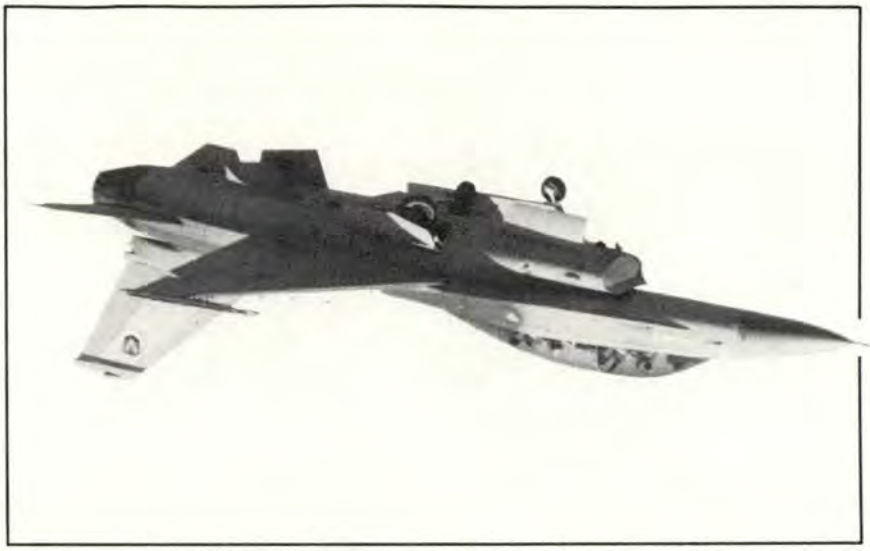
Bad Assumption

Our fictitious IP's first mistake was major — he assumed his student knew what he was doing. Perhaps the student did, but believing that lowers an IP's awareness. Before departing on a routine mission with a student (especially a good student!), take a quick look at his grade book and review his unsatisfactory missions. This might help you realize your student can violate the rules and kill you. They deserve all your attention. It should also be maintained that flying with another IP is especially conducive to accidental complacency — NEVER BE A PASSENGER!

Mistake #2 — if you're in that high threat environment of not being well rested, etc., DO NOT GET COMFORTABLE! AND STAY ALERT! Direct the air-conditioner on you. Don't lean your head back! Your body will beg you to make it more comfortable. Those are the first symptoms of complacency cropping up. Don't listen!

Mistake #3 — "Yeah, right, confirm." If you find yourself saying something without thinking about it, your mind is wandering. Some IPs have taught long enough that they could probably instruct a whole sortie and think about something else the entire time. How many times have you said "aimpoint, airspeed" or "don't duck under," or "trim" without thinking? I suggest you try to catch yourself saying something you didn't put much thought into — when you do, it's time to ***WAKE UP!***

You can do your best to physiologically beat accidental complacency, too. If you didn't get enough sleep, it's probably not a good idea to eat a heavy meal before flying — your stomach will draw blood from your brain, and you'll sleep with your eyes open. Plenty of cold water before you fly will also help keep you awake. If you keep yourself cool and somewhat uncomfortable in the jet, it's much easier to concentrate.



Regardless of the aircraft's attitude, staying alert and anticipating the next maneuver is mandatory in our high performance jets. STAY ALERT — STAY ALIVE!

One final recommendation is to make part of your student briefing a note to yourself where the pitfalls in the upcoming sortie may lie. For example: Is this your last flight? Your student's last flight? Have you had some problems that are nagging for attention? Is the FAIP board about to meet? And so on. Realizing that accidental complacency is a fact of human nature, and looking for or analyzing when it may affect you, may help you recognize and avoid it.

Cure

I'll leave you with one final suggestion. If you find your complacency symptoms manifesting themselves, *fly the airplane yourself!* There's no better way to wake up.

Ours is one of the few lines of work where falling asleep can get us killed. Even a momentary lapse in concentration can have catastrophic consequences. Consider that, and be aware of your complacency symptoms just as you're aware of your hypoxia symptoms — and as with hypoxia, remember to treat yourself immediately! ■

If you find yourself becoming complacent, fly the aircraft yourself. There's no better way to wake up. A momentary lapse can have catastrophic consequences.

This executive-level gathering provided a forum for senior Air Force guidance and policy discussions which were applicable to both the inspection and safety arenas.

WORLDWIDE INSPECTION AND SAFETY CONFERENCE

LT COLONEL KENT D. KOSHKO
Editor

■ The Worldwide Inspection and Safety Conference, held at Norton AFB in mid-October, was a success. The theme was "Inspection and Safety Synergism Into the 1990's."

This executive-level gathering provided a forum for senior Air Force guidance and policy discussions which were applicable to both the safety and inspection communities. Seminars covered a variety of key safety topics, including initiatives in ORIs, human factors, life sciences, safety information privilege, mishap trends, and a new approach to "what is safety."

Highlights included the keynote address by Lt General Bradley C. Hosmer, the Air Force Inspector General. He emphasized the importance of safety programs at all levels and the need for continuous crossflow of information throughout the Air Force. He discussed the confidence-building process we are experiencing in the Air Force. He emphasized the importance of telling the commander what is really going on in a unit, even if it's bad news, so the right decision will be made. He noted a common ingredient to all successful units is maintaining high standards. General Hosmer challenged each participant to seek innovative ways to continue the trend of decreased mishaps. He congratulated everyone for the banner year the Air Force experienced in FY89 and encouraged us to share the conference safety information with unit and command personnel. He recommended we keep lines of communication open in order to resolve complex issues.

Major General Alexander K. Davidson, Commander, AFISC, said we are experiencing an unusual degree of change in the Air Force, and we need to be prepared for these differences in the way we do business.

Brigadier General Chalmers R. Carr, Jr., Director of Inspection, summarized how inspections will be conducted in the 1990's considering fiscal constraints and reduced force structure. He said sharing resources during multi-MAJCOM inspections will become more prevalent. Also, AFISC will not provide direct oversight of the IG teams, but act as the liaison with the MAJCOMs.

Brigadier General James M. Johnston III, Director of Aerospace Safety, reminded us that most mishaps are caused by human factors. Commands are providing good mishap analysis, and he encouraged them to continue crossfeeding information. His major concerns included the loss of experience among flying personnel and the force structure drawdown. He saw the need to advance the rising status of command and squadron safety officers and to address safety programs in space. ■

Brig General Carr makes a point as Lt General Hosmer and Maj General Davidson listen. As General Carr pointed out, multi-MAJCOM Inspections are a growing part of the inspection process.

Lt General Hosmer stresses confidence building, meeting future challenges, the need to provide crosstalk among commands, and the importance of telling commanders the truth. He emphasized it is more important than ever to tap into our blue suit and civilian DAF community for innovative ideas.

This Could Happen to You

LT COLONEL KENT D. KOSHKO
Editor

Task saturation is a growing safety concern among our aircrews who are flying the most complex weapon systems and demanding scenarios in our history. As aircrews become proficient in our complex weapon systems, they need to develop a sense of "multiplexing" — the ability to efficiently accomplish several tasks simultaneously. This is especially important during in-flight emergencies when attention must be divided between flying the aircraft and completing the necessary critical action items. This article, and future issues of this magazine, are designed to help you plan ahead and enhance your task management skills.

JAMES M. JOHNSTON III
Brigadier General, USAF
Director of Aerospace Safety

■ The following is an unfortunate example of a routine flight where distractions caused loss of situational awareness and resulted in a fatal ending.

The F-111A crew was on a student upgrade sortie. Shortly after takeoff, the right canopy hatch opened to the full up position. Reaching a maximum altitude of 300 feet AGL, the aircraft began a descent accompanied by wing rock and nose oscillations. One minute after takeoff, the landing gear was lowered. The aircraft continued to descend and entered a left, nose-low roll. Seconds prior to impact, an out-of-envelope ejection was initiated. Both crewmembers were fatally injured, and the aircraft was destroyed upon ground impact.

When the canopy came open shortly after takeoff, the crew became distracted by wind blast and noise level.

As the aircraft slowed, the gear warning horn sounded, and the landing gear and flaps extended. The increase in drag from the gear and gear doors worsened an already critical situation and resulted in loss of aircraft control.

What happened? Both pilots channelized their attention on the problem of the open canopy and did not pay enough attention to aircraft control. In this case, the failure to manage their actions during an emergency cost the aircrew their lives.

Task management for the flight starts with thorough mission planning. After the normal paperwork is checked, crews should discuss emergency situations, including multiple emergencies and how to deal with them. Practice them in the simulator. Talk about managing your actions. Don't be surprised by emergencies — be prepared to deal with them in a calm and calculated manner. The more you discuss and practice them and analyze your actions on the ground, under a comfortable setting, the better prepared you will be to handle these pressure decisions in flight.

Reaction time during emergencies is often critical, but actions handled incorrectly or actions overlooked due to channelized attention can aggravate an already critical situation. We are taught from day one, during UPT or UNT, to handle emergencies quickly and precisely. That's all right if you get the right switch at the right moment. But what if you don't? You may have compounded an already critical situation.

So ensure you fully analyze your aircraft's condition, taking care of the most important steps first. Don't fixate on one problem. Scan the entire cockpit and external environment so you can effectively distribute your time and attention.

In a crew aircraft, ensure one pilot is designated to fly the aircraft during an emergency situation, while the other crewmember helps as best he or she can. The bottom line is, in an emergency situation, always **FLY THE AIRPLANE FIRST!** Don't become so distracted you lose situational awareness. ■

FIT FOR FLIGHT

CAPTAIN CHRISTINE FORTINBERRY
USAF SAM/NGI
Brooks AFB, Texas 78235-5301

■ Flying multimillion dollar, high performance aircraft is a real trip. But sometimes the trip is too far because we aren't fully prepared. Part of the problem may be proper education on nutrition, including knowing our own limits.

Interesting Stats

Over the last 3 years, there have been 61 physiological incidents in which missed meals or poor eating habits were contributory. These incidents involved 62 crewmembers, 35 of which were student pilots. In many cases, the crewmembers adopted their poor eating habits because of dieting, lack of time, or previous lifestyle. Such nutrition practices are not unique to crewmembers of the Air Force. We are part of a society that is fast-moving, anxious, and sometimes "hyper." We spend millions of dollars on antacids and diet books and relatively little on tasty, beneficial meals.

Poor nutrition increases your susceptibility to the stresses of flight. Hypoxia, hyperventilation, and fatigue are just some of the stresses which missed meals can exaggerate or aggravate. The combination of these stresses with night refueling in weather creates a very dangerous situation requiring more than skill to resolve. You may never find yourself in that predicament if you have taken the time for proper rest and nourishing meals.

A Great Program

Today we know more about the human body and how different things influence our performance than ever before. Many in-flight kitchens and base dining facilities are doing a good job of offering healthy heart options. We applaud their efforts.

A Fitting Comparison

Nutrition and athletic performance are popular subjects in the sports world today. Proper nutrition is the foundation for optimal physical performance and can give one competitor the "leading edge" over another.

The physical demands of flying today's aircraft are real. Coupled with the challenges, mission complexity, and responsibility for a valuable national asset, your nutritional needs can certainly exceed those of an athlete.

You must be fit — both mentally and physically, or you may not successfully complete the mission. Even worse, you might not come back alive! Consequently, proper nutrition is essential to give *you* the "leading edge."

Fuel for Performance

Energy needs for physical activity are met by the carbohydrate, protein, and fat in our diet. Numerous authorities are recommending a diet consisting of at least 50 to 60 percent carbohydrate, 20 percent protein, and a maximum of 30 percent fat.

Many of you may still be leery of carbohydrates, believing that "bread and potatoes are fattening." This misinformation dates back to the low carbohydrate weight reduction diets popular in the mid sixties and seventies. These were actually found to be very dangerous, producing fatigue, dehydration, nausea, and vomiting as side effects. It's the butter and sour cream we added to the bread and potatoes that are fattening. Carbohydrates and protein both provide 4 calories per gram, and fat provides 9 calories per gram — over twice as many!

Carbohydrate rich foods, such as whole grain breads, cereals, rice, pasta, fruits, and vegetables are an excellent source of energy, not to mention vitamins, minerals, and fiber, and should form the foundation of your meals. In fact, numerous major medical associations are recommending this to help reduce the risk of various diseases to include coronary artery disease and some forms of cancer. Just limit the amount of fat added!

Start With the Basics

The essentials of a good nutrition plan are actually quite simple. Figure 1 outlines the four food groups which have been developed to categorize foods with similar nutrient content. Use these and the recommended number of servings as a core to your diet. Increase the number of suggested servings or add fats, oils, sugars, and desserts (in moderation) to meet your individual caloric requirements. It is important to remember that no single food or food group contains the proper nutrients in sufficient amounts to meet all our needs. Eating a generously mixed and varied diet is the key to optimally meeting your nutritional needs.

Plan of Attack

One of the keys to good nutrition is a plan that meets your work schedule, lifestyle, and other daily demands. Often, with your busy schedule, building your day's total intake around four to six small meals works best. This does not mean full meals, but supplementing one or two fuller meals with smaller meals or snacks. Emphasize nutritious snacks, not a cup of coffee or diet soda and a candy bar. Try to have some kind of grain, protein source, and fruit or vegetable (such as a bagel, 2 ounces of skim-milk mozzarella cheese, and raisins).

Figure 2 provides a plan for consuming five meals a day. This is not intended to be a recommended calorie level but simply an example for developing a meal pattern that may suit your needs.

The Gist of It

- Develop a meal pattern and commit to it. Missing regular meals, such as breakfast, lunch, or dinner, reduces nutrition which can lead to fatigue.
- Supplement the ability to eat only one or two meals in a hectic schedule with nutritious smaller meals or snacks.
- Have readily available foods on hand such as whole grain breads, muffins, bagels, rolls; fresh or dried fruits, fresh vegetables, lean meats, and low-fat cheese.
- Use the four food groups as a guideline and build from them. Consume a variety of foods daily to meet all nutrient requirements.
- Be aware of intolerances you may have to certain foods. Identify those and avoid them.
- Meet individual caloric requirements with adequate energy intake.

Your body is a precision, high-powered machine. Don't abuse it by giving it low octane food . . . give it high test every chance you have.

I would appreciate hearing from you on your base's nutrition program. Call me at AUTOVON 240-3242.

This article was designed to give you some guidelines to begin building an optimal nutrition program. Future articles will cover fluid needs, vitamin and mineral requirements, fiber, fat, and more. ■

Figure 1.
The Foundation of a Good Diet

Food Category	Examples	Recommended Daily Servings
1. Milk and milk products — Source of calcium, riboflavin and protein	1 cup skim or 1% low fat milk 1 oz low-fat cheese 1 cup low-fat yogurt	2
2. Meat and high protein — Source of protein, niacin, iron, thiamine	2 oz cooked *lean* meat, poultry, or fish 2 oz low-fat cheese ½ cup low-fat cottage cheese 4 tbsp peanut butter 1 cut dried beans or peas 2 eggs (high in cholesterol)	2
3. Fruits and vegetables — Source of vitamins A and C	½ cup cooked ½ cup juice 1 cup raw	4
4. Grains — Source of carbohydrate, thiamine, iron, and niacin	1 slice whole grain bread ½ cup cooked pasta or cereal 1 cup ready-to-eat cereal	4

Figure 2.
Sample Five-Meal-A-Day Diet

	Calories	Carbo-hydrates (gms)	Protein (gms)	Fat (gms)
Breakfast				
1 cup skim milk	80	15	2	-
2 oat bran muffins	240	38	8	6
1 whole grapefruit	80	20	-	-
Lunch				
2 oz turkey	110	-	14	6
2 slices whole wheat bread	140	30	4	-
2 tsp mayo	90	-	-	10
1 cup carrot sticks	50	10	4	-
1 large apple	80	20	-	-
1 cup skim milk	80	15	2	-
Snack				
1 bagel	140	30	4	-
1 oz low-fat cheese	156	-	14	10
½ cup raisins	160	40	-	-
Supper				
4 oz broiled haddock	220	-	21	12
1 cup cooked rice	140	30	4	-
½ cup cooked broccoli	25	5	2	-
Spinach mushroom salad with 1 tbsp oil and vinegar	75 72	15 -	6 -	- 8
Snack				
3 cups popcorn	70	15	2	-
2 tsp margarine	90	-	-	10
1 cup apple juice	120	30	-	-
TOTALS	2,218	313	87	62
PERCENT OF TOTAL CALORIES		(56%)	(16%)	(25%)

A GREAT SAVE

LT COLONEL KENT D. KOSHKO
Editor

■ Many safety systems are designed for emergency use but are seldom, if ever, used. The reliable Aircraft Arrestment System is used almost daily by aircrews across the Air Force. It is one of our most dependable safety systems in operation today.

Emergency!

During an emergency on takeoff or landing, screaming down the runway at high speed in your jet, with the hopes of successfully engaging the barrier, can be an uncomfortable feeling, to say the least. But thanks to the diligence of so many dedicated men and women who maintain the aircraft arrestment systems worldwide, the ride can be somewhat less stressful . . . because they usually end up in a **great save!**

Reliable Safety Systems

In 1988, there were 1,244 successful aircraft arrestments in the Air Force in addition to 1,313 in 1987! These figures equate to saving millions of dollars of our combat assets and untold injuries to our highly trained aircrews. In many cases, the aircraft arresting system is the pilot's last chance to save his jet and possibly his life.

Takeoff and landing emergencies occur almost daily throughout the Air Force. Last year, successful engagements were accomplished by pilots flying 19 different Air Force and Navy aircraft (figure 1), from 10 commands (figure 2), and at speeds ranging from 5 to 185 knots (figure 3). Aircraft and aircrews were saved thanks to 10 different arrestment systems (figure 4). The most common emergency condition was total hydraulic failure where 286 arrestments occurred (figure 5).

The BAK-12 system is considered the most popular of all the arresting systems. In 1988, it was involved in nearly 54 percent of the aircraft arrestments. When coupled with the BAK-14 system, used at commercially operated airfields, it accounted for another 25 percent of the saves. The BAK-12 is a rotary friction-type energy absorber consisting of two identical units using standard B-52 wheel brakes. A steel cable stretches across the approach and departure ends of the runway, waiting to catch a jet's tailhook. There are approximately 310 BAK-12s in the Air Force.

The BAK-9 aircraft arresting gear

Figure 1.
1988 Barrier Engagements
By AIRCRAFT TYPE

F-4	502	QF-106	4
F-15	253	F-14	3
QF-100	120	T-38	3
F-111	87	TORONADO	3
F-16	82	UNKNOWN	3
A-7	73	S-3	2
A-4	46	F-100	1
F-18	30	F-104	1
E-2	12	F-106	1
A-6	11	T-2	1

Figure 2.
1988 Barrier Engagements
By MAJOR COMMAND

TAC	570
PACAF	258
USAFE	223
AFLC	51
ANG	46
AFSC	31
MAC	30
SAC	26
AAC	8
ATC	1

Figure 3.
1988 Barrier Engagements
By SPEEDS

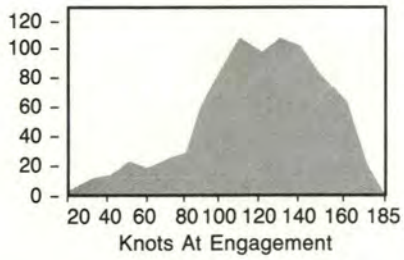


Figure 4.
1988 Barrier Engagements
By ARRESTING SYSTEM TYPE

BAK-12	667
BAK-12/14	318
BAK 13	164
BAK 9	71
BAK 13/14	9
MA-1A	9
BAK-9/MA-1A	3
E-5	3
MAAS	1
610SII	1

Figure 5.
1988 Barrier Engagements
By CAUSING CONDITION

Total Hydr. Fail	286	Engine Prob.	31
Unknown	217	Generator Prob.	25
Certification	153	Flap/Slat Prob.	23
Drone Recovery	130	Flt Control Prob.	21
Gear Prob.	103	Chute Prob.	17
Exercise	54	Tire Prob.	16
Others	51	Abort	15
Brake Prob.	42	Wet Runway	13
Anti Skid	39	Electrical Prob.	8

engaging device consists of a pretensioned hook cable and/or a nylon net deflected cable separated nominally by 35 feet. The hook cable is stretched across the active runway, approximately 3 inches high. Engagement capability is bidirectional. A 40,000-pound aircraft engaging the barrier at 160 knots can be arrested in just 950 feet. Max engagement speed is dependent on aircraft gross weight and may be as high as 190 knots.

The BAK-13 is a rotary hydraulic system used in AAC, PACAF, and USAFE. This system provides for rapid cycle recovery of hook-equipped aircraft in an austere forward environment. This system accounted for over 10 percent of the arrestments in 1988.

The BAK-14 retractable cable support system connects with the BAK-12 or any other comparable system. It is designed for use at commercially operated airfields and to support F-16 operations due to its low ground clearance. The cables, which are controlled by tower personnel, are recessed below the runway surface.

Another type of arresting system used by the Air Force is the MA-1A. It is the oldest system and has been used since the Korean War. The MA-1A is designed to catch aircraft which do not have tailhooks. Last year, nine aircraft were saved with the MA-1A. The E-5 is similar to the MA-1A without the net. The cable

continued

A Great Save

continued

is raised by rubber doughnuts to catch the aircraft's tailhook.

The full-size net system, which will replace the older MA-1A, is used to arrest aircraft without tailhooks. It is also used in conjunction with others like the BAK-9, BAK-12, BAK-13, and the newest state-of-the-art mobile aircraft arresting system (MAAS). The full-size net system uses ship anchor chains like the MA-1A and uses a large net erected on the departure end of the runway to catch and slow the aircraft. Holloman AFB, New Mexico, has the full-size net system installed.

The MAAS consists of two identical mobile trailers equipped with a BAK-12 unit, which are designed to be transported to a bomb-damaged runway or to any other site such as a road or highway where required aircraft emergency landings are anticipated. The system can be installed in approximately 28 minutes.

Pilot's Viewpoint

From a pilot's point of view, it's comforting to know that such a reliable system is ready and available 24 hours a day to handle a variety of takeoff and landing malfunctions and emergencies.

We salute the men and women who maintain these critical aircraft arrestment systems in all weather conditions throughout the year and around the globe. Thank you for many great saves! ■

□ In a recent close call, an F-16C was flying a tactical straight-in approach at 600 feet AGL on 9 miles final in the landing configuration. The pilot reduced power to idle and opened the speed brakes to reduce closure on the preceding aircraft. After a brief time in idle, he advanced the power and closed the speed brake to stabilize at final approach speed. As the throttle was advanced to military power, the aircraft felt sluggish and would not accelerate. The 15 degrees angle-of-attack (AOA) horn sounded, and the pilot began a descent to decrease the AOA while selecting afterburner — with negative results.

The pilot then raised the landing gear and checked the speed brakes closed while continuing the descent at slightly over 15 degrees AOA. With the throttle in afterburner, the pilot positioned the electronic engine control/backup control (EEC/BUC) switch to off, with no noticeable change in thrust. He snapped the throttle to military power and placed the EEC/BUC switch to BUC. The thrust immediately increased, and the aircraft began to climb.

The pilot continued to climb to 2,000 feet MSL and, at approximately 3 miles on final, began a descent for landing. When landing was ensured, the pilot configured the jet for landing and began a slightly steep approach. He landed approximately 2,000 feet down the runway in a three-point attitude.

The pilot began full antiskid braking, called for the cable, and lowered the tailhook, engaging the departure end BAK-13 between 80 and 90 knots. The aircraft was successfully "arrested," the engine shut down, and the pilot egressed safely.

Quick thinking by the pilot, coupled with a ready and reliable arrestment system, resulted in another great save! □

Enter the Classic 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 in December by a panel of experts on dumb humor. 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, Lt Col Bill Rinehart. Your neat little prize is in the mail.

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

THE WINNER IS:

Lt Col Bill Rinehart

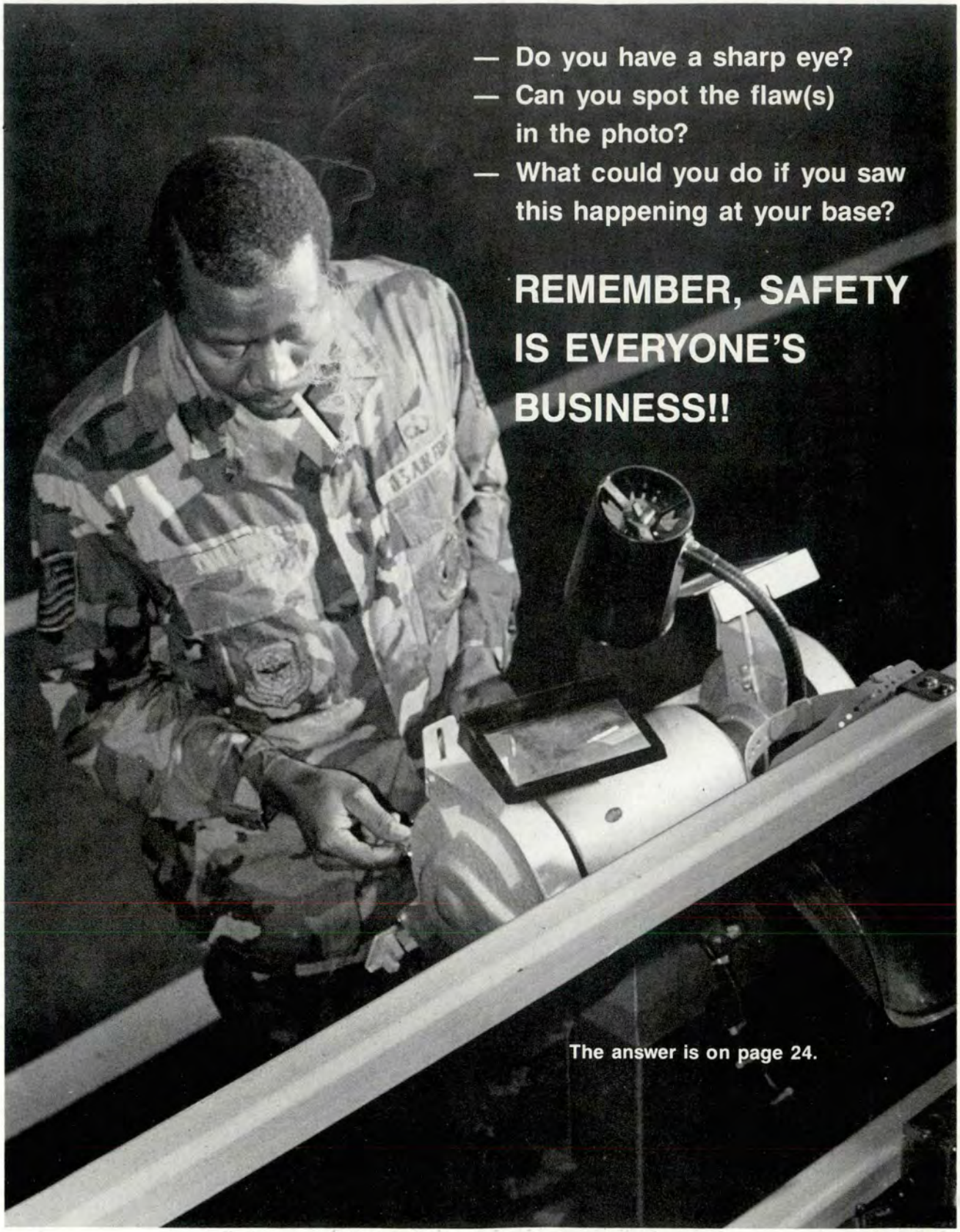
171 AREFW/MA (PaANG)
Greater Pittsburgh International Airport
Pittsburgh, Pennsylvania

Honorable Mentions

1. **". . . So I said to my career advisor, I don't care where you send me as long as it's not Goose Bay."**
   Chuck Woodside, SA-ALC/PMR, Kelly AFB, Texas
2. **Boy, you think the pilot could warm up his own seat!**
   TSgt Sandy Williams, 49th Test Team, Dyess AFB, Texas
3. **Suntan lotion and golfballs?! We brought the wrong pallet!!**
   SrA Barbara Hughes, 33 TFW/MAMI, Eglin AFB, Florida
4. **Batteries not included!?!**
   SSgt Susan Dollery, 49th Test Team, Dyess AFB, Texas
5. **L. TV dinners again? How are we going to cook 'em??**
   R. I'll go upstairs and crank up the engine — you stand behind it and yell when they're ready!!
   SSgt George L'Heureux, 60 MAW (Debrief), Travis AFB, California

SAFETY POSTER
OF THE MONTH

WHAT'S WRONG IN THIS PHOTO?



The answer is on page 24.

THERE I WAS

■ There I was, on a hot, muggy, summer day, waiting for our load to arrive for our beloved C-130B. Our mission today was to fly shuttles for a "user unit" going home from an exercise. "No big deal," I thought to myself.

As we loaded the first pallet aboard the aircraft, I noticed it was quite hard to push on the dual rail system. As loadmaster, I thought "Warped pallet," as I doublechecked the weights. After we loaded the pallets, all of which were hard to push, I thought to myself, "BOY, ALL THESE PALLETS ARE WARPED!"

I had begun to investigate further and asked the loading agency if these were the correct weights. Then the navigator yelled down to the cargo compartment, "Come on up for the crew brief, load. We're running behind schedule." "Okay, okay," I answered, as I signed off the load. (This was another broken link in a long chain of events.)

As we began engine start, I noticed the aircraft was sitting "kind of low." I was contemplating this when I remembered we had taken on quite a bit of fuel to carry us through the day, and we were close to max takeoff weight anyway. It just didn't look right, though, when I entered the aircraft ....

As we began to taxi out of parking, the AC noted the aircraft was slow to move. Our engineer explained we were parked on an incline. Then the engineer asked me if all the cargo weights were correct. I explained everything matched on the manifest, and the weights were correct to the best of my knowledge. The engineer reassured everyone that he put "a few extra thousand pounds on the TOLD (takeoff/landing data) card for MOM AND THE KIDS, so we'll be okay for takeoff if the cargo weights are off a little."

Approaching the runway, the pilot announced, "This will be a rolling takeoff, crew," as I buckled in for takeoff in my favorite position in the back of the aircraft. Our sluggish C-130B began to lumber down the runway, skybound. Sitting in the tail — I mean the last seat in the rear of the cargo compartment, I didn't feel the usual acceleration for takeoff and wondered .... Nothing was said in the cockpit except the usual stuff, and then "GO!!"

Our overgrossed C-130B slowly began to climb when I heard "Full power" come over the interphone. It seems the 50-foot pine trees at the end of the runway were getting taller instead of smaller!! After clearing the pine trees, tower called us and thanked us for the "air show." "Some airshow it almost was," I thought, as the pilot called back and asked me, "What did you say those pallets weigh?"

The crew began to investigate the slow climb, and we decided to step climb to our max cruise altitude to see if we were really overgrossed. The engineer figured max cruise altitude with the information we had and determined we should reach "about 25,000 feet." When the aircraft refused to climb any higher than 18,000 feet, we calculated we were about 25,000 pounds overgrossed!

It almost became a BIG DEAL after all, with *all* the factors figured in. As it turned out, the pallets were not weighed, but simply tagged at about 2,500 pounds each.

Several lessons here, but the one that sticks out in my mind most is aircrews are not the only ones susceptible to get-home-itis. Anyone can catch it, especially "user units" not flying with you. However, the aircrew must remember they will always be held ultimately responsible to answer questions when something goes wrong. I just pray you never have to answer up with your life. We were lucky. The next time I have a "warped" pallet, I will measure it to see how warped it really is! Finally, I don't care if "it came on a C-130" or not — if it does not look right, add up, check out, or feel good, then I'd rather *live* with a late takeoff. ■

Why Safety??

COLONEL CHARLES I. MAAS
Directorate of Aerospace Safety

The Challenge

■ FY 1990 and the immediate years ahead offer challenges to the Air Force ... and particularly to flight safety officers ... unlike any we've seen in recent times. The era of "deep peace" that many are forecasting is going to be a challenging time for warriors. Even though their skills will still be vital to the nation as a whole, keeping them honed will be tough. Dollars are dwindling and times are changing. Are you still going to have a job? The answer is an emphatic YES!

A Little History

What are the needs of tomorrow's Air Force that will differ from yesterday's and today's? One of the most critical will be the way we handle our assets. Twenty years ago, in 1969, the Air Force experienced 299 major aircraft mishaps — the equivalent of over four fighter wings! And those figures don't include combat losses. Yes, they flew more hours then ... nearly three times as many. But the rate was 4.0 compared with approximately 1.6 for FY89.

No doubt about it, we've cleaned up our act a bit. But there's a little hidden problem that's begun to worry some of us: We've ceased improving. For the last 7 years, the Class A mishap rate has vacillated between about 1.5 and 1.8. We seem to have gotten stuck on a plateau.

Change

But that's only a part of the problem. The more pervasive issue is that the equation is continuing to change. If you happen to be a fan of some of the futuristic thinkers like Toffler, you'll recognize corroboration of the principal of a rapidly increasing *rate of change*. That means we're not only seeing change, the rate at which the changes are occurring is increasing, too. That's exactly what's happening to the costs of weapon systems and the value of the crews who fly them. It costs more to buy B-2s and ATFs than we had imagined. The training of crews costs more than it ever has because it's more sophisticated. The result is that a loss makes a much deeper impact than before. The simple bottom line is that the cost is going out of sight at the very time it appears we're in for some deep cuts in the defense budget.

FSO Charter

So, flight safety officer, what's your part in all this? I predict your value to the commander is going to grow exponentially. The leader charged with making the tough decisions will need every bit of good advice to get the most out of the assets available. You're going to be a key risk manager; someone with a different perspective and a different set of tools for being smarter about every component and every facet of the mission.

And that's what it really comes down to ... managing risk. In the past, the safety function has been maligned for being an elite bureaucracy which demanded the impossible (zero mishaps) while spending most of its time investigating other's mistakes. After all those reports we

filed, the data got fed into a black hole somewhere, and that's pretty much the last you ever saw of it.

New View

That's changing, too. The top view of safety has become much more pragmatic. Safety is no longer held up as some sacrosanct moral requirement (recall the perennial caveat "safety is paramount"?). The official position is that from now on, the mission is paramount, and prudent risk awareness and control are part of getting the mission done well and efficiently. (As a minor aside, there may be some of you, or some of your acquaintances, who don't want to make these changes. Unfortunately, I don't see many options. It's a bit like saying, "I don't do computers," while the rest of the world around you has already taken the plunge into the information age. Anachronisms get left behind.)

New Tools

That's big change. Along with that change is the realization that you . . . the folks at the point of the spear . . . need tools at your level to help implement risk management. That's an effort the Directorate of Aerospace Safety at AFISC is very much involved with. Here are some examples.

The Aerospace Safety Automation Program (ASAP) has finally been funded. This program will ease your administrative burden and give you analytical tools to do your job better. Among these will be software to vastly speed report preparation and analyze trends. Look for distribution of this package in the next few months.

How about a better handle on identifying and being able to forecast critical human factor breakdowns that result in aircraft losses? The Aviation Mishap Prevention (AMP) Program is intended to do just that. Contractors are in the final stages now of establishing parameters that will help identify human failure modes and causes. When this comes on line, we'll have a better tool than ever before for dealing with the causes of most of our mishaps.

Another fundamental shift in philosophy is causal analysis. What's different about this, you ask. Don't we look for causes now? The answer is yes, but the system isn't structured to benefit much from that discovery. No doubt from time to time you've racked your brain and queried the safety database to come up with why a certain kind of event happened, or what the causes were of similar events in the past. More often than not, I'll bet you were frustrated with the answer because you just couldn't come up with *why*. Over the years, we've gotten very good at tracking events. We can tell you what happened, when it happened, and compare those factors in a dozen different ways. But telling you why is not so easy . . . and that's something we intend to fix.

Here are some of the concepts the Directorate of Aerospace Safety is examining in trying to turn this process around.

- How can we automate the entire Class A report? Sure seems like we ought to be able to develop a workable, fill-in-the-blanks, electronic format that would be transportable on disk. Even better, how about a way to send report messages of all kinds electronically?
- Before we do that, we need to simplify the entire reporting system before we drown in paperwork, forms, and summaries. Right now it takes several years to learn the ins and outs of the safety reporting systems — that's counterproductive.
- Causal analysis. I mentioned this before. We think this process is the best hope for driving the Class A rate lower and improving safety's direct contribution to the mission.

Summary

Now let's summarize this some before we wrap it up.

What Is Safety

The Air Force "does" safety because our top leaders believe it's good business. Safety isn't an idea we worship, it's a practical effort capitalizing on good judgment that helps avoid making costly, unnecessary mistakes. If ever there was a time for innovative concepts on how

continued

Why Safety?

continued

to work smarter and better, it's now!

Safety is an active process of planning ahead to avoid risk. Only by determining what the potential risk factors are can you advise your superiors whether to press on, back off, or change the tactics to mitigate the potential.

How Do You Make It Work?

To do this, you have to work next to your commander. You have to be competent, he (or she) has to trust you, and you need to have your act together. If you're three layers down in the bureaucracy and the only time you ever see the commander is at the going-away party when someone leaves, you're out of the loop. Chances are you aren't contributing very much to the mission. Stand up and get responsible; not everything about your job is popular, but your commander needs you as never before.

Your primary function is to create the kind of influence that persuades people to avoid risk. That's prevention of the first order; investigating a mishap only has potential for prevention of the second order. We need first order prevention very badly.

You need to be practical about your business and do your best to focus on the important issues rather than get swept away by the pressing ones. Creating positive influence is a lot more than just conducting one more inspection or filing one more report. This is a people business; people who plan well and thoughtfully avoid making unnecessary mistakes.

How well are you doing? To find out, don't just look at your suspense log . . . look at your mishap and injury rates. If you have every "i" dotted and "t" crossed but people are getting hurt and assets are being squandered, your program is not working properly. On the other hand, if your unit works cohesively and smoothly, and your injury and loss rates are low, your program must be in reasonable shape.

Conclusion

Even though the function of risk management (determination, awareness, and control) is a process difficult to get a firm grip on, the results of a successful program are overwhelmingly positive. Successful commanders of winning organizations are *practicing risk management* even if they call it something else. The challenge of today and tomorrow requires us to get the most benefit from every asset we have. You safety officers, NCOs, and civilian professionals have a golden opportunity to demonstrate the value you can add to your unit by being positive efficiency experts. Good hunting!. ■

What's Wrong in This Photo?

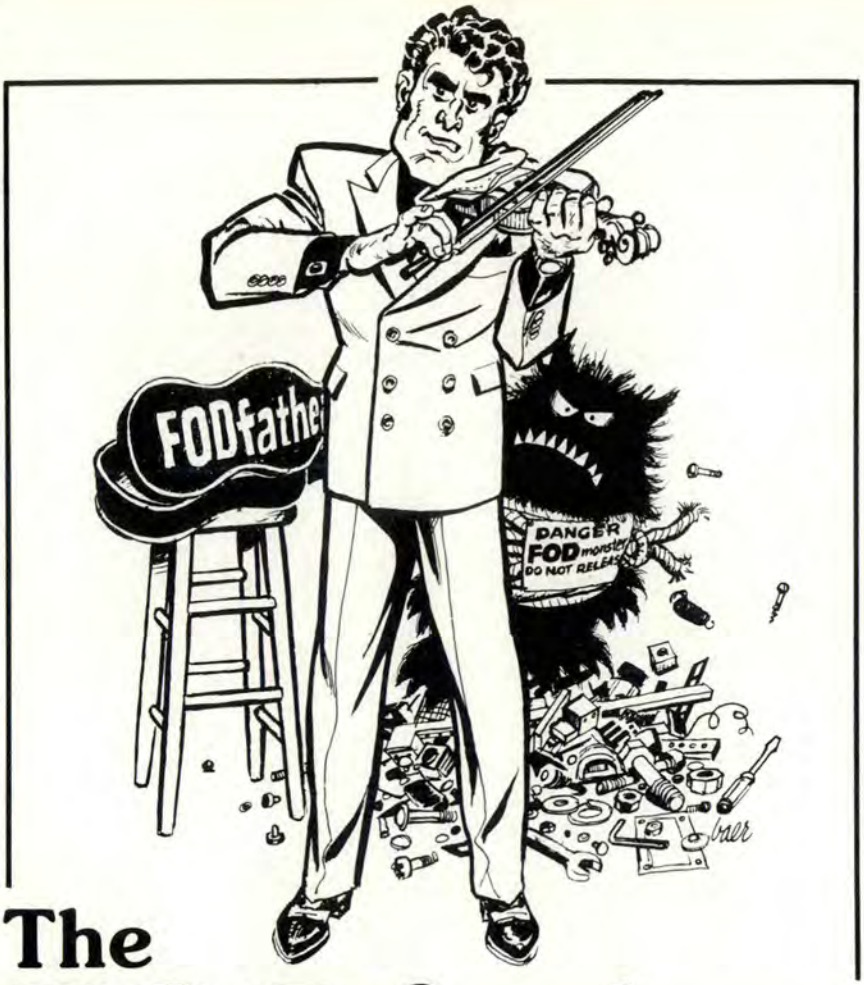
continued from page 20

■ An obvious discrepancy in this staged photo is that the operator is not wearing eye protection. The operator has also failed to properly adjust the shield and the tongue guard. In addition, work rests are required to be used during all offhand grinding operations. These help to steady the work piece and prevent it from flying back and hitting the operator. When properly adjusted, the rest should be set with a minimum opening of 1/8 inch to prevent the work from being jammed between the rest and the wheel.

From the position of the rest and shield, it is obvious the grinder was not inspected prior to use.

Smoking is prohibited in most industrial areas. Operating a grinder with a cigarette in your mouth is definitely not a good idea.

The next time you have the need to operate a grinder, it is a good idea to review AFOSH Standard 127-12, Industrial Machinery. Chapter 4 of this publication contains the procedures for safely operating an industrial grinder. ■



The FODfather

CMSGT ROBERT T. HOLRITZ
Technical Editor

■ The return of FODfather in our September issue has brought many responses from both the ops and maintenance communities. Without exception, the comments were positive, and I received many suggestions on how to improve the column's content and format. One of the suggestions brought to light a dangerous misconception that needs to be cleared up immediately.

The suggestion, which came from a former pilot, recommended that "since FOD is a maintenance problem, it would be better to print it in the maintenance section of the magazine." This mindset, which I am sure is not held by the majority of aircrew members, is not only false — it is dangerous. The fact is, flightcrews are significant contributors to FO.

By definition, FO is anything in an aircraft which is where it is not supposed to be. This definition is not confined to tools, safety wire, and objects used by maintainers. It also includes such things as aircrew checklists, pens, pencils, hardware from life support gear, flight lunch items, to name just a few. While an analysis of cockpit FO found during major phase inspections typically yields a significant amount of maintenance-related FO, the average aviator would be amazed at the amount of FO that is aircrew related. In fact, during major inspections when the cockpit is virtually disassembled, it is not uncommon to find FO in the form of line badges, uniform patches, and aircrew checklists.

While it would not be feasible to control aircrew equipment in the same manner as we do in maintenance, it is possible to cut down on the amount of FO generated by aviators. Here are some hints:

- Take only what you need into the cockpit.
- Make an inventory of what you fly with — even if it is only a mental one.
- Inspect your flight gear for loose or missing fasteners before entering the cockpit.
- After the flight, re-inventory; inspect your flight gear to be sure nothing is missing.
- Report any missing objects to maintenance immediately. Make an entry in the forms.

Here is an example of how a forgetful aircrew member helped another get an unexpected lift. After an uneventful landing, the crew of an F-4 opened their canopies. As the rear canopy began to open, it jettisoned, and the rear ejection seat fired. The WSO noticed no appreciable acceleration shock, and after one and a half swings in the chute, he landed on an asphalt area near the aircraft, sustaining only minor injuries. The investigation revealed neither the lower ejection handle nor the face curtain had been pulled. Further investigation produced a badly dented radar camera film container on the floor of the rear cockpit. An analysis of this showed the dents on the film container matched identically with the corresponding marks on the ejection seat torque tube and the cam roller assembly.

The investigating team determined the film container jammed between the torque tube and cam roller and, as the canopy was opened, the torque tube moved sufficiently to activate the seat-mounted initiator. The WSO did not carry a radar scope camera on this flight: **THEREFORE, THE FILM CONTAINER WAS LEFT BY A CREWMEMBER FROM A PREVIOUS FLIGHT.**

The FOD monster is alive and well! Winning the war against FOD requires a joint effort from both aircrews and maintenance. The next time you climb out of the cockpit, think about the next person to strap into the aircraft. Ask yourself, "Did I leave anything behind?" ■

MAINTENANCE MATTERS

By the Book

■ "Do it by the book" is a phrase familiar to all aircraft and munitions maintenance specialists. From the first day in tech school, they are constantly reminded the TO is the maintainer's Bible, and deviation from TO procedures is a violation of a lawful order. But TOs are written by people and, as such, some can be fallible and can contain wrong or inadequate information.

A bomber was destroyed when it jumped the chocks and ran into a concrete structure. Investigators determined a key factor in the mishap was the fact that two circuit breakers were not reset during the pre-engine run checks. This rendered the brakes inoperative.

Further investigation revealed the requirement to reset these circuit breakers was inadvertently omitted during a revision of the checklist several years prior to the mishap. However, since it was common knowledge the circuit breakers must be pushed in to provide braking during engine runs, no one took any action to correct the TO deficiency. Unfortunately, since the step was not in the checklist, the engine run crew forgot to reset the breakers, and a multimillion dollar bomber was destroyed. This is a good example of the problems that can be caused by inadequate or deficient technical data.

The chances are that you are working with one or more technical publications that are deficient in some manner. They may be unclear or contain improper information. They may even leave you hanging by not providing the information necessary to perform a task. How many times have you agonized over a troubleshooting chart that doesn't even come close to identifying the symptoms you are trying to troubleshoot. Fortunately, TOs differ from the Bible in an important way. They can be changed.

As one might expect, the procedure for changing a technical order is a fairly complex one. It requires coordination with, and approval from, many agencies. The good news is that initiating a recommended change is a very easy process that requires the completion of only one simple form, the Technical Order System Improvement Report (AFTO Form 22).

Essentially, the form asks only three questions: What is the deficiency, what is the reason for the change, and what changes are recommended? While the form is self-explanatory, procedures for completing it are contained in TO 00-5-1, Air Force Technical Order System. After completing the form, have your supervisor sign it. And that's it!

Depending on the degree of urgency required by the change, you will be notified of approval or disapproval of your recommendation within 45 calendar days. If the recommendation is disapproved, you will be given the reason for the rejection in writing. If you disagree with the rationale for the rejection, you may resubmit the recommendation, explaining why you disagree. It may be that additional information is needed to clarify your submission.

In many instances, a recommended TO change also qualifies the submitter for a cash award under the Air Force Suggestion Program. If a recommendation falls into this category, simply complete an AF Form 1000 (AF Suggestion Report) along with the Improvement Report.

Whether you are a wrench bender, avionics technician, or an ammo troop, the few minutes it takes to fill out a Technical Order Improvement Report will help make maintenance smoother and safer for everyone who must depend on the TO to get the job done right.

FODless Rivet Gun

How many times have you had to search for the stem of a cherry rivet that flew out of the rivet gun and landed in some almost inaccessible area of the aircraft? The people who make the cherry rivet have come up with a new design of rivet gun that captures the rivet stem, drastically decreasing the FOD potential of the cherry rivet. The company's latest design pulls the spent stem through the riveter head under vacuum and deposits it into a plastic bottle attached to the rear of the machine. This bottle has a large window that opens to collect the stems. Several Air Force and Navy units are already using the new gun and are extremely satisfied with its performance and reduction. ■

OPS TOPICS

Foulup . . . LISTEN UP!

■ Fatigue, malnutrition, assumptions, and channelization . . . not a great way to start a student training sortie.

A flight of helicopters had landed and were instructed to clear the runway at the midfield point, approximately 6,000 feet from the threshold. A T-38 student on a check ride had been holding at the number one position for several minutes and was instructed to taxi onto the runway and hold.

The student pilot repeated the instructions, changed to departure control frequency, and taxied onto the runway. Meanwhile, the tower requested helicopter flight to taxi without delay.

Once the T-38 student pilot lined up on the runway center line, noticed the HSI was out of limits and informed the IP, who actuated the fast slave switch in anticipation of the student pilot asking him to do so. The student noticed the HSI swing back within limits and **assumed** it was correcting itself since the IP had not said anything about fast slaving.

The student pilot then ran up the engines, performed the lineup check, and released the brakes. The IP noticed the HSI jump off the runway heading by about 20 degrees, looked outside, and noticed the aircraft was moving. The IP later stated he was surprised to be moving, but **assumed** he had missed the takeoff clearance. He attributed the HSI jump to the acceleration of the T-38 and began thinking about how and when to fix the HSI once they were airborne.

The monitor in the runway supervisory unit (RSU) had checked the T-38's configuration as they taxied onto the runway, then diverted his attention to the helicopters which were now at midfield. As the lead helicopter was turning off the runway, and number two was approaching the turnoff, the monitor noticed the T-38 accelerating past the RSU. This surprised him since he had not heard tower issue takeoff clearance.

The tower controller noticed the T-38 when they were 1,000 to 1,500 feet from the approach end threshold, canceled their takeoff clearance, and instructed them on guard frequency to abort. The student pilot retarded the throttles to idle, and the IP assumed control to accomplish the abort. The tower then informed the second helicopter, which had moved to the left side of the runway due to a grabbing brake, to again "taxi without delay, T-38 coming up behind you." The T-38 initiated the abort at about 120 knots and passed the second helicopter on the right with about 50 feet of clearance and traveling at 80 knots.

Conclusion: The student pilot heard the instructions to hold and repeated them, but interpreted them as clearance for takeoff, probably due to a combination of mild **anxiety** from being on a check ride and **force of habit.** The IP knew they were instructed to taxi into position and hold, then allowed his attention to **channelize** on the HSI malfunction. As a result, he lost situational awareness until the abort was started. The IP denied being fatigued, but his 72-hour history revealed he had a mild illness 2 days previously, had been awakened several times the night prior to the incident, and **had not eaten lunch!**

The RSU monitor also made an **assumption** that takeoff clearance had been issued when it had not. More attention on his part may have allowed him to intervene.

The insidious effects of fatigue are caused by several factors. Proper crew rest, a healthy diet, and attention to detail are all good steps towards a safe flight. And finally, even if you have takeoff clearance, it is a good habit to look down the runway before you release brakes just to make sure no one else is on it. Remember — if it doesn't look right, ask someone. But most of all, DON'T ASSUME! ■

The Directorate of Aerospace Safety has established a "Safety Hot Line." If you have a safety concern you think the Director of Aerospace Safety should know about, call this AUTOVON number (876-7233) and leave a message. The Director of Aerospace Safety or a member of his staff will personally review and answer each call.

UNITED STATES AIR FORCE

Well Done Award

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

TECHNICAL SERGEANT
David S. Roden

STAFF SERGEANT
Earnest Rush, Jr.

36th Tactical Fighter Wing
Bitburg AB, Germany

■ An F-15C, with 14,000 pounds of fuel on board, was in a hush house for a routine engine run. One of its engines had just received an N1 sensor change due to a previous augmentor blowout and required trim. TSgt Roden was in the cockpit running the engines, and SSgt Rush was manning the trim box and fire control panel. Twenty minutes into the engine run, TSgt Roden noticed smoke engulfing the engine area. Without hesitation, he slammed the throttles off, pressed the fire lights to shut off the fuel flow, and quickly egressed the aircraft by hanging onto the cockpit rail and dropping to the floor. SSgt Rush immediately called the fire department using the crash net. TSgt Roden grabbed the nearby fire extinguisher and sprayed the aircraft-mounted accessory drive until the bottle emptied.

By this time, smoke had thickened, severely diminishing visibility. SSgt Rush manned the second fire bottle, allowing TSgt Roden to climb on top of the aircraft to direct the spray down inside the "chimney" to further control the fire. After the second fire bottle was emptied, fire department personnel arrived and extinguished the fire.

TSgt Roden, exhausted and gasping for air, slid down the side of the aircraft to safety. Both NCOs were escorted outside to recover and then rushed to the hospital. Due to their correct and timely actions, the aircraft was saved from major damage. Both men knew of the close proximity of the fire to the fully loaded 3A fuel cell but disregarded their personal safety and responded decisively.

Their superb teamwork prevented a potential disaster and saved a valuable combat aircraft. WELL DONE! ■

☆U.S. GOVERNMENT PRINTING OFFICE: 1989 — 679-051/80021

UNITED STATES AIR FORCE

Well Done Award

FIRST LIEUTENANT

Brian MacLeod

178th Tactical Fighter Group (ANG)
Springfield-Beckley Municipal Airport
Springfield, Ohio

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

■ First Lieutenant Brian MacLeod had just descended on the wing through weather in an A-7D during recovery to home base. While in the clear below the clouds, the flight leader split him off for a single-ship instrument approach, but then Lt MacLeod's aircraft radio began an ever-increasing static hissing noise. This was immediately followed by a blinding flash and a loud bang. A lightning bolt had entered through the canopy, passed through Lt MacLeod's helmet, head, body, and exited out the metal survival seat kit attachments. All aircraft antennas were damaged, and the ALR-46 RWR amplifiers were destroyed.

Lt MacLeod's muscles involuntarily contracted, leaving him stunned and temporarily blinded. Through extreme mental effort, he was able to level the aircraft and establish an orbit about a tower until his flight leader rejoined with him. Exhausted and disoriented, he then flew on the wing for a formation approach to final and landing. During the landing roll, he was initially unable to raise his legs to put his feet on the brakes. Again through intense will power, he was able to move his feet to the top of the rudder pedals and safely stop the aircraft. Lt MacLeod turned off the runway and shut down the aircraft but was unable to exit the aircraft without assistance.

The outstanding determination and airmanship demonstrated by Lt MacLeod averted a potentially dangerous situation and saved a valuable TAC combat aircraft. For this superb job, he has earned a WELL DONE! ■

11 November 1989

A Veterans Day Salute

to the Men and Women of the Armed Forces

Flying Safety magazine proudly salutes the veterans of our Armed Forces for their leadership, courage, valor, and sacrifice which have made the United States the greatest nation in the world! Dedication and teamwork — two enduring qualities exemplified by our men and women in uniform.