# TAC ATTACK

NOVEMBER 1968




FOREWARMED ...page 4

**for efficient tactical air power**

# TAC ATTACK

NOVEMBER 1968

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TACTICAL AIR COMMAND

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## Angle of ATTACK

# your plan for winter

By now, your plan for winter operations should be just about complete. Yet, despite the best of plans, some relatively simple items invariably crop up to cause trouble.

One of these is winter clothing. A crew chief trying to preflight in freezing cold needs plenty of warm clothing. Yet every winter you can find at least one man on the flight line in his summerweight fatigues. Not only is this detrimental to his health, it causes him to rush thru preflight or post-flight. Then problems appear such as a low charge on hydraulic pressure gauges, improperly inflated tires, or insecure panels.

Pilots sometimes fall into the same trap when they rush out to fly with only a summer flight suit and jacket. Invariably, they miss that lift-killing coating of frost on the wing or slab. It's there because the chilled crew chief didn't feel deicing was necessary. Or maybe ice on pitot static ports causes problems. The pilot rushed his walkaround in an effot to get out of the cold wind.

In winter everything must move slower, from flight planning to engine shutdown. Planning must be more detailed, preflights more thorough, taxi speed slower. And the decision to fly, which every operations officer faces, must be more carefully considered. Does the mission justify the risks involved with flight from a snow-packed runway? Is that last mission of the day worth the risk of landing on a coating of ice . . . coated by late afternoon freezing of the melted snow?

And in your ice and snow removal plan, is the munitions loading and holding area included? Are chains available for vehicles that may require them? Is your snow removal equipment operational and in good condition? As elementary as some of this may appear, each year we have aircraft damaged by the same basic causes; snowbanks, slush and ice patches, flat tires and struts, and skidding trucks, to name a few.

By careful planning and religious attention to detail, we can foil winter hazards with an accident-free season. Be certain you do your part . . . now!

R. L. Liles

R. L. LILES, Colonel, USAF
Chief of Safety

# forewarmed for winter

By Capt (Dr.) C. R. Hoyt
Flight Medical Officer
Langley AFB, Va.

Cold injury occurs occasionally in civilian life, but too often among military forces. Cold played a vital role in the defeat of Napoleon's army in Poland in 1812 ... the U.S. suffered many cold injuries during the World Wars and in Korea. Chilblains (inflammation of skin), immersion foot, trench foot, and frostbite are types of cold injuries.

Chilblains result from intermittent exposure to above freezing temperatures with high humidity present.

Immersion results from exposure (12 hours or more) in water at temperatures below 50 degrees Fahrenheit. Parts of the body other than the feet may be involved also.

Trench foot is similar to immersion foot and results from long exposure to cold and wetness from freezing to 50 degrees F. An important factor in producing trench foot is immobilization or dangling of the lower extremeties.

Frostbite is the most severe form of cold injury. It is crystallization of skin or subcutaneous tissue fluids and is produced by exposure to freezing temperatures.

Man is a warm-blooded (homoiothermic) animal. This means that he can maintain his own body temperature through wide temperature variations. The average rectal temperature is about 98.6 degrees F (37 degrees C) with a normal diurnal (twice daily) variation of 1.8 degrees F (1 degree C), being highest during late afternoon and lowest in the eary morning hours. Some night shift workers reverse this normal diurnal rhythm.

The temperature of human tissue depends on metabolic activity of the tissue, temperature and amount of blood flowing through the region, and temperature of the surrounding air. For example, the liver has a much higher temperature than the nose.

Human heat loss is mainly through the skin. It occurs by sweating, increased blood circulation, changes in temperature between the air and the body, and a cooler environment. Also, the amount of clothing, wind intensity, and amount of skin exposed affect heat loss.

Cold injury can occur to all unprotected flesh at temperatures below +50 degrees. However, regardless of wind speed, exposed tissue will not freeze if the temperature is above +32 degrees F.

A 1964 tri-service publication (AFP 161-1-11) includes a wind chill chart as a guide to determine the rate of cooling which occurs in exposed or inadequately protected flesh. The wind chill chart (back cover) indicates that with wind velocity and lower temperatures, the chance of cold injury increases. And the most troublesome cold injury is frostbite which is the actual freezing of tissue. (Also back cover)

Once frostbite has occurred (the skin will appear white or waxy, will be numb and feel smooth), there is no cure for the affected area. Frostbitten skin is dead skin. However, the surrounding skin can be saved.

The method seen in the movies, rubbing the skin with snow, just makes the condition worse and spreads the frostbite. Immerse the affected area in warm water (104 - 107 degrees F). If water is unavailable use warm areas of the body such as the stomach or armpits. Gently exercise the affected area to prevent muscle degeneration. When these measures are carried out, a maximum recovery of tissue and function is assured.

Important to everyone exposed to the elements are factors which contribute to, and prevent cold injuries. Idleness, ground moisture, clothing moisture, and degree of fatigue contribute to cold injuries. Physical activity, protective clothing, sunlight, and warming shelters are deterrents to cold weather injury.

Clothing for personnel working in a cold environment must be designed to combat the elements and at the same time, enable the wearer to move freely. Several factors in keeping warm with any clothing are; keep it clean, wear it loose, keep it dry, avoid overheating. Wool, if the wearer is not allergic to it, is an excellent protective material. It insulates even while wet, drys rapidly, and maintains its protective properties after having been wet.

Woolen undergarments are therefore highly desirable for combating cold. However, the Air Force issues a two piece undergarment which is 100 percent cotton in a waffle weave pattern to give moisture absorption and dead air space for insulation. Once wet, cotton is not as effective in providing warmth as wool and takes longer to dry out.

A good insulator must have dead air space or cells in the fiber of the fabric, be porous to enable "breathing" to allow moisture out, and have some resistance to moisture. The best are goose or duck down, small feathers, and wool. Cotton is only fair. Animal fur and synthetic fibers are good. Leather must be soft and not polished or oiled, as it eliminates the porous qualities of the hide.

Once the garments are chosen, they should be worn in three layers, the more layers, the better, but no more than one-quarter of an inch air space between the clothing and skin for maximum heating. The first layer, next to the body, should be loose fitting wool, loose twill, cotton, or quilted thermal underwear and should have cuffs at the neck, wrists, and ankles. The second layer, or military garment should be medium weave, medium weight, and not tight fitting. The third and outer layer, should be wind resistant (nylon is readily available and water repellent, but it should not be water proofed or rubberized, as it must breathe.

In temperatures of 15 degrees F and above, cotton underwear and standard fatigues, plus the CWU-S/P intermediate trousers and CWU-7/P intermediate jacket will provide adequate out-of-doors protection. In temperatures from plus 15 degrees to minus 65 degrees, the heavy parka CWU-8/P and heavy trousers CWU-6/P are designed for wear over the intermediate garments. Gloves are available in several styles and should be used depending on the activity required. And so it is with socks, 25 percent cotton and 75 percent wool, and footgear. There is no reason to suffer from cold effects, as long as we use the proper Air Force equipment and common sense.

The wind chill charts, reproduced on the back cover of this issue, should be placed in all duty sections which have personnel exposed to cold in their routine jobs.

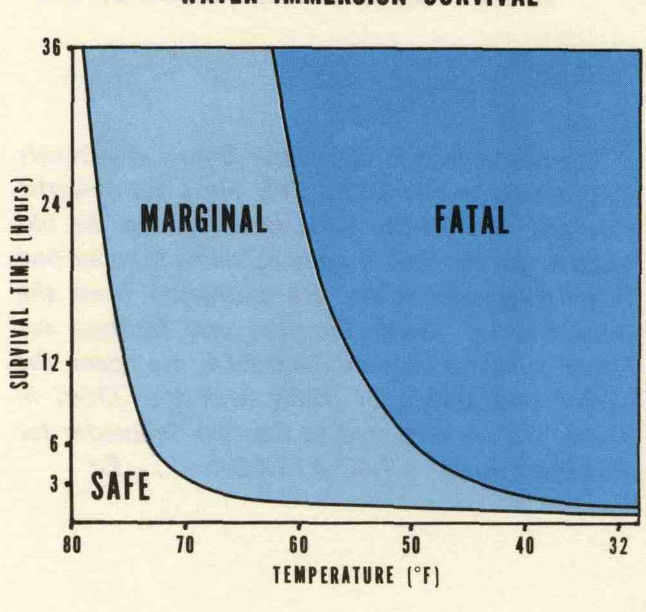
Besides the effects of cold on exposed skin, other cold weather problems are snow blindness, chapped skin, sunburn, carbon monoxide poisoning, and falls. Again, common sense will help prevent most of these from occurring.

Good supervision includes monitoring the amount of time personnel are at work in the cold. And intelligent scheduling provides rewarming periods that are a must. For mechanics working around aircraft in cold weather, protection can be afforded by wearing a nylon glove under a heavy glove. This allows the nylon gloved hand to be used for minute work with frozen metals without incurring skin damage. The motor pool, security police, maintenance crews, service station attendant and numerous other jobs demand some degree of outside exposure. Use of the basic principles mentioned above will help prevent cold injuries and lost man hours.

Crew members flying missions into winter environments should have proper survival gear in case of ditching in cold water or bail-out over frozen tundra. (See Chart) The environmental ground temperatures should be covered in the briefing.

We must recognize the special requirements that a cold environment imposes. Then we can determine the best methods of living, with or in some cases surviving, these environmental handicaps.

## WATER IMMERSION SURVIVAL



# winter-eyes

**By Capt. James P. Schneider**
**335th TFS, Seymour Johnson AFB, N. C.**

*Captain James P. Schneider is an F-4 Aircraft Commander in the 335th TFS. He is not only the youngest A/C in the Wing but is giving the old heads a run for their money by being number one in air-to-ground strafe. He graduated from the University of South Carolina and finished Air Force pilot training in Class 67A. He spent the winter and spring of 1968 with the 335th in Korea. We are indebted to Captain Schneider for his timely input to TAC ATTACK. . . .Ed*

The F-4 is designed as an all-weather fighter-bomber and with your help it can perform exceptionally well in below freezing conditions. With winter hazards rapidly approaching and cold weather operations a prime subject of conversation, it seems an ideal time to come forth with some "lessons learned" poop from our January 1968 F-4 deployment to Korea.

To start with you've got to dress properly. This means at least long underwear, flying and G-suits, plus the bulky "bunny" suit. Have you ever gone out for an early takeoff in 20-degree weather with the wind blowing hard enough to frost your long-johns? Makes you rush your preflight in order to get out of the cold. Then rushing to get your before-taxi checks finished, you lower flaps, put them back up, and behold, the Boundary Layer Control (BLC) light stays "On." That'll slow you down and be hard to explain as to why you didn't abide by the Dash One.

In winter you must go slow . . . in everything you do. Get to your bird early so that you'll have plenty of time for a meticulous preflight. Tires, air bottles, and accumulators have a way of leaking when temperatures fall. And be especially careful that gear struts, pitot tube, and static ports are free of ice.

Take a good, close look at those engine nozzles. And make sure they still rattle. Ice can literally weld them in place.

At about this stage in the preflight you'll notice your hands are getting cold and stiff. Just a reminder . . . wear the heavy G.I. gloves with wool inserts. You can use your light flying gloves when in the cockpit and save the others for any unscheduled outdoor activity.

Once you're absolutely sure you have the safest airplane in the inventory you'll have to climb into that icebox called a cockpit. Unless, of course, you and the crew chief are good friends and he has been piping in hot air so that everything's nice and warm.

By the way, be careful of that icy ladder lest you slip and break a leg. And by all means wear your gloves getting in. A naked hand on very cold metal rungs can quickly peel away your skin.

Once in the cockpit don't rush to get that temperature panel working. If you're properly dressed you should be warming up by now. During engine start you'll want to get "start" ignition early, at about six percent. Cold igniter plugs need warming up too.

After starting when you check oil pressure, don't be alarmed. It'll be way up there initially. But as the oil warms up it'll drop down. Remember the limits . . . 100 psi for no longer than 45 seconds.

After both engines are running check oil pressure again. Don't cycle generators until the needles say 50 psi for longer than 45 seconds.

If you're not getting much air thru the heater ports, rotate the temperature control knob full hot and defog handle full forward. This should thaw your temperature selector valve in about a minute.

On the subject of frozen valves we come to the BLC system. Don't go checking the flaps right away after start. Best practice is to run for 12 to 15 minutes at 85 percent. In Korea we found it best to wait until reaching the arming area. There we could have everything warmed and our checks seemed to go more smoothly. This procedure ended all cold-temperature-caused BLC problems. Crew chiefs, however, should still tape wing leading edges.

If your flaps check good but the BLC light stays on, it's probably ice on the limit switch. A couple of cyclings will usually take care of that.

Once chocks are pulled (and they should be ice chocks) go easy on adding power. Remember those J-79s put out more power in cold weather. With a snow or ice-coated taxiway this can cause some embarrassment. When you taxi, go real slow. If nose wheel steering doesn't take, use wheel brakes plus steering for turns.

In the 335th we found it a good idea to have pitot heat "On" for all takeoffs, even in clear weather. This way we made sure we didn't lose the pitot system when it was most needed.

You should be aware that RPM and EGT read lower in cold weather. Therefore, if you see 96 percent at full military it's not a malfunction but engine cut back.

On takeoff you'll accelerate faster than normal. But before you rush gear retraction remember to delay and let the air blow off any slush or snow thrown up by your tires. Otherwise you may have frozen gear problems on landing.

RCR gives a pretty fair picture of landing roll when you've got ice or snow. Touchdown on the end of the runway "on-speed" or slightly slow. Brakes won't be very effective so drag chute is an absolute must. In a stiff crosswind you can't use the chute. Then you'll just have to be patient and hope the brakes eventually take hold. If you start to slide remember you'll get some help from rudder, ailerons, and above all . . . differential thrust.

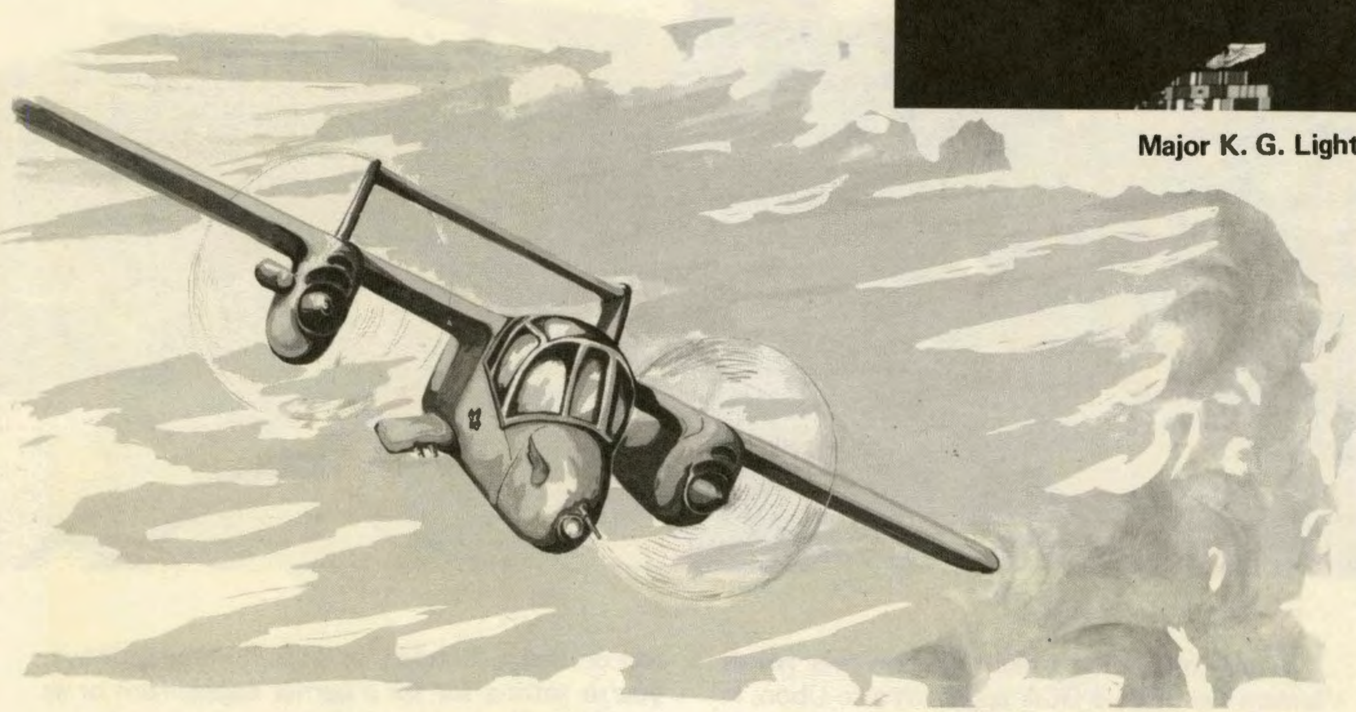
Once you have directional control you may want to shut down one engine to get rid of residual thrust. You'll tend to taxi faster after landing, what with a lighter aircraft and the idling engines. On the way back in remember, ***TAXI SLOW!***

As you climb down the ladder, the crew chief will smile because, naturally, you don't have any writes-ups. And you'll get a kind of "well done" feeling. Then a buddy passes you walking in and says, "Rough today, huh Frank?" And you can say, "Nawh, I remember when I was . . ."

TACTICAL AIR COMMAND

# PILOT OF DISTINCTION

Major K. G. Light



Major Keyolan G. Light of the 4409th Combat Crew Training Squadron, Eglin Air Force Base, Florida, has been selected as a Tactical Air Command Pilot of Distinction.

Major Light was on a routine training flight in an OV-10A. Rapidly deteriorating weather conditions forced Major Light and his student to return to their home base. On initial approach the student in the front seat retarded both throttles to flight idle in the break. The right engine responded but the left engine did not. It remained at 100 percent and 1400 pounds of torque. Major Light assumed control of the aircraft, lowered the gear, and lined up on final approach. On final, EGT of the left engine exceeded limits and the unbalanced thrust aggravated yaw control. Touchdown was 35 knots above recommended speed. Major Light controlled the aircraft with the help of the student who held the stick forward and provided nose wheel steering. Major Light feathered the left engine on the runway and completed a successful landing.

Major Light's rapid evaluation and quick action in a new aircraft during a critical situation qualifies him as a Tactical Air Command Pilot of Distinction.

# wet runways....

# ....unpredictable

By Major John M. Lowery

"After completing a night mission over North Vietnam we made a GCA approach into Ubon. It was raining very hard so I followed the GCA glide path close to touchdown and landed slightly long. The F-4 touched firmly. I applied maximum brakes but the bird didn't decelerate. It soon became obvious that we were going off the end, so I reached for the hook. About this time we ran onto the grooved portion of the runway and the brakes really took hold. In short order we stopped and turned onto the taxiway. Because of the grooves we didn't need the barrier."

These comments came from a TAC Lt Colonel who recently completed a tour in SEA. His experience graphically illustrates a serious operational problem . . . and its solution.

If you rely on RCR to compute your landing roll on damp, flooded, or slush covered runways, you're getting set for a barrier engagement or as statistics show too often, an accident. We've suspected this all along but now we know it's true. And we know why.

Many variables are involved in getting stopped on a wet runway. Some of these are aircraft ground speed, tire tread design, inflation pressure, footprint area and the like. RCR readings do not take these factors into account.

Stopping on snow and ice however, is a different story. In this case RCR may provide a fairly accurate picture of landing rollout because the runway contaminant is a solid instead of a fluid. And the various dynamic forces are not involved.

The Spring 1968 tests at NASA's Wallops

Island revealed several significant findings:

1. At the present time there is no accurate way to forecast aircraft stopping distance on a damp or flooded runway with currently available measuring equipment.

2. Tire tread design and degree of tread wear are major factors in wet surface stopping distances.

3. Transverse runway grooves, using a pattern of 1/4 inch wide, 1/4 inch deep, and a one inch center space will give a wet, asphalt runway the stopping potential of the same surface dry.

RCR readings on a wet, slick runway were almost identical to readings obtained on a wet, grooved runway. Yet when an aircraft landed on the two surfaces for comparison, stopping distance calculations were often four times longer on the ungrooved surface. This explains why many aircraft end up in the barrier or off the end, despite an RCR that forecasted more than adequate runway.

An F-4D was clocked at 134 knots just after touchdown on a three-eighths inch aggregate asphalt surface. Tires were new, wide, three-grooved design. The damp, ungrooved surface provided only 28 percent of the dry runway braking potential while the same surface grooved gave 95 percent. RCR readings were 24.18 ungrooved and 24.7 grooved.

At 60 knots these same surfaces showed 56 percent of the dry stopping potential on ungrooved versus 96 percent on grooved. Again, RCR readings were 24.18 ungrooved and 24.7 grooved.

At 134 knots, runway covered with a 0.1 to 0.3 inch film of water, the figures showed an even greater contrast. On an asphalt runway, the flooded, ungrooved surface provided only 4 percent of the dry braking potential while the grooved strips 51 percent. RCR readings were 20.54 ungrooved and 20.28 grooved.

As a matter of interest, damp, ungrooved concrete is the slickest surface you'll find, even with a burlap drag finish to roughen texture. F-4D landing data showed calculated rollouts on concrete were three to four thousand feet longer than on both small and large-aggregate asphalt. Grooving the concrete cut stopping distance by five thousand feet.

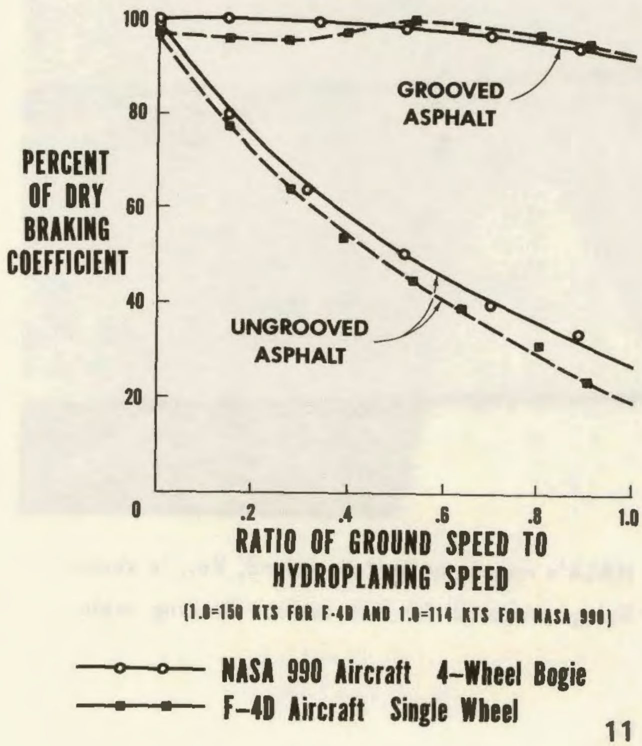
Grooving asphalt cut landing distance only two or three thousand feet. But it put landing roll distance at the dry runway stopping distance figure. In other words, grooving (1/4 x 1/4 x 1 inch pattern) eliminates the necessity for a runway slipperiness factor, such as RCR. (See attached chart.)

Crowning and rough surface overlays are the methods heretofore used by civil engineers to improve surface traction. This unfortunately does not solve the problem. Crowning will eliminate standing water. However, NASA tests have shown that the pavement need only be damp to cause thin film lubrication skids or reverted rubber skidding. These latter two forms of hydroplaning are the primary cause of our wet runway mishaps..

On the other hand, rough surface textures, provided by large and small aggregate asphalt, effectively take care of the slower speed thin film and reverted rubber skids. However, water tends to collect in the texture of some surfaces and

**EFFECT OF RUNWAY GROOVES ON AIRCRAFT BRAKING PERFORMANCE**

**(wet with isolated puddles)**



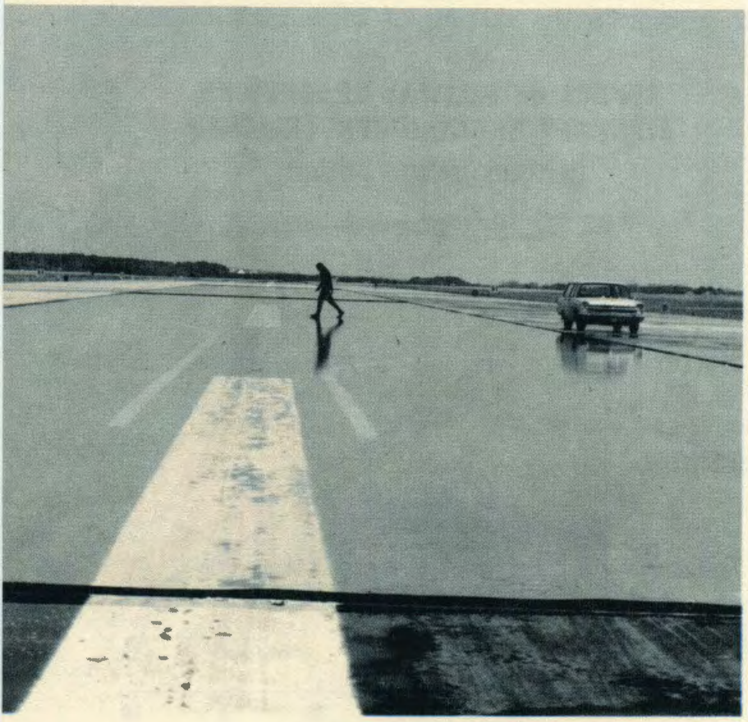
# wet runways..

encourage onset of dynamic hydroplaning. In addition when new, this roughed surface causes increased tire wear and a resulting increase in direct maintenance manhours.

The primary disadvantage is that after several months of heavy use, runway asperity drops as the aggregate become polished with use. Although you may have a good surface texture depth, the runway will become susceptible to thin film and reverted rubber skids.

At some of our dry climate bases an asphalt rejuvenator, known as fog seal, is used to prolong runway life. While this rejuvenator does not fill-in surface texture it has the unfortunate effect of making the runway lose its roughness, thus having the same effect as polishing. In at least one case a treated runway became hazardous even when dry.

Transverse runway grooves eliminate all forms of hydroplaning. The grooves not only benefit wet weather operations, they improve dry runway stopping. Tires skidding on a dry surface tend to slide on the molten rubber, a product of friction heat. The grooves wipe this molten rubber from the tire footprint, thereby salvaging some of the braking force and extending the time of inevitable blowout.



**NASA's runway at Wallops Island, Va., is shown being prepared for wet surface braking tests.**

In some cases grooves act to prevent dry skids. For example, a KC-135 wheel was run onto a grooved section of runway locked in a total skid. Traction was so great the brake was unable to keep the wheel locked. The wheel began to spin-up and subsequently produced a 60 percent slip ratio. This provided an efficient braking coefficient from a situation that should have resulted in a blown tire. Surprisingly, the tire tread was not damaged.

In the United States, two Air Force runways are grooved. One located at Beale AFB, California has the optimum 1/4 x 1/4 x 1 inch groove pattern. If you land there when it's wet, you do not have to consider a slipperiness factor (RCR). Your stop will be just slightly longer than the dry figures, because it's concrete not asphalt.

If you land on TAC's grooved runway at Seymour Johnson AFB, N. C. you will also have grooves to help you get stopped. This pattern however consists of two foot strips of 1/4 inch square grooves with a 2 inch center, separated by two foot strips of ungrooved pavement. The amount of assistance this pattern offers has not been scientifically measured. We do know from operational experience in SEA, that it offers a significant improvement.

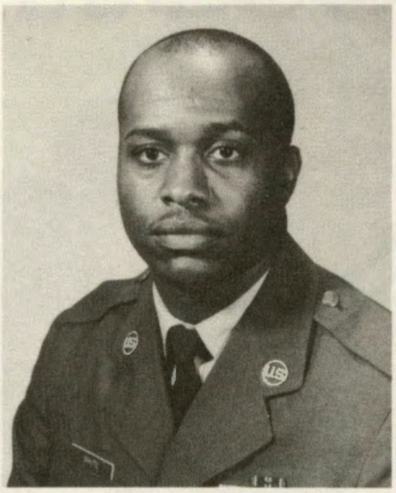
The hazards of hydroplaning during wet runway operations have become so pronounced—TAC has had seven cases reported from 20 January 1968 to 25 September 1968, one of which was a major accident – new standards are under consideration for all our operational bases.

Optimistically, we can expect grooving on more and more of our runways. Perhaps the future will see transverse grooves as a standard for all military aircraft operations.

In the meantime . . . beware of wet runways; they're shorter than you think!

## MAINTENANCE MAN OF THE MONTH

Technical Sergeant Willie L. White of the 831 Air Division, Edwards Air Force Base, California, has been selected to receive the TAC Maintenance Man Safety Award. Sergeant White will receive a letter of appreciation from the Commander of Tactical Air Command and an engraved award.



TSgt White

## CREW CHIEF OF THE MONTH

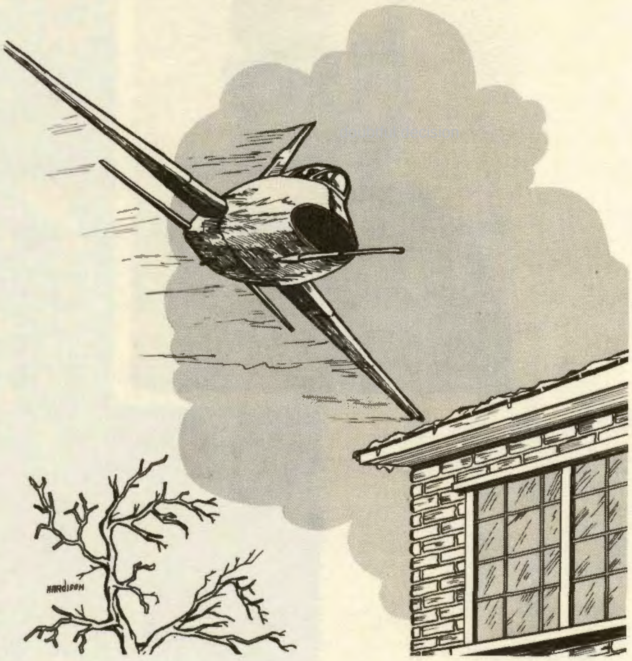
Staff Sergeant Steve L. McVittie of the 4512 Organizational Maintenance Squadron, Luke Air Force Base, Arizona, has been selected to receive the TAC Crew Chief Safety Award. Sergeant McVittie will receive a letter of appreciation from the Commander of Tactical Air Command and an engraved award.

SSgt McVittie

a 2nd look at a....

# DOUBTFUL DECISION

**By Don Reynolds**



Breaking through a low cloud cover, nose and right wing down, witnesses saw an F-100 plunge through the roof of a house, leveling the two story brick residence and killing two occupants. The Supersabre pilot of less than six months, a second lieutenant, apparently made no effort to eject.

He was Rake Four from a flight of four originally scheduled for a morning mission on the range. But immediately after the briefing, the mission was cancelled due to weather at the range. The Group DCO requested the flight be rebriefed for a low-level navigation mission, and that it pass over the range to eye-ball the weather, which was reported as breaking. The DCO wanted verification, in hopes the weather would reach minimums in time for the afternoon schedule.

Rake One, rebriefed for the alternate mission. They would go in spread formation and fly VFR in the clear. Rake Two was also a second lieutenant, and had experience similar to ill-fated Rake Four. No special instructions were given the flight regarding the anticipated weather check at the range.

The flight departed, proceeding along the low-level route; all check points and times were accurate. Just before reaching the most westerly check point they encountered reduced visibility and the flight leader reversed course, climbed to 6500 feet in the clear and proceeded to the range above a solid undercast. At the range, determined by DME and radial, Rake One said the undercast topped at about 3500 feet. Range minimums were 5000 feet and five miles visibility. The flight made a climbing turn to 10,000 feet, heading toward home.

After three or four minutes of flying, a clear area appeared in the undercast. The flight leader later described it as from 20 to 40 miles wide and as long as the eye could see. Another flight member described the clearing as from three to five miles wide and 10 miles long, dotted with puffy clouds.

Rake One decided to use the opening to take a look at the underside of the cloud cover as a part of his weather observation report. He called for a loose intrail formation and started a shallow banked 360-turn descending toward the opening.

Rake Four had less than nine total hours of actual flying "on the gauges." Rake Two's experience wasn't much better. The flight leader's only briefing as he started the turn was, "in the event you inadvertently enter ragged clouds, climb on top."

Knowing the cloud tops to be about 3500 feet, Rake One knew he would be taking his flight to at least 2000 feet to see the underside. With the almost 800 MSL ground level in the area, only 1200 feet was available for maneuvering. Also, the briefed range weather included possible snow showers.

As the turn bottomed out at 2000 feet, Two encountered reduced visibility and called, "Two going on top." He rolled his wings level and recovered in the clear a few seconds later. Rake Three saw Four sliding to the outside of the turn as they entered the cloudy area. He momentarily lost sight of One and Two and heard Two call that he was going on top. He then regained sight of One still in a turn and asked Four if he had him (Three) in sight. Rake Four said, "No, going on top." Rake Three looked back to check on Four and saw him sliding low and to the outside, four to five ship lengths behind. A few seconds later, a sound described as "UNK!" was heard on the radio. At about the same time witnesses reported seeing the crash during a fine flaked snowfall.

Rake Three followed One as he leveled and pulled up. Both were on top of the cloud layer in only a few seconds without switching to the gauges. Whether Rake Four suffered vertigo, or just took too much time switching to gauges, will never be determined.

The Aircraft Accident Board's investigation determined that mechanical failure was not a factor. Their findings were twofold: Primary cause . . . Pilot factor in that the pilot failed to maintain aircraft control during transition to instrument conditions at an altitude too low to effect a recovery. Contributing cause: Supervisory error on the part of the flight leader in taking a flight of four aircraft in loose trail formation to an area where IFR conditions were likely to be encountered.

The Board terminated its findings with: "Knowing the weather conditions from visual observation, it must be assumed the flight leader had good indications that the flight possibly could get IFR. Or, at the least, into reduced visibility and would find it nearly impossible to maintain visual reference to the other aircraft when such a large distance (even three ship lengths) separated them. The ease with which a pilot is able to control his aircraft during confusing or rapidly changing conditions depends a great deal on his experience level; Rake Four did not have that amount of experience to fall back on."

# TAC OUTSTANDING FLIGHT SAFETY OFFICER

**Major Sam G. Henley of the 75th Tactical Reconnaissance Wing, Bergstrom Air Force Base, Texas, has been selected as the Tactical Air Command Outstanding Flight Safety Officer for the six-month period ending 30 June 1968. Major Henley directed an accident prevention program rated "Outstanding" by the 12th AF Safety Survey Team. During his tenure the Wing aircraft accident rate dropped from 21.1 to zero. He was instrumental in the elimination of a serious runway FOD hazard. He also served as project officer during the production of an outstanding USAF safety film, "The Unknown Thirty-Six Seconds." For his contribution to safety Major Henley will receive a letter of appreciation from the Commander of Tactical Air Command and an engraved plaque.**

**Major S. G. Henley**

# Fertilizer Deicer

By **Don Reynolds**

Keeping airdromes operational during seasonal ice and snow conditions trouble many Air Force commanders. In recent years the problem has increased in scope, not because the weather is more severe, but with advent of all-weather aircraft capability, mission effectiveness is often dependent on launch and recovery facilities.

This problem has been the subject of recent Air Force research. A test program, conducted during the past three years in collaboration with the Royal Canadian Air Force, has proven that several techniques are available that would almost eliminate the problem.

But the sure-fire solutions have serious disadvantages. Example: Melt snow and ice as it falls on runways, taxiways and ramps with radiant heat applied by electrical or liquid heaters buried in the concrete. It really works, but cost is prohibitive.

Several tested liquid deicing chemicals worked equally as well as anti-icers, but one evaporated too quickly, one caused troublesome aircraft corrosion, and several were too expensive to be practical.

One chemical, a low cost "garden variety" called urea, proved ineffective in severe climates but worked well as a deicer and anti-icer in milder winter climates. Urea was tried at several TAC installations last year and is now recommended command wide.

It is a colorless, crystalline substance, used in most fertilizers, and was first tested as a deicing agent but later was found to have good anti-icing qualities. Besides low cost urea creates no corrosion problems. During testing, a urea solution was sprayed directly into the intakes of various types of jet engines without harmful effects.

**Urea, a common fertilizer, is an effective and low cost ice control agent. The chemical is non-corrosive, works equally well as an anti-icer and deicer, and is available in several forms. Above: The prilled form (spherical pellets) is recommended because it will not cake like the crystal form, and flows easily through the spreader. Left: Conventional trailer spreaders can be used, freeing spreader trucks for other wintertime problems. Below: Applied as an anti-icer, the prilled pellets prevents freezing rain and snow from forming into ice. It also has a residual effect that prevents ice from bonding to runways for periods up to 10 days. When applied over ice, it will cut through a quarter-inch cover in about 30 minutes.**

It has only two residual effects, both favorable. Areas treated with urea resist subsequent ice build-ups for a week or more. And during the summer months grass grows extra green along the runways.

It is produced in several forms: pellets, prilled (extruded), and crystal. The pellets and prills have a clay coating which acts as an anticaking agent during storage. The crystal form is not recommended because it will cake during storage. This makes spreading difficult. And it does not have granular composition that gives added traction on icy or wet pavement.

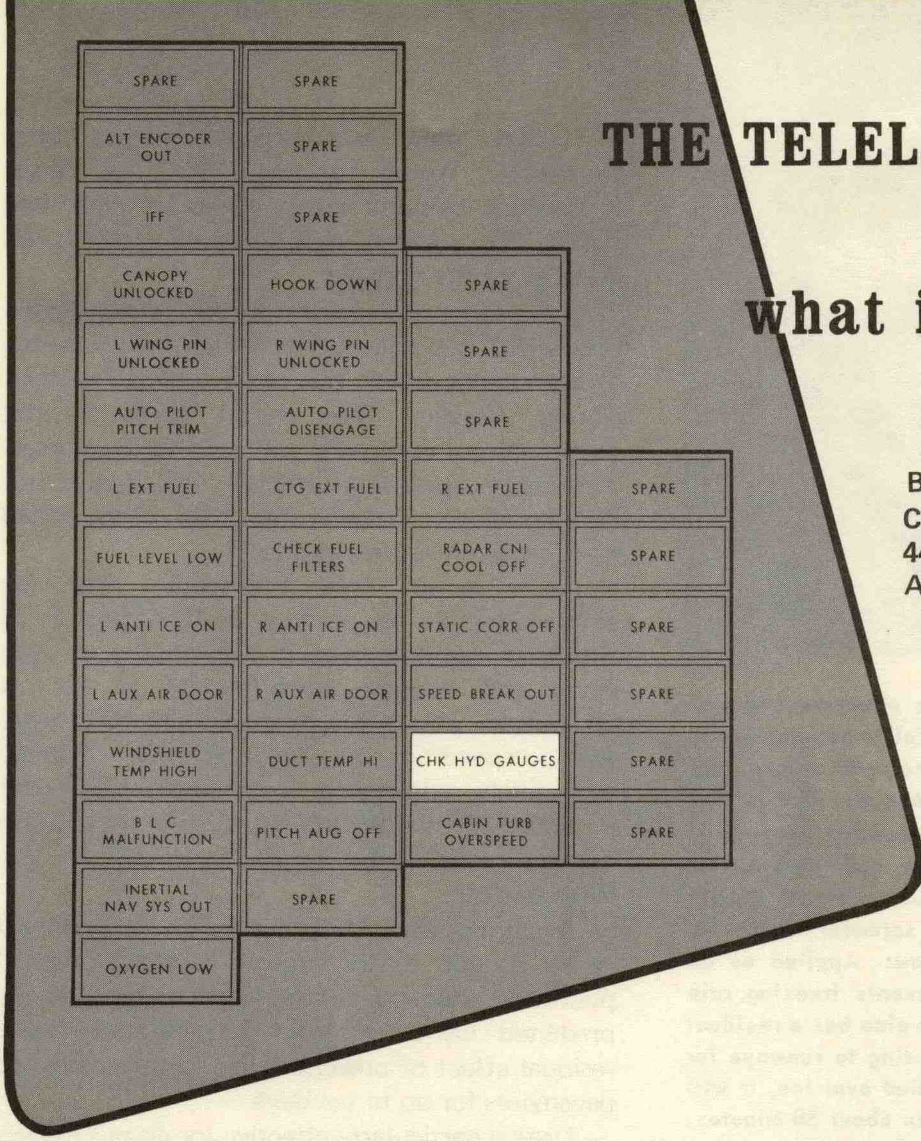
As a deicer, urea is effective when the ambient ground temperature is 15 degrees F. or above. It can be spread in a 50-foot wide strip along the runway centerline at a rate of one-quarter pound to one pound per 100 square feet, depending on ice thickness. Applied accordingly, one-quarter inch ice cover will melt in about 30 minutes. As the slush is swept from runway center to the edge, non-treated ice also turns to slush.

As an anti-icer, urea is applied to the one-third center section of the runway at about one-half pound per 100 square feet. It not only prevents a predicted ice cover from forming but has a residual effect of preventing ice from bonding to pavements for up to ten days.

Urea is particularly effective for glaze ice cover or hoar frost. In tests, a very light spread removed thin ice in three to four minutes. A rotary sweeper clears away excess water leaving a damp surface which does not refreeze. Immediately after a deicing application, urea prills increase surface traction comparable to sand.

The chemical can be distributed with conventional spreaders either towed by or mounted on a five ton truck. However, a self-contained spreader vehicle is being tested which offers accurate spread density at greater speeds. It is expected to include a relatively inexpensive electronic spread control unit which fits into the vehicle glove compartment, readily adjustable by the operator.

Urea will not replace volume snow removal equipment, but it is a solution to the "glazed ice gap" which annually reduces operations at several TAC bases. ➝




# THE TELELIGHT PANEL...

## what it doesn't say

By
**Capt Lynn B. Grant**
**4457 CCTS, Davis-Monthan AFB, Ariz.**

Captain Lynn B. Grant is currently an F-4 aircraft commander and academic instructor with the 4457th CCTS at Davis-Monthan AFB, Arizona. Formerly a member of the Maine ANG, flying F-84s, he returned to active duty in 1961. Since then he's been stationed at Chaument AB, France, Holloman AFB, N. M., Command Post in Saigon, and now DM. He is presently teaching the electrical, pneumatic, hydraulic, flight and auto pilot control systems.

Telelight panels, in most of our supersonic fighters, have reduced the problem of keeping pilots appraised of malfunctions occurring within their trusty steeds. Our stalwart heroes can strap on their twentieth century Jennys, secure in the knowledge that should any problems arise they will receive immediate warning, thanks to the myriad of colorful lights on the "billboard." This allows prompt and precise corrective action to counter or control the faulty system.

There's one possible side effect of this "instant fault reporter." We, as pilots, tend to rely more and more on the telelight panel to give us a complete list, or overall picture, of what we have lost in the way of systems. In addition, most pilots become secure in the knowledge that what the telelight panel doesn't tell them the checklist or the Dash One will.

Take the F-4 for example: The left generator is out and the bus tie is open. What equipment is lost? Merely turn to page E-22/23 in your checklist and there you'll find listed all the inoperative equipment.

The same is true for most of the major systems in the aircraft. The telelight panel informs the pilot of a major system or component malfunction and the checklist tells you what has been lost and what to do about it.

"So what?" you ask. So . . . it ain't so!! The telelight panel, the pilot's checklist, and the Dash One have done you in. They haven't told you everything you need to know.

Now before anyone jumps up and down, calling for my head, look at a couple of systems that are suspect. The first is the hydraulic system PC-1 and Utility. The second is the stability augmentation portion of the flight control system.

Assume you are airborne and lose your PC-1 hydraulic system. What are the cockpit indications compared to the actual situation? In the cockpit you have the master caution light and the "Check Hydraulic Gauges" lights illuminated. The PC-1 pressure gauge will read less than 1500 ± 100 psi. For the purpose of our discussion we will assume the pressure is zero. Now what have we lost?

According to the telelight panel and pressure gauge we have lost only a hydraulic system. According to the Dash One we have lost hydraulic pressure to one half of the stabilator actuator and to one-half the left hand aileron/spoiler actuators. The checklist merely states, "Land as soon as practicable."

Unfortunately, this is not the complete picture. Nowhere in the description of the PC-1 system; in the description of the stab aug system; or in the emergency sections of the Dash One and checklist does it mention you have also lost your ***pitch aug as well . . .*** and without benefit of the "Pitch Aug Off" light at that.

Since the pitch augmentation system is powered solely by PC-1, it stands to reason that when the system is lost, pitch augmentation also fails. The "Pitch Aug Off" light only illuminates when the pitch aug switch is off or the electronic portion of the pitch aug system has malfunctioned. And in the case of a hydraulic failure the pitch aug switch does not move to "Off."

Of course, on the newer three switch stab aug control box, the switch is held mechanically in the "On" position. However, on the old, single switch, stab aug control box, the switch is held on electrically. This switch will not move to the "Off" position either.

In all fairness to the Dash One, I must say that the relationship between PC-1 and the pitch aug is mentioned in a note after the auto-pilot section on page 4-32. "How can this be?" you cry. "What happened to our faithful, never erring telelight panel, Dash One, and checklist?" Before you get all choked up, let me spin you around one more time.

As the relationship between PC-1 and the pitch augmentation has been ignored by the Dash One and checklist, so too has the relationship between the utility hydraulic system and roll-yaw augmentation. The utility hydraulic system is the only hydraulic system powering the roll and yaw augmentation system, even with the new change, which routes utility pressure to one-half of the spoiler and aileron actuators. Therefore, it again stands to reason that ***loss of the utility hydraulic pressure also causes loss of the roll and yaw augmentation portion of the flight controls.***

Once again no warning lights advise you of this fact, nor does the Dash-One or checklist even hint at this relationship.

By this time I'm sure you can see the implications of this problem. If you lose both PC-1 and utility hydraulic systems, you lose the entire stability augmentation system. And not one single warning light, nor remark in the emergency procedures, advises you of this fact.

In situations like this, good, old fashioned, common sense comes into play. Any time you lose PC-1, perform the corrective actions listed for loss of pitch aug as well. If both PC-1 and utility systems are lost, take it real easy and get on the ground as soon as possible. But don't get into pilot induced oscillations and the like, because YOU are now the only stab aug system on board.

***TAC is taking steps to see that the tech order and checklist are both modified to include this information. Hopefully, some engineering changes will also be forthcoming. We are all indebted to Capt Grant for this timely information.***

***Ed.***

# TIRE TIPS...... *for Winter*

## TREAD DEPTH

One of the most valuable aids you can give a pilot during winter operations is a good set of tires . . . and this includes the nose wheel. Fall, winter, and early spring are the times a pilot is most likely to encounter standing water, slush, snow, or ice on the runway. This means he'll be subjected to slick surfaces. By giving him good rib-tread tires you'll decrease chances of a tire-traction-loss incident or accident. If a tire has less than 1/16 inch tread remaining it performs as if it's bald.

## INFLATION PRESSURE

Inflate an aircraft's tires in a warm hangar, then park it outside in winter cold and you have a quick case of under-inflation. In fact, you can calculate the potential pressure loss by deducting one percent of the total pressure for each five-degree drop in temperature. This subjects crewmembers, and passengers if it's a transport, to several hazards.

Like the slick or worn tire, under-inflation encourages traction loss, known as hydroplaning, on wet, slick runways. Hydroplaning speeds are in direct proportion to tire pressure. High pressure tires require higher speeds to hydroplane. Lower the pressure and you lower the onset speed and the aircraft will hydroplane longer.

Low tire pressures also magnify the standing wave effect and tread distortion, which diminishes footprint area at higher takeoff and landing speeds. This increases the chance of traction loss and causes a rapid build-up of tire-damaging heat.

## TIRE TREAD

Don't use smooth or dimpled treads when there's a chance of rain, snow, or ice. These treads almost guarantee traction loss on even damp runways. Install dimple or smooth treaded nose wheel tires and you'll be denying the pilot adequate nose wheel steering with even the slightest runway moisture.

## COMPRESSED AIR

Filters should be used on all air inflation lines. This prevents moisture from freezing up tire valves . . . which brings on slow leaks. Some aircraft tires are inflated with dry nitrogen in winter. This prevents many minor, but irritating problems.

## VALVE CAPS

Insure that caps are installed on all air filler valves, both tires and gear struts. This can save you many headaches from water, snow, and ice contamination.

## FLAT SPOTS ON TIRES

Don't let an aircraft sit for extended periods in the same spot. This is not necessarily a problem peculiar to winter. High gross weights and long periods parked in the same position can cause flat spots summer or winter. But cold intensifies the problem and a short taxi to takeoff position will not warm the tire enough to round out flat spots. Then the aircrew will notice gear vibrations on takeoff . . . resulting in unnecessary maintenance checks after landing.

## TIRE STORAGE

Don't store rubber products of any kind near electric motors, generators, or battery chargers. Electricity changes oxygen to ozone which causes premature aging of rubber.

## CONCLUSION

While aircraft tires may seem of minor importance to some, in the overall operation of a sophisticated aircraft, they can be the key to safe flight. Don't take them for granted.

# the ICE MAN COMETH

**By Lt Col Carl E. Pearson**

Most Air Force types keep their cold-weather mobility gear in shape and stay ready for world-wide assignment in a matter of hours. They adapt quickly to freezing temperatures, snow, ice, and longer hours of darkness with "winterized" clothing, equipment, and attitudes. So, as a person, you're cold-weather capable. But how about that car you drive? And that second, "pure-transportation" jalopy. Check their combat-the-cold readiness against these:

• Check engine cooling system for leaks, replace soft radiator hoses, tighten loose clamps, and then add antifreeze . . .you'll avoid replacing it, and possible engine damage.

• Repair that leaky, sneaky exhaust system you lived with all summer. It won't let you survive the winter. If it doesn't kill you, the carbon monoxide will seriously affect your driving alertness.

• Keep windshield defrosters and blades in top shape to avoid ice and snow buildup. Don't try to get by playing peek-a-boo thru an ice hole. Scrape windshield, rear, and side windows clean before moving. If it's freezing, using the windshield washer will lose you in a self-inflicted ice storm

• Your tire's remaining tread and correct inflation are more important than ever. Traction is sharply reduced on snow, ice, or wet surfaces. And you can't start, stop, or turn on winter's slippery stuff without tire-to-road friction. Maintain full recommended tire pressure for full tread contact. Reduced inflation actually reduces your tire's grip below its full potential. So don't let air out of your tires and remember that tire pressure decreases one pound for each nine-degree temperature drop.

• If you put ballast in your trunk, be sure it's ahead of your rear axle. Weight aft of your rear wheels makes your car unstable and reduces front wheel braking traction and steering capability. In heavy going keep moving. Your tire's natural "flotation" disappears when stopped.

• Cold weather starts with a weak battery can "chatter" your starter relay, burning the points. Also, weak batteries mean long, slow engine turnover, overheating starters to the point of seizure.

• Winter's centrifugal force is strong as summer's, but your traction and cornering capabilities are weaker on winter's slick curves. Friction between tires and road surfaces keep you planted on roads when turning. As soon as centrifugal force exceeds the force of friction, you're off the road. At 20 mph a 3000 pound car resists 156 pounds of centrifugal force in a 500-foot radius curve. At 60 mph the force zooms to 1400 pounds. Slow down more than ever on curves . . .and watch out for quick lane changes.

• Your night driving increases sharply and 90 percent of your driving decisions are based on sight . . .so are the other driver's. Get your headlights on earlier. Parking lights only are dangerous.

• Add your own checklist ideas here . . .and get ready for winter driving ahead of time!

# you get more static......in winter

It was a cold January night. An aircraft was in fuel cell repair because of a leak near the nose jack pad. Defueling was in progress. Both drain valves for the right internal wing tanks were open and fuel flowed in a steady stream into a locally-made 55 gallon drum. After a time, fuel appeared to be draining too fast, so one of the mechanics decided to shut off the drains. He stooped under the wing, and with a screwdriver, reached to flip the valves closed. As his hand neared the valves, a spark jumped from the screwdriver and ignited fuel vapors. The fire was extinguished, but not before a valuable first line aircraft was badly damaged.

The maintenance men involved in this static-electricity accident were well qualified and knowledgeable. But, as if to prove "familiarity breeds contempt," investigators found 19 separate violations of two basic tech orders and two violations of an Air Force manual.

Some of the more obvious errors included: improper shoes on the airman who attempted to close the valves and sparked the fire; corroded and unserviceable static ground points; a homemade and non-approved 55 gallon drain barrel, also improperly grounded; personnel anti-static discharge points were not provided so that body static could be readily eliminated prior to approaching the aircraft.

Another Air Force static-electricity accident happened last winter. The cause was a lack of basic knowledge. This time an aero club bird was involved.

The pilot made an unscheduled landing in the cold Northwest. He needed fuel, so a local service station trucked in two five-gallon jerrycans of hi-octane.

To prevent spillage, the pilot used a plastic funnel. As he poured the tank filler neck began to glow . . . then suddenly, fire! The aircraft was destroyed.

The cause was listed as static electricity. Friction of the fuel flowing thru the funnel generated an electrical charge. The plastic funnel acted as an insulator between the electrical charge and the conductive metal tank filler neck. The electrical charge built up until it had sufficient strength to breakdown the insulating effect of the plastic funnel. The result? Fire!

Dry, cold, winter weather makes static electricity a special problem. Actually it is with us all year long . . . it's just worse in winter. You probably experience it most often in the shock you get after sliding across an automobile seat and touching the door handles, or walking across a thickly carpeted room and grabbing the door knob.

Pilots frequently see static electricity in the form of St. Elmo's fire around the windscreen of a jet, or on the prop tips of a recip. In flight it's no problem because aircraft are built with the capability to discharge electrical build-up.

On the ground our tech orders spell out procedures for bonding and grounding to prevent dangerous accumulations of static electricity. But here are some tips to help check your protection in the shop or on the flight line:

(1) Check all ground connections to be sure they provide continuous, low-resistance paths to ground . . . otherwise they're useless.

(2) Bonding and grounding conductors must be large enough to handle required electrical conductivity and mechanical strength.

(3) Connections to equipment and ground must be strong and insure good electrical contact.

(4) Grounding two pieces of equipment that are close together by separate ground conductors does not always eliminate the static hazard. A difference of electrical potential can exist and a static spark can occur. To eliminate this difference of potential all bodies in close proximity must be electrically interconnected or bonded.

TO PREVENT STATIC-CAUSED EXPLOSIONS:

(1) Don't use non-conductive material such as plastics or nylons.

(2) Bond and ground all static producing objects.

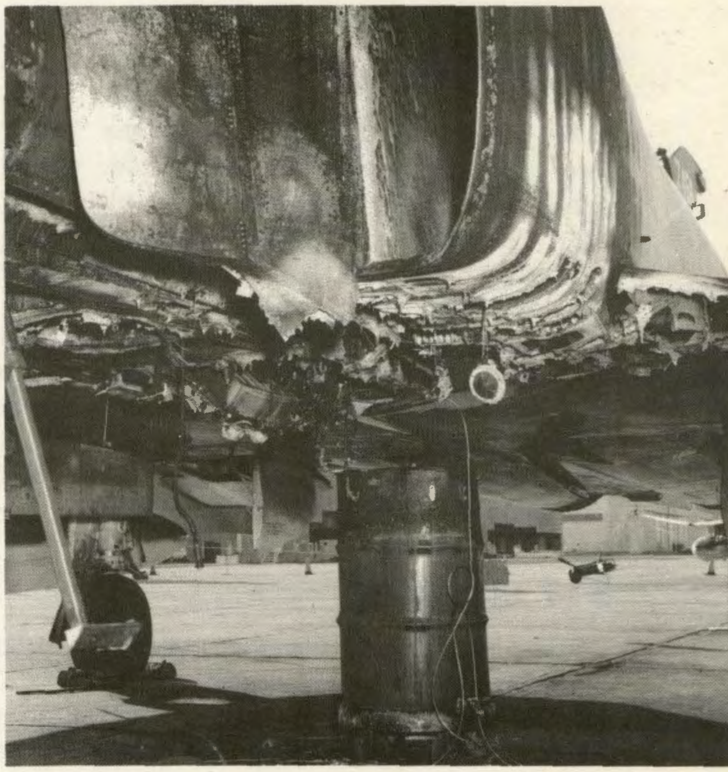
(3) Have an electrician physically check your bonds and grounds for adequacy.

(4) Test your ground outlets periodically.

(5) Connect all machinery and equipment in one room to a common ground to avoid differences of potential.

(6) See that all piping such as exhaust systems and collection ducts are banded together. Physical connection of pipes or ducts does not necessarily mean the system is bonded.

This winter don't put up with a lot of unnecessary static . . . electricity that is.



**An unauthorized barrel, improperly grounded caused this static sparked fuel fire.**


References:

1. Tech Order 1-1-3.

2. Tech Order 00-25-172.

3. AFM 127-101.

4. "Static Electricity," TAC ATTACK, Jan 66.

5. Moody, Ruben B., Lt Col. "Static Electricity," AEROSPACE MAINTENANCE SAFETY, Feb 65.

# CHOCK TALK ....incidents and incidentals

## PAINT COMPLAINT

An F-4 had repeat write-ups on the "Static Corr Off" telelight. It illuminated during acceleration, rapid changes in altitude, and sometimes remained lit during supersonic flight.

Troubleshooters replaced the central air data computer several times, checked the water trap, ran several total leakage checks, and changed the filter. The problem remained unsolved. Then a sharp maintenance type saw that the exhaust vent cap for the CADC was almost covered with paint; the screen was about 80 percent blocked. Paint was removed . . . and write-ups stopped.

## WET COMPUTER

While descending to land an F-4 crew noticed instrument fluctuations; altimeter 600 to 1200 feet, vertical velocity 0 to 2000 feet, and airspeed 25 knots. In the traffic pattern the pressure altimeter was 400 feet higher than the radio altimeter. After landing, there was an error of 100 knots airspeed, and 550 feet on the altimeter.

Maintenance investigators found water in the static system. The radome on this newly assigned Phantom did not have the drain holes aligned with the drain. Water collected in sufficient quantity to back-up and saturate the CADC . . . causing serious instrument errors.

The rest of the wing's F-4 fleet was inspected and two other newly arrived aircraft were found with the same problem. A check of Dash Six preflight work cards showed that no requirement existed for checking this drain.

The wing promptly submitted AFTO Form 22s, to have the radome drain check added to F-4 PRPO cards. Locally, they require pilots and crewchiefs to check the drain before every flight. They caution all F-4C and D users of the necessity and importance of radome draining after any rain.

## INFLIGHT DEFUELING

Shortly after the F-100F took off his wingman reported fuel streaming from the belly panel. After a successful emergency landing, maintenance crews removed the aft section and ran the bird on the trim pad. They soon discovered that above 85 percent rpm, fuel sprayed from the tube assembly of the cooler-to-fuel pressurizing valve. The tube was removed and inspected.

Maintenance inspectors found the tube ferrule was not properly silver-soldered to the tube assembly. This allowed a high pressure fuel leak. The engine had been overhauled by a civilian concern in February 1968. Inspection of four other recently overhauled engines turned up one other with questionable soldering.

How about your engines?

## RESTRICTED TRAVEL

The F-4 aircraft commander cranked up and proceeded with the after-start checklist. When he checked flight controls the stick did not appear to go full back. The crew chief confirmed that stabilator movement was also limited. The flight was aborted.

Maintenance investigators found that actuator rods in the pitch viscous damper were installed backwards. This limited normal rod travel by four with a maintenance slant.

inches and restricted the horizontal stabilator to 12 degrees down versus a normal 20 degrees.

The damper had been overhauled by the base field maintenance squadron. To compound the problem, the mechanic who installed the unit, did not follow tech order checkout procedures which would have revealed the error.

The wing has recommended red strips on the fuselage to indicate the full-up and full-down stabilator position providing ground crews with a quick check reference line.

Best procedure is for each mechanic to follow the book. If your job is to supervise overhaul of a dampner . . . supervise!

If you're supposed to inspect for quality of maintenance work performed . . . inspect! Other lives depend on you!

## "FAILED TO"

Transient maintenance types removed the F-100's right link bay panel to reach oil sampling gear. After removal, they ***failed to*** replace the panel. Also, ***failed to*** record it on the Form 781.

During his preflight the IP noted the loose panel, but maintenance help wasn't available. So, he and his student strapped in, requesting some support by radio. He ***failed to*** mention the unsecured panel to his transient alert crew when they arrived and also, ***failed to*** request a runway quick-check.

Upon landing at home base the pilots discovered the panel missing.

If you don't follow the basic rules of panel play (either full open or full closed, no half-way measures) you put on a pretty poor show. And like bad panel shows on TV, you never ***fail to*** have something or someone replaced.

## "KNOCK-KNOCK, WHO'S THERE?"

Herky cruised quietly at FL 180 . . . then started playing a game of airborne "knock-knock" around its right wheel well. Searching for right responses to "Who's there?" the crew answered, "It's HF antenna" . . . a notorious knocker when broken. So, they peered thru the sextant for confirmation and saw both antennas firmly fixed. Puzzled now, they were relieved when the bongo beat stopped.

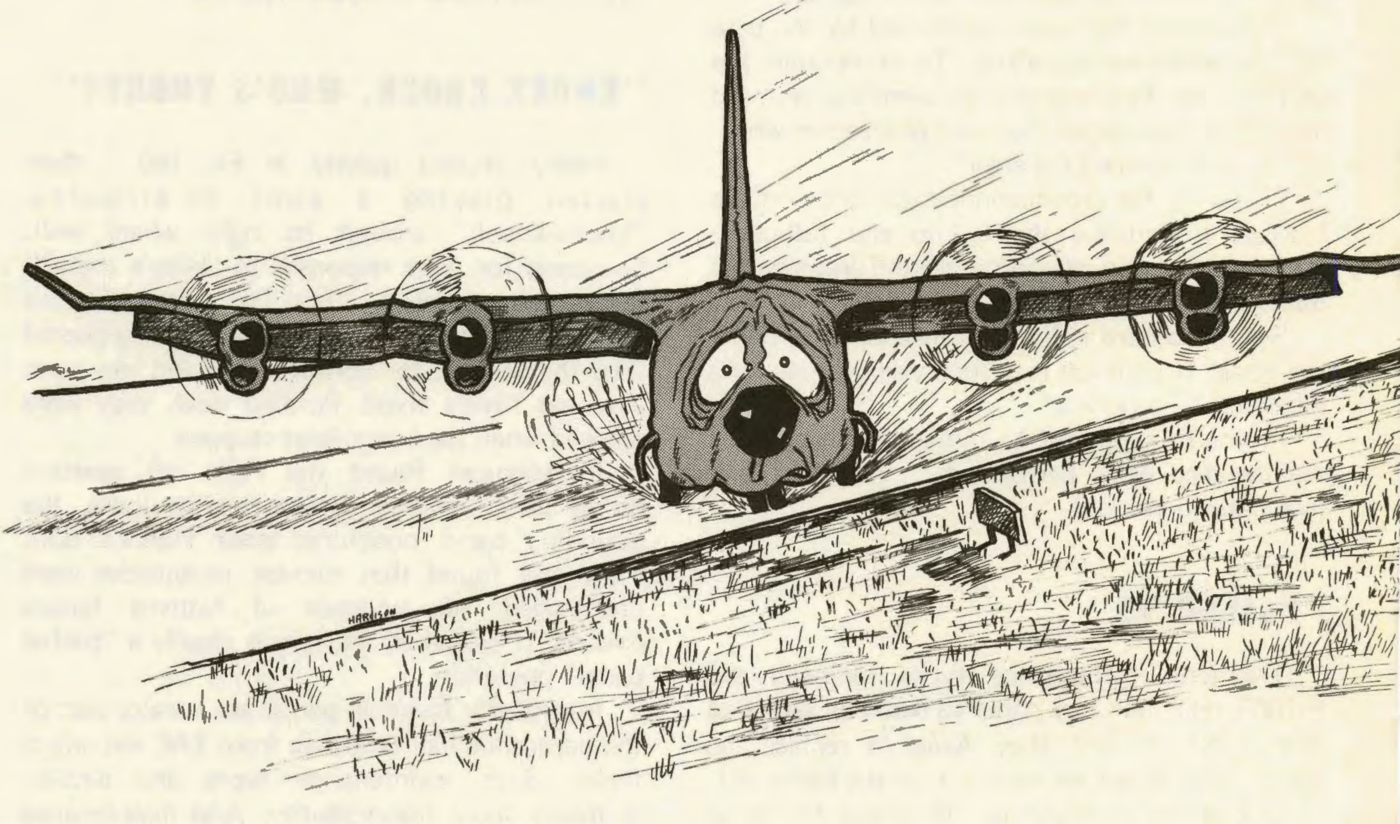
Investigators found the right aft gearbox access panel missing. Before tearing loose, the pounding panel punctured poor Herky's skin. They also found that cam-loc receptacles were undamaged; no evidence of fastener failure existed. If closed at all, it was clearly a "partial panel" operation.

Improperly fastened panels are a major part of the hazardous hail dropping from TAC aircraft in flight. Both maintenance types and aircrew members share responsibility. And maintenance has the "last clear chance" for a dropped object save during quick-check.

Most successful operators avoid panel loss by setting a few basic rules to live by. First: either all the way open, or all the way closed. No in-between arrangement is allowed. Second: never use a failed fastener; repair or replace worn fasteners before they fail. Third: if you're still being caught with your panels down, make certain you're living up to the first two rules!

# WHOOPS ?

By Major Keith C. McDonald
316 TAW, Langley AFB, Va.



As we broke out of the clouds about a mile out on GCA for runway 25, my copilot switched to Saigon Tower. The tower operator was talking continually to many aircraft in the VFR pattern beneath a rain shower. He reported, ". . . Wind 360 at 10 gusting to 20; cleared to land!" A right crosswind.

Immediately after touchdown I lowered the Herky's nose wheel, and in a flash we were off the right side and over a runway distance marker. I considered full reverse on number one engine, but the right wing was down so I rejected that thought. Gyroscopic effect might cause the wing to dig into the ground. I remember applying left brake but the antiskid cycled so I stopped braking. Steering turned the nose wheel but did not change aircraft direction.

Finally, when the nose wheel became effective I steered back on the runway, then to the first turn-off. As my heart stopped pounding I realized we had blown a main gear tire.

Later, I looked at the holes in the aircraft, the blown tire, broken brake line and all that hydraulic fluid on the ground, and I thought, maybe I should have done something else . . . where did I go wrong?

After careful study and some 20/20 hindsight here are some of the lessons learned in my incident. Many pilots don't believe the C-130 will hydroplane. Actually this can occur quite easily because of the wide, low pressure tires. Reportable incidents are relatively rare though, because reverse thrust does most of the work in getting stopped. And many cases of wet runway traction loss go unreported because no damage resulted.

The key to my unusual hydroplaning incident is the crosswind. Usually an aircraft with hydroplaning tires, under crosswind conditions drifts off the downwind side of the runway. Why did I go off into the wind? Tests with the C-130 at Dyess AFB showed repeated instances of front main wheel spin-down (decreasing rotation) with the aft tires rolling merrily along. NASA found that the front tires have a squeegee-effect which removes fluid from the path of the rear tires. Even without use of brakes the front wheels may start to spin-down and stop at 70 percent of a tire's critical hydroplaning speed, usually between 57 and 99 knots, depending on tire pressure. This means the rear wheels will continue to provide braking and cornering traction while the front wheels and nose wheels are without traction.

When you apply brakes in this situation the type of antiskid system has an important effect on the success of crosswind landings or aborted takeoffs. The C-130 system (unless T.O. 1C-130-743 is complete) has two dump-type antiskid valves, one for the right wheels, the other for the left. When you apply brakes and a skid is sensed by either a front or rear wheel, the dump valve blocks pressure to both front and rear brakes on the side where the skid is detected. And all brake pressure on that side is released.

In my mishap, skidding of the left front wheel when I applied left brake caused a pressure relief on both left wheels. This denied me directional braking control from the non-skidding left rear wheel. With the nose wheels hydroplaning, the free rolling rear wheels on both sides were pivot points allowing the crosswind to turn the aircraft. This caused the plane to run off upwind.

The new Hytrol Mark II System (T.O. 1C-130-743), which is just coming into service, modulates brake pressure at each wheel individually. This "peaker seeker," as it is called, oscillates slightly, maintaining maximum braking on each wheel thus providing peak braking without skidding. As you can see, the rear main wheels can provide some braking under the worst conditions since they don't appear to hydroplane except on the smoothest runway.

Critical hydroplaning speed for the C-130 nose gear is about 65 KIAS. Yet progressive traction loss can begin at 70 percent of that figure. This means that on a wet runway, moving as slow as 46 knots, the aircraft can weathervane into the wind, leaving you with aerodynamic controls and asymmetrical power (and possibly some brakes) to keep her straight.

The tech order says to maintain directional control by means of aileron and rudder, nose wheel steering, differential brakes and power . . . in the order. And it's common knowledge that rudder is effective as low as 40 knots. My point is, don't get into the habit of hanging onto nose wheel steering when your flight controls are effective. Jumping onto the steering as soon as the nose wheel touches down on landing is especially hazardous as I've tried to show.

Get overly dependent on nose wheel steering and you may find the thing about as satisfying as sucking your thumb . . . and just about as rewarding.

# TAC TIPS

...interest items, mishaps

## DAMP DERRIÈRE

After a heavy snowfall, early morning ramp temperature dropped to five degrees below zero. Having departed warmer climes two days earlier, our transient Phantom phlyers wore winter underwear, summer flying suits, and jackets.

Transient alert needed help launching airplanes that morning because snow removal created slowdowns. As good TAC types do, the aircrew pitched in and helped ready their birds. A helpful flight medical officer riding one Phantom's back seat helped remove chocks on four birds. Slippery footing on the icy ramp forced him to sit in snow while kicking loose frozen-down chocks. In the process he acquired a wet flight suit and a damp derrière. Also, two frigid nights cold soaked the Phantoms and, subsequently, the phlyer's posteriors.

During a refueling stop about two hours later, our friendly FMO felt a burning irritation. On arrival at home his discomfort aggravated to the point where he preferred to stand rather than sit. Diagnosis was frostbite . . . in an unaccustomed area. Fortunately, it resulted in only a week of "standing operating procedures."

Wearing wet flight suits in subzero temperatures is a known invite to frostbite. And it's also true that bulky winter flying gear in a fighter's crowded cockpit cuts crosscountry comfort considerably. But for your own survival, when you head toward frozen lands from TAC's warm winter resort areas wear your cold weather clothing. And like our minuteman forefathers: Keep your posterior dry!

## HAZARDOUS LAG

It was a dark moonless night. The F-4 pilot was flying a night bombing mission. He pulled out, as briefed, at 1200 feet indicated. But a flash of movement and a few scattered light-reflecting objects showed him flying at tree top level.

After this near fatal accident the pilot landed and dutifully wrote up the system. But maintenance personnel could not find an altimeter discrepancy.

As a precaution the pitot tube was replaced and the aircraft scheduled for a functional check flight. With another F-4 flying chase, and at dive angles corresponding to the night bombing incident, the test pilot noted a 250 foot altimeter lag in a 10 degree dive; 500 foot lag in a 20 degree dive; and a 1000 foot lag in a 30 degree dive. In addition, it lagged in a climb.

Again maintenance specialists could find no malfunction. However, this time they replaced the central air data computer (CADC) and rescheduled a flight test.

The altimeter worked perfectly and the CADC was UR'ed. Pending results of a tear down report, speculation centers on an internal problem within the CADC static pressure manifold.

Had this fighter unit not taken extra precautions to isolate the problem, a subsequent night mission could have ended in disaster.

## PREFERRED IFR ROUTES

FAA has published an Advisory Circular (90-38) outlining background, intent and requested actions pertaining to preferred IFR routes. This system has been in effect for some time in the low altitude structure, however, a 300 percent traffic volume increase from 1963 to 1967 has made preferred routing necessary in the high altitude structure.

Use of preferred IFR routes, while not mandatory, is certainly necessary from a safety and traffic flow control standpoint. Many airways will be ear-marked for one direction only. If you file for one, going the wrong direction, ATC will with morals, for the TAC aircrewman.

no doubt reroute you to another conforming to your direction of flight. If you don't care to follow the route provided, ATC will try to clear you as close as possible to your flight plan. If weather becomes a problem, controllers will again attempt to steer you around troublesome areas. Obviously, all this affects your planned fuel reserve.

FAA's Air Traffic Service emphasizes that, "The importance of cooperation and understanding in use of preferred routes cannot be over emphasized." Forewarned is forearmed. Watch that fuel reserve!

## DART PRESSING BARRIER

An F-100's first two passes went scoreless during an air to air gunnery mission. On the third, the dart disintegrated. Struck not by a volley of 20mm, but hit by the vertical stabilizer of the pressing Supersabre.

A wingman moved in to give a visual inspection report to the over-eager jock, who, after a controllability check, decided on a straight-in approach at a nearby strip (damage repair later estimated at more than 100 hours). Thanks to a BAK-9 barrier, the F-100 was saved from further damage when the drag chute jettisoned immediately after deployment.

The only unused barrier which could have saved this pilot from the dart pressing incident is located between his ears. A thousand-to-one odds says it will be cocked and ready from this day on.

## APPROACH END BARRIER ENGAGEMENT

We've recently had two separate instances where F-4 pilots attempted approach end barrier engagements with MA-1A modified barriers. They were unsuccessful because MA-1A barriers are designed for runway over-run and not approach end engagements. One engagement resulted in a minor accident with significant damage to the aircraft. The other was an incident.

These mishaps indicate a lack of knowledge of the capabilities and limitations of jet barriers and arresting gear systems.

Only a BAK-9 or BAK-12 arresting gear system can be used for both an approach end and runway over-run engagement. An MA-1A modified barrier, or an MA-1A used in conjunction with a BAK-9 or BAK-12, can handle only runway over-run engagements.

If an approach end engagement is desired on a runway with an MA-1A used in conjunction with a BAK-9 or BAK-12, the MA-1A must be disconnected before an engagement is attempted.

All pilots should be knowledgeable on the barrier and arresting gear information available in the FLIP Enroute Supplement and FLIP Terminal Charts.

F-4 pilots, particularly instructor pilots . . . don't be caught lacking this valuable information. It could be embarrassing.

by Maj Sol Harp
Hq TAC (OSF)

## SKI BOOM

USAF recently advised there is some high level concern over the hazards of sonic booms near ski resort areas. Those of us who ski know only too well the dangers of a snow avalanche.

Sonic booms, like a gunshot or the noise of a dynamite explosion, can very possibly set the heavily drifted snow in motion. So out of respect to your fellow sportsmen make certain any planned low level routes or supersonic runs avoid known ski resort areas. Don't be a spoil-sport.

# LETTERS to the EDITOR

The American Fighter Pilots Association reports eight new chapters have been added to their growing membership.

Establishing the new chapters were Air Force personnel at Shaw AFB, N.C.; Perrin and Ellington AFBs, Tex.; Davis-Monthan AFB, Ariz.; Eglin and Homestead AFBs, Fla.; and McChord AFB and Adair AFS, Wash.

The chapter formed at Ellington is being chartered in the name of the 147th Fighter Group of the Air National Guard and thus becomes the first ANG chapter in the revitalized AFPA.

Responsible for founding the new chapters were:

At Shaw, Col James D. Catington, Chief of Staff for Ninth Air Force;

At Perrin, Col Russell D. DeMont, Deputy Commander, 4780th Air Defense Wing;

At Ellington, Major Dean T. Landon, 147th Fighter Group;

At Davis-Monthan, Col Robert A. Ackerly, Commander, 4455th CCTS;

At Eglin, Col Daniel (Chappie) James, Jr., Vice Commander, 33rd TFW;

At Homestead, Col Walter P. Meyler, Commander, 319th FIS;

At McChord, Col Frederick M. O'Connor, Commander, 318th FIS;

And at Adair, Col Wayne R. Rhynard, Commander, 26th Air Division.

The American Fighter Pilots Association is a multi-service association of former and active fighter aircraft organization members, together with members of their supporting units and people sympathetic with and dedicated to the principles of the AFPA.

Anyone interested in joining can obtain complete information by writing the American Fighter Pilots Association, P.O. Box 90363, Airport Station, Los Angeles, California 90009.

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Dear Editor:

Regarding your article in "Tac Tips" on F-4 Trapped Fuel Flameouts (July 1968), there was a slight error. The tape on the fuel counter shows internal fuselage fuel only, not fuselage and internal wing tanks.

We enjoy TAC ATTACK very much in our squadron; keep up the good work.

Hugh M. Saint, Major, USAF

*Thanks Major (and other Phantom pilots who wrote similar letters), we goofed. We weren't keeping a close watch on our gauges, or at least their titles. In describing the fuel gauge, we said, "...the tape and counter decrease proportionately; the tape indicates fuel in the fuselage and internal wing tanks." This should have read, "...the counter indicates...". Our apologies, and we appreciate your right seat monitoring. Ed.*

Dear Editor:

Reference your TAC Tip on smoke switch in the August 1968 issue. You state that smoke bombs, proper nomenclature smoke grenades, used to mark drop zones have letters and number which read "M-18, Smoke, Yellow, BBA-1-30."

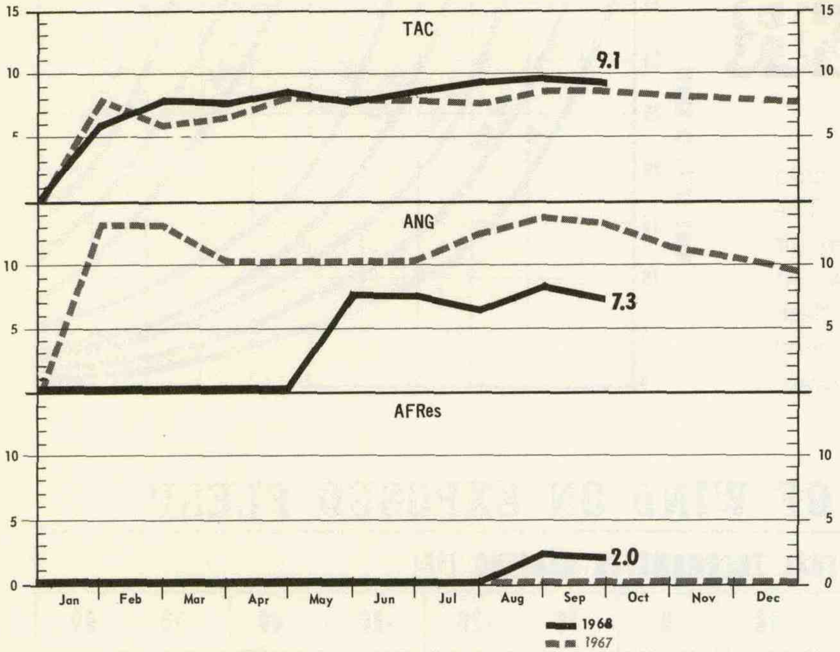
TAC Combat Control teams also use white, green and red smoke to mark the drop zone. The white grenades have an M8 smoke, HC and lot number. The other colors have M18 smoke, color and lot number. PBA-1-30, you have listed is only the lot number and will not be the same on all grenades. White smoke is the most widely used smoke for marking drop zone.

A1C Kenneth L. Copeland
9th APS, Forbes AFB, Kansas

*We appreciate your letter. This information should be useful to our airlift people and Combat Control Teams. Our point was that "WP" stands for white phosphorous, which is dangerous. Ed.*

# TAC TALLY

## MAJOR AIRCRAFT ACCIDENT RATES AS OF 30 SEPTEMBER 1968 *




## UNITS

| | THRU SEP 1968 | THRU SEP 1967 | | THRU SEP 1968 | THRU SEP 1967 |
|---|---|---|---|---|---|
| 9 AF | 5.7 | 8.3 | 12 AF | 9.3 | 9.6 |
| 4 TFW | 9.8 | 7.2 | 23 TFW | 20.8 | 11.6 |
| 15 TFW | 10.4 | 25.9 | 123 TRW | 8.0 | 14.0 |
| 33 TFW | 9.1 | 9.8 | 27 TFW | 8.3 | 13.5 |
| 113 TFW | 21.5 | 15.0 | 140 TFW | 5.8 | 20.4 |
| 4531 TFW | 12.3 | 0 | 479 TFW | 9.6 | 10.1 |
| 363 TRW | 3.2 | 10.2 | 474 TFW | 38.1 | 0 |
| 64 TAW | 0 | 0 | 67 TRW | 12.6 | 6.3 |
| 316 TAW | 0 | 0 | 75 TRW | 0 | 17.6 |
| 317 TAW | 0 | 5.3 | 313 TAW | 0 | 0 |
| 464 TAW | 0 | 2.9 | 516 TAW | 0 | 0 |
| 4442 CCTW | 0 | 7.7 | 4453 CCTW | 12.8 | 3.9 |
| | | | 4510 CCTW | 6.0 | 9.0 |
| **SPECIAL UNITS** | | | | | |
| 1 SOW | 7.1 | 6.7 | 4500 ABW | 0 | 0 |
| 4410 CCTW | 18.1 | 9.4 | 4440 ADG | 0 | 0 |
| 4409 SUP SQ | 0 | 0 | 4525 FWW | 33.9 | 24.1 |
| | | | 4416 TSQ | 48.1 | 0 |

## AIRCRAFT

THRU SEP (1968 / 1967)

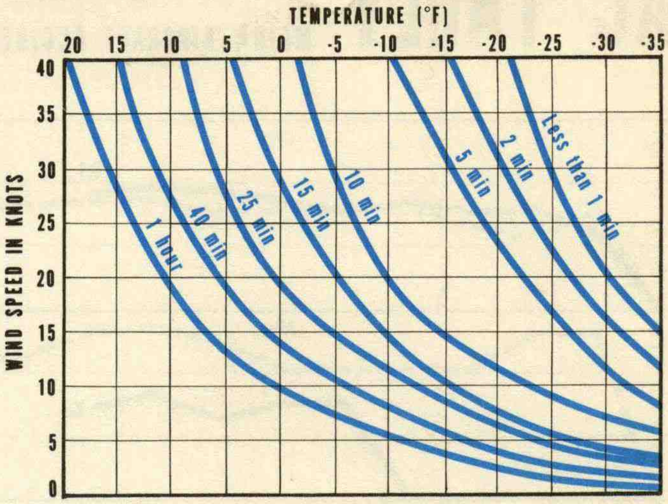
| TYPE | TAC 1968 | TAC 1967 | ANG-AFR 1968 | ANG-AFR 1967 |
|---|---|---|---|---|
| A-1 | 52.0 | 23.1 | 0 | 0 |
| RB-66 | 0 | 0 | 0 | 0 |
| F/RF-84 | 0 | 0 | 7.2 | 16.7 |
| F-86 | 19.8 | 0 | 28.4 | 9.7 |
| F-111 | 45.2 | 0 | 0 | 0 |
| F-100 | 11.8 | 15.9 | 0 | 23.7 |
| F/RF-101 | 10.3 | 36.5 | 0 | 22.4 |
| F-5 | 18.3 | 19.0 | 0 | 0 |
| F-105 | 22.8 | 15.7 | 0 | 0 |
| F-104 | 11.6 | 0 | 91.0 | 0 |
| F/RF-4 | 11.5 | 12.8 | 0 | 0 |
| C-47 | 0 | 29.3 | 0 | 0 |
| KC-97 | 0 | 0 | 0 | 0 |
| C-119 | 0 | 0 | 2.0 | 0 |
| C-123 | 16.2 | 0 | 0 | 0 |
| C-130 | 0 | 0.6 | 0 | 0 |
| T-29 | 0 | 0 | 0 | 0 |
| T-33 | 2.5 | 0 | 10.6 | 0 |
| T-39 | 0 | 0 | 0 | 0 |
| C-7 | 0 | 29.3 | 0 | 0 |
| O-1 | 8.5 | 14.1 | 0 | 0 |

* ESTIMATED FLYING HOURS

# cold + wind = DANGER

Wind velocity speeds-up effect of cold temperature on exposed flesh. The combination creates an equivalent calm air temperature shown on the chart below. At actual temperatures above 32 degrees F. flesh will not freeze (frostbite), regardless of wind velocity, but body heat loss remains relevant.

**MAXIMUM EXPOSURE BEFORE FROSTBITE**




## COOLING POWER OF WIND ON EXPOSED FLESH

| ESTIMATED WIND SPEED (MPH) | ACTUAL THERMOMETER READING (°F) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 50 | 40 | 30 | 20 | 10 | 0 | -10 | -20 | -30 | -40 | -50 | -60 |
| | EQUIVALENT TEMPERATURE (°F) | | | | | | | | | | | |
| calm | 50 | 40 | 30 | 20 | 10 | 0 | -10 | -20 | -30 | -40 | -50 | -60 |
| 5 | 48 | 37 | 27 | 16 | 6 | -5 | -15 | -26 | -36 | -47 | -57 | -68 |
| 10 | 40 | 28 | 16 | 4 | -9 | -21 | -33 | -46 | -58 | -70 | -83 | -95 |
| 15 | 36 | 22 | 9 | -5 | -18 | -36 | -45 | -58 | -72 | -85 | -99 | -112 |
| 20 | 32 | 18 | 4 | -10 | -25 | -39 | -53 | -67 | -82 | -96 | -110 | -124 |
| 25 | 30 | 16 | 0 | -15 | -29 | -44 | -59 | -74 | -88 | -104 | -118 | -133 |
| 30 | 28 | 13 | -2 | -18 | -33 | -48 | -63 | -79 | -94 | -109 | -125 | -140 |
| 35 | 27 | 11 | -4 | -20 | -35 | -49 | -67 | -82 | -98 | -113 | -129 | -145 |
| 40 | 26 | 10 | -6 | -21 | -37 | -53 | -69 | -85 | -100 | -116 | -132 | -148 |
| | LITTLE DANGER (for properly clothed person) | | | | INCREASING DANGER | | | GREAT DANGER | | | | |
| | DANGER FROM FREEZING OF EXPOSED FLESH | | | | | | | | | | | |

**Trenchfoot and immersion foot may occur at any point on this chart.**
**Wind speeds greater than 40 mph have little additional effect.**

*See Forewarmed for Winter, Page 4*