flying

SAFETY

SEPTEMBER 1987

The First Forty Years

Lest We Forget

For Want of a Nail

The Creature of Cancellots

UNITED STATES AIR FORCE

SEPTEMBER 18, 1947

Happy Birthday Air Force

Forty years ago this month, the Air Force was born. It consisted of almost 400,000 people and an assortment of mostly propeller-driven aircraft left over from World War II. Today, our Air Force employs more than one million military and civilian members supporting the most sophisticated weaponry in the world. It is a result of 40 years of evolution — good times and bad.

The Air Force has met numerous challenges in the last 40 years — the Berlin Airlift in 1948, the Korean war a short time later, expansion and modernization of the Strategic Air Command in the 50s, the 1962 Cuban Missile Crisis, and the Vietnam War. The Air Force is known around the world for its help in humanitarian actions, and most recently supported air rescue operations in countries where American citizens were threatened by hostile actions.

Even though the Air Force has had a safety program since becoming a separate service in 1947, our safety record is an important success story that, perhaps, hasn't had the exposure it deserves. When I started flying in the early 50s, the Air Force was experiencing around 140 major mishaps a month at a rate of 36 per 100,000 flying hours. Fortunately, for us, we have made great improvements. This year, by contrast to those rather astounding statistics of the past, we are averaging less than 4.5 mishaps per month at a mishap rate of 1.6 per 100,000 flying hours.

Getting to this point hasn't been easy. It's required a lot of long, hard work. We have a formal safety organization, and that has played an important role. But the real contribution to mishap prevention belongs to all of you — the commanders, supervisors, aircrews, maintainers, and the full spectrum of support personnel throughout the Air Force.

I will retire this month with almost 34 years of service. I am proud of our accomplishments and the opportunity to have flown and fought for the best Air Force in the world. My wife, Sis, and I bid farewell to all of you and pray for your ongoing efforts to keep the flame of freedom burning brightly.

Fred A. Haeffner

Major General Fred A. Haeffner
Commander, AFISC

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SPECIAL ISSUE

To help us remember and commemorate our past, *Flying Safety* features selected articles reflecting on this period. We celebrate the last 40 years with "Safety Warrior," "Lest We Forget," and "A Real Safety Warrior."

UNITED STATES AIR FORCE
SEPTEMBER 18, 1947

SPECIAL FEATURES

REGULAR FEATURES

DEPARTMENT OF THE AIR FORCE • THE INSPECTOR GENERAL, USAF

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THERE I WAS

■ I was a young aircraft commander on TDY with an even younger copilot, flying an approach in the soup with a lightlift helicopter — having that "something is wrong" feeling. But what could possibly be wrong?

The day had sure started off great, and the weather was beautiful. Since we needed to put some time on the aircraft, we planned an IFR trainer for the afternoon. Everything looked good; the forecast called for possible fog when we arrived back at base, but I was looking forward to some IMC. The weather at home keeps almost all of our gauge-flying in the clear, and we have our approaches down so well that we can rattle off briefings in a matter of seconds and fly the approaches from memory. However, I enjoy IFR and try best to train well (seeing "we play as we practice"), respect, and work with my crew and comrades — so I thought.

Well, from takeoff, everything went smoothly, and we got some good training in. We were already planning postmission activities on our last leg back to base when the weather reports caught our attention. Where we had been deciding on which approach to shoot, approach control told us that we would *have* to take an ILS — it seemed that a thick fog bank did creep in! Hey, no problem.

As usual, I knocked out an approach brief as my copilot scanned the approach plate and flipped switches. The frequencies were set, we received our clearance, and everything was fine until we intercepted our glide slope that we shouldn't have intercepted yet! Call ATC? Nah, the controller was busy. Our receiver malfunctions half the time anyway. My partner and I didn't bother to check everything again since shooting localizer mins seemed to be a good enough idea. So down we went!

"Wow, that tower was close!" And as if I awoke from a dream, I switched out the VOR frequency that was set in and tuned in the correct one for the ILS, banked into the localizer course, and caught the glide slope as the VASI lights made a welcome appearance through the weather. The taxi in was long and quiet; I learned a lot about myself, my attitude, and how lives can depend on my definitions of a couple of words.

"Training" is the real thing as far as effort is concerned, and everything, including briefings and approaches, should be treated as such. "Crew" is not one working for everyone, but everyone working as one. They deserve my respect, attention, and double-checking. I guess we really do "play as we practice!" Treat others (and approaches) as you would have them treat you! ■

CAUSES AND PREVENTION OF CANOPY LOSSES

BOBBY L. MOORE
Senior Field Service Engineer
MCAIR-HQ TAC
Langley AFB, Virginia

Note from the Author: *As I was editing this article for publication, it dawned on me that we have gone almost 2 years since the last in-flight inadvertent canopy loss from an F-4. So why are we concerned with canopy loss prevention now? (Last in-flight canopy loss was 15 June 1985.) We are not losing canopies! Then I realized we had achieved success through such articles and briefings as this, and if we want to continue enjoying this sweet success, we must not relax! We must "keep on keeping them on!"*

Article adapted from a three-part series in McDonnell Douglas Aircraft Company's *Product Support Digest*, February 1984.

TEN PHANTOM CANOPIES

Ten Phantom canopies all in a row,
Aircraft at attention and ready to go.

Ten Phantom canopies out on the line,
"An improperly rigged system" and then there were nine.

Nine Phantom canopies arranged very straight,
"A worn open/close mechanism" and then there were eight.

Eight Phantom canopies pointed toward heaven,
"FOD on the cockpit sill" and then there were seven.

Seven Phantom canopies not ready for tricks,
"Improperly adjusted sequence cam" and then there were six.

Five Phantom canopies, wish there were more,
"No shear pin inspection" and then there were four.

Four Phantom canopies working smoothly and free,
"A loose fitting rain seal" and then there were three.

Three Phantom canopies reaching up to the blue,
"Premature seal inflation" and then there were two.

Two Phantom canopies glistening in the sun,
"Regulator pressure too high" and then there was one.

One Phantom canopy by itself not much fun,
"Some new way to lose it" and then there were none.

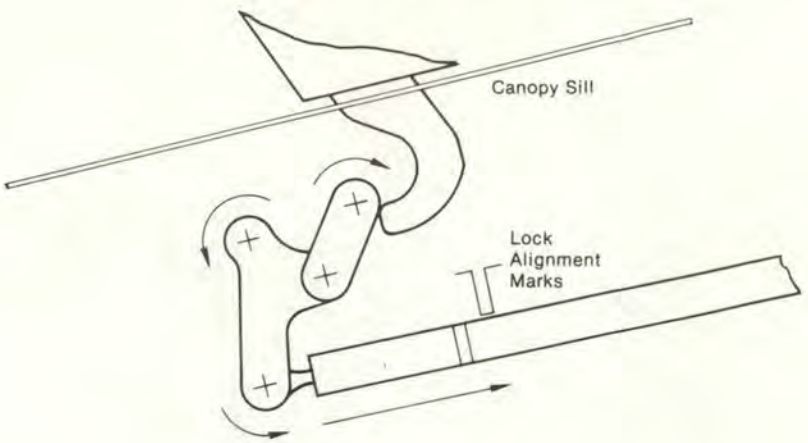
■ From 1965 through 1975, the Air Force Inspection and Safety Center's records showed an average of 17 canopy losses per year — 1975 was right on the average . . . 17. Canopies are not cheap, nor is the time it takes to fit, rig, and install a replacement when one is lost. So in 1976, I decided to do a little research. I visited some TAC bases with a 35-minute briefing for aircrew and maintenance people on causes and prevention of canopy losses, as I saw the situation.

In 1976, the total loss was down to 5, but in 1977, it went back up to 10. In 1981, I went out again and briefed, but this time with a 2½ hour presentation, and once more, the trend turned around. Five canopies were lost in 1981; only three in 1982 (one in TAC); and six in 1983 (two in TAC).

While only a zero loss rate would be truly acceptable, at least we are keeping the trend down. To maintain this trend, there must continue to be a joint and concerted effort between aircrews and the maintenance folks. At McDonnell Douglas, we stress a "team" effort to accomplish any goal, and it will only be this same team effort in the military that can cut canopy losses much farther.

continued

FIGURE 1 - STALLED CANOPY



CAUSES AND PREVENTION OF CANOPY LOSSES

continued

Cause Factors

An analysis of canopy loss records from 1972 through 1983 shows losses can be categorized into four basic cause factors — unlocked, stall, shear pin failure, and jettisoned, with the rest identified as "undetermined." Over 70 percent of the losses were identified as "stalls," which makes that far and away the major cause for loss. A "stalled" canopy is one that is not completely down and locked on the aircraft.

The canopy system itself may be a strong contributing factor to the canopy loss problem. Because of the F-4 canopy's "automatic" system, when the lever is moved to the closed position, the canopy closes and locks in several seconds without any further effort. Aircraft you may have been familiar with before the F-4, required one effort to close the canopy and then a second effort to lock the canopy. This automatic function and its perfect operation so many times may induce a sense of complacency; therefore, we close the canopy without "thinking."

If there is just one point I could leave with you, it is that NOTHING should be done around a jet fighter without thinking, and especially around a jet fighter cockpit. The F-4 is definitely a "thinking man's airplane!"

Canopy Loss Analysis

As noted earlier, there are four basic reasons for a canopy to be lost in flight — it jettisons (either intentionally or unintentionally); it becomes unlocked; a shear pin failure occurs; or it stalls (was not locked on takeoff).

- If the initiator has fired, it is very likely the canopy was jettisoned.
- Lever actuations have been the cause of several canopy losses and probably are the major cause for unlocked canopy separations. Improper rigging and component failures are also causes for inadvertent unlocking in flight.
- The shear pin can fail if the canopy does not fit properly or is improperly rigged. An underserviced damper will contribute to a premature shear pin failure. The canopy closing on foreign objects left on the sill will cause excessive loads to be applied to the shear pin. Also, if the shear pin inspection is not performed as required, a loose pin could go undetected and prematurely fail. However, after all these cause factors are noted, it still remains that canopy stalls are the major cause of inadvertent canopy losses.
- A canopy will stall for any number of reasons. Anything on the sill when the canopy is closed certainly will prevent the canopy from closing completely. If the preload is too high, the actuator may not be able to overcome this resistance and it stalls. A slow-closing canopy could be caused by binding linkage or premature canopy seal inflation. If the rollers engage only the forward radius of the canopy hook as illustrated in Figure 1, they can be forced forward to free the canopy.

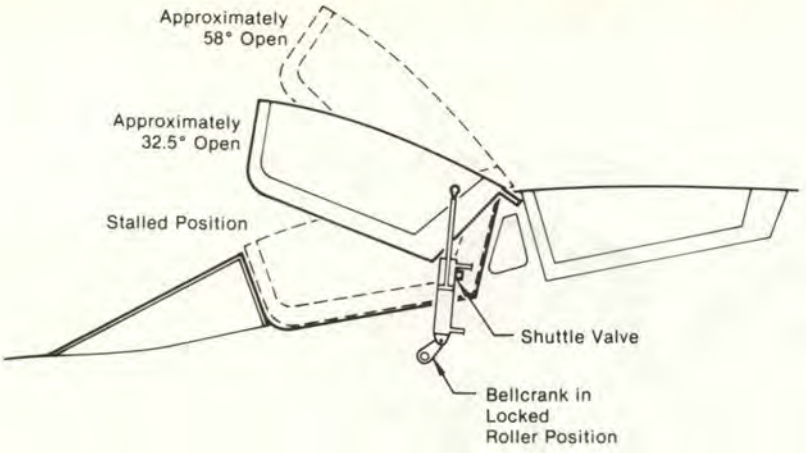
This occurs as the result of an increase in the internal pressure of the cockpit and canopy seal. The rollers have stalled, the linkage has not moved full travel, and the stripes are not aligned, indicating to the crewmember the rollers have not engaged the hooks, and he has a stalled condition.

If the airplane takes off with the canopy mechanism in a stalled condition, the piston rod is drawn out of the actuator as the canopy raises in the air stream (Figure 2).

As the area above the piston decreases, the pressure increases, and when this pressure equals the shear load of the shear pin, the pin fails. This pressure then drives the piston back down into the cylinder with a "hammer" action which causes the lower mount bolt to bend or break and shears the shuttle valve bolts.

For a front canopy, this is positive proof the canopy departed because

FIGURE 2 - STALLED CANOPY SEPARATION



of a stalled condition. Not because it was unlocked or jettisoned — had that happened, air pressure would have been applied to the bottom of the piston and no hammer action would have resulted. Not because the shear pin failed — had that happened, the piston (which is about one-quarter of an inch or less from the bottom of the cylinder) would have only a short travel and would not result in a hammer action causing damage to the mount bolt and shuttle valve. This type of damage can only be the result of a stall.

Because the rear canopy acutator is mounted in a gimbal ring mount, a rear canopy lost as a result of a stalled condition causes a different type of damage. After a rear canopy stall loss, the shuttle valve mounted to the bottom of the actuator will either be knocked loose, and/or the fitting attaching the normal up line to the shuttle valve will be broken or cracked. The gimbal ring mount bushings may be distorted. Impact marks usually will be found in the bottom of the cylinder. In either a forward or aft canopy loss, the rod will be retracted after a stall loss.

Loss Prevention

I believe prevention of canopy losses is a two-fold responsibility; positive action is required from both aircrew and maintenance people.

■ AIRCREWS — Look around the sill for foreign objects each time you get into the cockpit. You don't need to use a stopwatch, but do observe the canopy as it closes. If you notice a "slow-closing" canopy, bring it to the attention of the maintenance folks. I can guarantee you will never lose a canopy because of a stall if you will watch the unlock light go off — if the system is properly rigged. You may lose one for another reason, but not because of a stall.

Check to see if the canopy is completely closed and the stripes are exactly aligned (Figure 3). I cannot say they can be anything other than exactly aligned. I will say this — the stripes must be one-quarter inch wide and painted, not taped! I would abort if I found an aircraft with tape used for the alignment indicators.

Why? Picture if you will a young energetic crew chief who finds the tape off and laying on the console. He thinks he knows exactly where it goes on the rod. He replaces the tape, but gets it in the wrong place. The canopy is locked, and this time the system stalls. Because of the misplaced tape, there is an indicated "good" alignment, but it is really a *false* indication. The situation now exists that could result in a lost canopy.

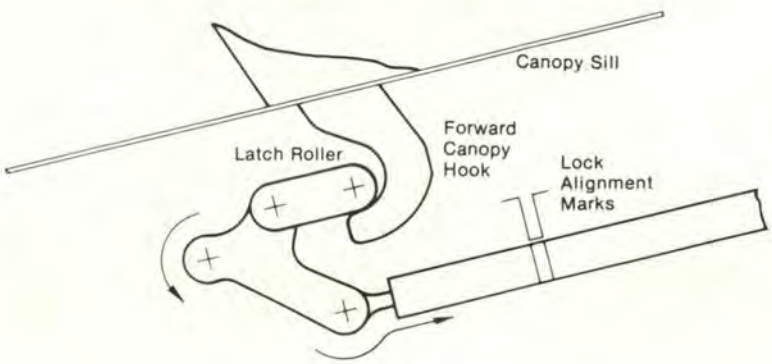
■ MAINTENANCE — You people spend much more time in the cockpit than the aircrews, so you have a better chance to discover anything wrong with this area. Also, you usually open and close the canopies without the engines running, so you are better able to notice any unusual noises. The tech order requires frequent checks of the actuator shear pin. You must do it, and do it right! Tech order rigging procedures are lengthy but complete, and if you follow them step by step, you will properly rig the canopy system.

Finally, there is absolutely no excuse for using tape for the alignment stripes instead of paint. The tech order is clear on how to apply the stripes — it is with paint, not tape!

We can conclude that if the canopy is closed and locked, it will, in all probability, remain locked. We can further conclude that if most losses result from stalls, most of those losses can be prevented. ■

*Reprints of the entire article, including information concerning canopy loss investigation and reporting procedures, may be obtained by addressing written request to: Editor, *Product Support Digest*, McDonnell Douglas Aircraft, Dept 92, Bldg 77, St Louis, Missouri 63166.

FIGURE 3 - PROPERLY RIGGED CANOPY FULLY LOCKED



UNITED STATES AIR FORCE

SEPTEMBER 18, 1947

THE FIRST FORTY YEARS

On this 40th anniversary of the Air Force, we pay tribute to the 40 years that led to the birth of the service we know today.

JERI E. ROOD
Directorate of Aerospace Safety

■ As we celebrate 40 years of the United States Air Force, we should remember that U.S. military heavier-than-air aviation has actually been going on for 80 years. For half that time, from 1907 to 1947, U.S. military fliers were part of the Army. The air arm started as an extremely small outfit and went through many changes over the following 40 years before it was separated from the Army. It took a long fight by dedicated individuals to build what is today the world's most powerful air force.

Even after Orville Wright took man's first powered flight in a heavier-than-air craft, the United States did not immediately realize the importance of what had been accomplished. In fact, the British and French governments were trying to negotiate with the Wright brothers long before the U.S. Government took official notice.

Aeronautical Division

When the War Department did set up an aviation group, it was modest, to say the least. In 1907, an aeronautical division was formed within the Army Signal Corps to handle "all matters pertaining to military ballooning, air machines, and all kindred subjects." It was given a staff of only three men, one officer and two enlisted men — and one of the enlisted men soon deserted.

And for a long time, they had nothing but balloons to fly. It wasn't until 1909 that the Army accepted its first Wright airplane for the Division.

The beginnings of the Air Force were indeed humble. The people in the Aeronautical Division were only temporarily assigned, and for a time, the entire flying force of the United States consisted of that one airplane and one man — Lt Benjamin D. Foulois, who had received part of his flying training by mail from the Wright brothers. At one point, Foulois was spending his own money for repairs to the airplane.

The War Department put a little more emphasis on aviation as the Army assigned more officers to flying duty and bought more planes. The Department's budget had a specific amount for aviation for the first time in 1911 — the huge sum of $125,000.

The Aviation Section

By 1914, the Division had over 100 men and 15 aircraft. That year, the Aviation Section of the Signal Corps replaced the Aeronautical Division. It was set up with 60 officers and 260 enlisted men; the first people permanently assigned to aviation.

In 1916, the Section got a test of combat when it was involved in the Punitive Expedition into Mexico against Pancho Villa. By the end of 6 weeks, all eight aircraft were either worn out, in need of major repairs,

In 1911, the Army had no money to replace its own worn out Wright Type A airplane purchased in 1909. So William F. Collier, owner of Collier's magazine, bought a new Wright Type A that he loaned to the Army for $1.00 per month.

In Mexico, the fliers contended with bad weather, mountains, and unfriendly natives. After this picture, the crowd burned and slashed holes in the fabric and removed bolts and nuts before Lt Dague managed to take off in a shower of rocks.

The Army Air Service entered World War I with no combat experience, obsolete aircraft, and no doctrine for air power employment. Three of the pioneers of WW I are pictured here. Frank Luke (top), Eddie Rickenbacker (bottom left), and Billy Mitchell (bottom right).

or had crashed. This action, plus the possibility of U.S. involvement in the war in Europe, convinced Congress to greatly increase the budget for the Aviation Section.

Foulois, working in the Aviation Section in Washington, developed a plan for a buildup of the air arm to support the three-million man army. He was able to convince Congress to allocate $640 million for his plan.

The Air Service and WW I

By the time of U.S. entry into the First World War, the Air Service consisted of over 100 officers and over 1,000 enlisted men. However, there were few airplanes. Between the purchase of the first plane in 1909 and U.S. entry into the war, 224 planes had been purchased, but by then, few were still flying. In April 1917, the Army had 55 planes — all of which were trainers. Fifty-one of these, according to General John J. Pershing, were obsolete and the others were obsolescent.

The growth of the air arm of the Army continued. The Air Service, Allied Expeditionary Forces, was created in 1917 after U.S. entry into the war. The next year a Director of Air Service was appointed, and military aviation was separated from the Signal Corps.

During the war, the Army Air Service flew mostly in a supporting role to the huge ground armies, including reconnaissance of enemy troop movements, artillery spotting, and close air support. In the view of most of the Army command, interruption of enemy communications and bombardment of enemy war production by Air Service fliers was secondary to their support of ground troops. Still, there were opportunities to demonstrate the effectiveness of air power.

Two battles late in the war, at St. Mihiel and the Meuse-Argonne, provided such a chance. Fifteen hundred aircraft of French, Italian, British, and American units were put under the control of Brig Gen William ("Billy") Mitchell, Commander of the Air Service, First Army. Mitchell used the majority of them to fight for air supremacy, destroying enemy planes and attacking ground targets.

By the end of the war, Air Service aviators had flown 20,000 combat missions and shot down 800 enemy planes, at a loss of 300 U.S. aircraft. Further, they had dropped 275,000 pounds of bombs — negligible by World War II standards, but still an example of things to come.

Post War Changes

Following the war when the Army was demobilized, Air Service officer strength dropped from 20,000 at war's end to around 200 in 1919. This disturbed many who wanted to see a growth of military aviation. Most in the Air Service wanted it to be separate from the Army, while Army officials were against losing control of an important function. The Army Reorganization Act of 1920 formally gave the Air Service the role it had filled during the war, that of the combat arm of the Army.

The difference of opinion was between those who saw a larger and more important mission for the air arm, including offensive bombing, and those who believed the effec-

continued

tiveness of aircraft was limited to support of infantry. Those against were unconvinced of the value of offensive air operations, and they were horrified at the possibility of action against civilian targets. They included Army officers up through the General Staff, and civilians up to the Secretary of War.

Those in favor of expanded emphasis on the Army's air arm tried to convince their superiors that aircraft could be used to attack the means of producing war, and thereby destroy the will to fight. They ranged from moderate advocates such as the Air Service Chief, Maj Gen Mason M. Patrick, and fliers like Maj Foulois and Maj Henry H. ("Hap") Arnold to the very vocal (and sometimes intemperate) Gen Mitchell.

Mitchell, now the Assistant Chief of the Air Service, staged demonstrations of the strategic power of aircraft in the early 1920s. He had Air Service bombers sink several old battleships, including the heavily armored German battleship *Ostfriesland*, and professed the day of such ships was past. He continually defended the need for air power in speeches and in books like *Winged Defense*. His outspoken manner attracted both public attention and official disapproval. He was eventually court-martialed for insubordination after some extremely critical remarks about superiors. He subsequently resigned from the Army rather than remain silent about air power.

Gen Patrick, then Chief of the Air Service, was a more moderate advocate. His interest was in advancing the growth of military aviation rather than in fighting for complete separation from the Army. Gen Patrick wanted the Army's relationship to the air arm to be much like the relation of the Navy and the Marine Corps. He wanted the Air Service to be directly under the Secretary of War rather than the General Staff, to increase the influence of flying officers over those without air experience.

The years after WW I saw the introduction of in-flight refueling, bomber aircraft, and parachute training, but aviation progress was slow. Charles Lindberg's transoceanic flight opened people's eyes to the aircraft's true potential and spurred the development of more modern, long-range fighters and bombers.

In the 15 years following the war, Congress had about 14 different boards and committees study the question of the role aviation should play in the Nation's defense. The conclusion was the air arm should remain part of the Army.

For instance, in 1925, the Lambert Committee in Congress recommended the establishment of a Department of National Defense with separate Army, Navy, and aviation departments. At about the same time, the Morrow Board came to different conclusions based on some of the same testimony. It rejected the Defense Department idea and instead backed an air arm remaining under the War Department — although with increased power in the Department hierarchy, including representation on the General Staff.

Public and official interest was focused on air power at the end of 1925, when the reports of the Lambert Committee and the Morrow Board, and the court-martial conviction of Billy Mitchell all occurred within a period of less than a month.

The Army Air Corps

The result of all these studies was the 1926 Air Corps Act, which followed most closely the recommendations of the Morrow Board. The Act turned the Air Service into the Army Air Corps. This increased the numerical strength of the air arm and further increased its prestige as an offensive force as opposed to an auxiliary service of the Army. It left the air arm under the War Department's General Staff, and thus, the Air Corps had to compete with the rest of the Department for its share of the limited funds appropriated by Congress for a peacetime War Department.

The level of growth in the aircraft inventory provided for by the Air Corps Act did not occur, but the fewer than 900 planes in the Air Corps in 1926 had risen to 1,650 by 1931.

Following the Air Corps Act, the differences of opinion concerning

The Japanese attack on Pearl Harbor "awakened a sleeping giant," and the U.S. Army Air Forces quickly became the world's more powerful air force. It was WW II that finally set the stage for an independent U.S. Air Force.

aviation continued, as did the studies of the need for an independent air force. The conventional wisdom was that the United States was too far away from potential enemies to worry about attack from the air, and therefore, a service charged with air defense of the Nation was unnecessary. Further, the Navy and War Departments had a vested interest in keeping air operations within their control, and they proved powerful opponents to any drive for an autonomous air force.

However, in the 1920s, aviation was moving ahead faster than the conservatives realized. Record-breaking flights — including the Air Service round-the-world flight in 1924 and Charles A. Lindberg's solo transatlantic flight in 1927 — demonstrated the possibilities of aviation.

General Headquarters Air Force

Another wave of commissions in the early 1930s, by both the War Department and the newly established Federal Aviation Commission, studied the need for an independent aviation service. Once again, they supported the status quo, but also recommended setting up a General Headquarters Air Force, composed of all air combat units, trained as a unified force and able to perform both close support and independent action.

The War Department moved on these recommendations in 1935 when it created the General Headquarters (GHQ) Air Force. The GHQ Air Force was a coordinate component with the Air Corps, with its own commanding general who reported directly to the Chief of Staff in peacetime, and to the theater commander in wartime. It was a step in the right direction, but military aviation was split between the two organizations, with training and employment under the GHQ Air Force and supply and individual training under the Air Corps.

It took an emergency situation to further strengthen the air arm and to give it more autonomy. Reacting to the worsening situation in Europe at the end of the 1930s, President Franklin Roosevelt called for U.S. production of 10,000 planes a year for the protection of the Western Hemisphere. After the German invasion of France in 1940, he called for an Air Force of 50,000 to meet the mounting threat.

The Army Air Forces and WW II

The Army Air Forces were created by order of the Secretary of War in 1941. The Deputy Chief of Staff for Air was also the chief of the new organization, and he commanded both the Chief of the Air Corps and the Commanding General of the Air Force Combat Command (formerly the GHQ Air Force).

This is the organization the United States went to war with in World War II. Early in the war, the Army Air Forces was recognized as one of the three major Army commands, and the Office of the Chief of the Air Corps and the Air Force Combat Command were abolished.

Further moves toward autonomy came in the course of the war. During the fighting in North Africa, the tactical air forces were at first under control of ground commanders. The British, who had had a separate air force since World War I, brought the idea of coequal ground commanders and air commanders reporting to the theater commander. The effectiveness of this arrangement became evident when Allied planes took control of the air away from the Germans.

The eventual victory in Africa led to the Army Air Forces field manual in 1943, which stated "Land power and air power are coequal and interdependent forces; neither is an auxiliary to the other."

The U.S. Air Force

All those changes of organization, policy, and practice over all those years brought about the establishment of the Air Force as a separate service on 18 September 1947. The association of the Army and its air arm — from a tiny three-man operation to an equal partner in global conflict — is well worth remembering on this special birthday. ■

LEST WE FORGET

UNITED STATES AIR FORCE

SEPTEMBER 18, 1947

CAPTAIN STEPHEN M. MORRISETTE
6 CAMS Project Warrior Officer
HQ 6th Strategic Wing
Eielson AFB, Alaska

■ The night of 27 February 1963 was a night not unlike so many other winter nights at Eielson AFB. It was bitterly cold. It was dark, and snow was falling from low-hanging, ill-defined clouds. All over the base men were reporting to their duty posts for a long winter night's work. This is the story of several of those men.

Airman Second Class (A2C) Roy Hursey stood in the ranks of guard-mount. He listened to the instructions and announcements of the flight chief. It was a routine way for an air policeman to start a routine night of duty. A2C Hursey was assigned to man the north gate. The north gate was not bad duty. At least it was warm. All he had to do was wave through the incoming cars and write a few passes. There might be a pedestrian or two and perhaps a phone call to break the monotony. There would certainly be plenty of time to think of a high school sweetheart back in Star, North Carolina. After his shift, it would be midnight chow with some of the guys and then to bed.

Major John Harris was also pre-

Airman Second Class Roy Hursey will not be forgotten. He lost his life standing his post on the night of 27 February 1963.

paring to perform a night's work. Major Harris was to pilot a KC-135A to a point in the arctic sky to refuel a waiting B-52. In the eyes of some, a more glamorous job, but nonetheless routine. Major Harris, his aircraft 56-3597, and his crew were on temporary duty from Castle AFB, California. This night's mission would be like so many others he had flown. He and the six other men in his Stratotanker would be back in the "Q" before the sun came up on the 28th. Only a couple more missions, then he and his crew could return home to California.

At 2029, Major Harris and his copilot, Captain John Weatherway, lined "597" up on the "31" end of the runway. A final check of the engines and Major Harris released the brakes. A normal takeoff roll ensued. It would be an on-time takeoff. Captain Weatherway called "S-1" (the point of the takeoff roll at which a safe abort is no longer possible).

It was at some time after this call that the night's routineness ceased. Everyone on board felt it. Major Harris and Captain Weatherway also saw it on the instrument panel. Number one engine had failed! The aircraft began to drift to the left of the runway. The all-important airspeed began to decrease, but Major Harris had to take off. There was not enough icy runway left to stop the tanker — "597" limped into the cold arctic night.

A2C Hursey heard the tanker start its takeoff roll nearly 3 miles away. He had often heard this roar as departing KC-135s passed 200 yards east of his post. The roaring howl of the tankers was much different than the thunder of the B-50s and C-124s that frequently took off during his shift.

Cold arctic air does strange things to both the sounds and sights of the night. Sounds are amplified. Lights seem more brilliant. Perhaps A2C Hursey realized that this time the tanker sounded even louder than usual. Perhaps he realized that this time the landing lights illuminated the surrounding snow even brighter than usual. Perhaps, as the light and noise rose to alarming intensity, he turned and saw "597" flying 3 feet off the ground and coming right at the north gate shack.

At 2030 hours, A2C Hursey was the first of nine men to perish as the crippled Stratotanker flew through the guard post on (old) Richardson Highway. The bottom 3 feet of the guard shack remained intact. The aircraft burst into flames and struck the ground just north of the now destroyed post of A2C Hursey. A series of fiery explosions occurred as "597" continued sliding past the Ben Eielson Memorial, curving to the left, crossing Richardson Highway, and into the field west of the road. Along with A2C Hursey and the seven airmen aboard the tanker, A2C Martin Jones died in the crash. A2C Jones was a pedestrian who was walking near the gate.

None of those men wanted to die that night. All of those men died tragic deaths. It was, however, the unfortunate death of an air policeman that was memorialized at the north gate. Perhaps, because his death is indicative of the death of a lone warrior, standing vigil in the dark, deterring an enemy that is usually unseen. Perhaps, A2C Hursey never thought of himself as defending the freedom of a nation as he left guardmount that night. It is doubtful that he thought he might give his life in the defense of his country that night.

As we think about Hursey Gate, we should realize that we are each warriors. We are set apart from our civilian counterparts by an oath that we each have sworn. An oath that states we will give our lives, if called upon, in the defense of our nation.

The death of A2C Hursey and the other eight men that night is of no less import because they died on a routine night on a routine watch because of a routine mission. Our nation was built and is maintained by such ordinary men who died such routine deaths. Hursey Gate, and the field just to its north, is not just the entrance to Eielson Air Force Base — it is a battlefield where nine American warriors did their duty. ■

Hursey Gate, and the field to its north, is not just the entrance to Eielson Air Force Base — it serves as a reminder that nine Americans lost their lives serving their country.

"For want of a nail . . ."

CMSGT AUGUST HARTUNG
Maintenance Technical Editor

■ Over 300 years ago, George Herbert, the author of *Outlandish Proverbs*, wrote a statement that is as applicable today as it was in 1640:

"For want of a nail, the shoe is lost; for want of a shoe, the horse is lost; for want of a horse, the rider is lost; for want of a rider, the battle is lost; for want of a battle, the kingdom is lost."

In combat, the accidental damage or loss of an aircraft, missile, or piece of support equipment due to a maintenance malpractice could cost countless more lives if we cannot inflict the planned damage on our adversary. U.S. airpower can't afford to have any of its "winged horses" out of battle because aircraft maintainers damaged them. Yet, day by day, the current and future combat capability of our Air Force is being chipped away by what always seem to be, in retrospect, careless or forgetful acts.

The Problem

Don't get me wrong. I'm not implying *all* aircraft maintainers are intentionally careless. After working in the aircraft maintenance business for almost 20 years, I'm thoroughly convinced aircraft maintenance people are some of the most dedicated and professional folks to be found anywhere.

Yet a review of mishap report upon mishap report continues to highlight the same problem — namely, we just don't seem to learn from experience. Rarely do we find a new type of mishap. Instead, the same type of errors continue to damage expensive aircraft, missiles, or pieces of support equipment.

If we can learn from experience, mishaps can be prevented. Knowing those things that can cause a mishap and then eliminating them will not only result in a job properly done, but also preserve precious combat resources.

Most mishaps do not have a single cause. Rather, they are often the result of a series of unsafe acts that occur in a certain sequence.

It may be helpful to pause for a minute and consider some sample mishaps. Not one of them is unique. Sadly, the factors involved have been repeated time after time.

■ The first mishap almost cost us an aircraft. Just after takeoff on a functional check flight, an F-16 pilot was quickly informed by the supervisor of flying that his Falcon jet was streaming fuel and flames. After deselecting augmentor and declaring an emergency, the pilot executed an uneventful simulated flameout approach and landing.

Investigation showed that fuel was leaking from the augmentor fuel pump outlet line coupling. During previous maintenance, the augmentor fuel pump outlet assembly was removed to facilitate other maintenance. The 5-level jet engine mechanic, who performed the work, misinterpreted a key tech data step, but never asked for assistance. According to his training record, the mechanic was task-certified to perform all work on engine plumbing, but had never previously installed an augmentor fuel pump outlet line assembly.

The supervisors who checked for proper component installation, both immediately after the work was completed and after the engine was run on the test cell, did not identify the improper installation. All they actually checked was that the

One person can make the difference in maintenance-related mishaps.

components were correctly safety wired.

Are there other mishaps, you ask? Sad to say, the answer is yes. From dangerous explosives incidents to costly FOD mishaps, the list continues.

- Considerable damage to aircraft external fuel tanks and pylons have resulted from carting aircraft without checklists. In one mishap, supervisors allowed five people to accomplish two sequential operations on three aircraft. One supervisor had all the checklists in the aircraft cockpit with him, while a weapons loader was carting a station with the auxiliary power unit running. Since no one had checked the station safety pin, which was not fully inserted, the station cartridge fired during the emergency jettison check just after the loader had installed it.
- Here's another incident. This one involved FOD that cost us over $17,000 in a matter of seconds. After the alert preparation engine runs were completed on a B-52H aircraft, the maintenance crew noticed extensive damage to the No. 7 engine. Sometime prior to the engine runs, an engine technician blended the No. 7 engine blades for minor damage, only he left a 6-inch file in the intake area after performing the repair.

Single strokes of engine damage such as this totaled over 8 million dollars in 1985 and 15 million dollars in 1986. Even more unfortunate last year was the loss of an aircraft attributed to FOD.

Making a Difference

My point is this. Those of us in aircraft maintenance need to realize our work is serious business. We need to consciously think about four factors if we are to make a difference in the area of aircraft maintenance safety and, consequently, our combat capability.

Supervisory control is generally a key factor. The other factors are knowledge and skill, attitude, and behavior.

Supervision. The first factor is supervision. The success or failure of the supervisor is bound to have far-reaching effects on any maintenance operation. A good supervisor will make sure each person on the team knows exactly what is expected of him or her. This means supervisors know the people working for them are thoroughly aware of their responsibilities and precisely what their jobs entail — *to include safety requirements*.

Knowledge and Skill. The second factor is to make sure each individual knows how to accomplish his or her job properly. Knowledge and skill are the requirements for accomplishing this, and this knowledge and skill are largely products of the supervisory element.

This is especially noticeable to any maintenance organization, since we are continually required to train so many new people coming to us from the technical schools, as well as from other commands where different types of aircraft are operated. Knowledge enables an individual to take the necessary maintenance actions to prevent a potential mishap or incident.

Attitude. The third factor, our attitude, is the way we feel about something. Everyone in the maintenance career field must realize aircraft maintenance business is serious business. Don't be led by a bad attitude, ranging from complacency to being in a hurry, which can lead us to committing a needless error. All of us understand what improper maintenance means, but what we may not understand is our personal responsibility to develop a sense of self-discipline and control. The self-disciplined person is never pressured into forgetting to use technical data or proper safety equipment.

Behavior. This leads to the fourth factor, behavior. Behavior is our way of acting, especially when we're on our own. Do we conduct ourselves differently when the boss isn't around to watch? Proper behavior, like supervision, starts at the top and filters down to the point where it is apparent what is expected of everyone involved in maintaining aircraft and related equipment.

Regardless of the type of aircraft or the type of maintenance, some things remain the same. Those doing the work must know how to do it, realize its importance, and must do it safely. Supervisors are the final safeguard.

Summary

Our challenge, then, is to develop supervisory responsibility, knowledge and skill, attitude, and behavior to perform our maintenance tasks safely. If we can do this, I'm convinced we can maintain the narrow combat capability advantage we currently enjoy over our adversaries. By keeping it safe for us, we can make it unsafe for them. ■

Where Do You Draw The Line?

1LT WILLARD SHEPARD
HQ 926 TFG (AFRES)
Naval Air Station
New Orleans, Louisiana

■ The first lieutenant was a good friend of mine. He was a jovial and fun-loving guy who I became close to during our Fighter-Lead-In Program days at Holloman AFB. He had good hands, and you could tell he believed he could handle any situation in the air. He was great to party with; he leaned more towards the nightlife than his flight manuals. In the end, it may have been this lack of discipline and his somewhat cocky attitude which caused him to fly his airplane into the ground earlier this year.

His death affected me. I had read mishap reports before, and being in an AFRES squadron where a tour in Southeast Asia is the norm rather than the exception, I had listened to the stories about friends who were lost during missions. However, this loss was a first for me, and also the first in a series of A-10 mishaps which have sent the "Hog's" mishap rate climbing.

The Zone

A short time later, another lieutenant flew his A-10 into the dirt during a defensive turn. My operations officer has always warned me about what he calls "the zone" — the area between 300 and 500 flight hours. It's where many mishaps occur. Since I'm now in the zone, I've thought about what probably makes it dangerous and what it takes to make it through this time in a flying career, and beyond, safely.

However, this article isn't just for my lieutenant wingman friends. Some of the most senior pilots in TAC have also driven into the ground this year. One was killed while doing an unauthorized loop.

Being one of only two lieutenants in a reserve squadron, I can still vividly remember my pilot training days, yet every week I fly with aviators who are the most seasoned the Air Force has to offer. During the early days, there is a tremendous attention to detail in our flight duties. We simply don't know enough to be dangerous. I don't know of anyone in my pilot training class, or follow-on RTUs, who intentionally performed an unauthorized maneuver. Anyone with common sense realized the rules were there for a reason, and if you violated them, your life was in jeopardy.

One colonel told me, "When you

graduate from pilot training, you get two things — a bag full of luck and an empty bag for experience. Hopefully, your experience will build up before your luck runs out."

Experience Vs Judgment

But experience can be deadly. With it comes "judgment" — a feeling that it's OK to press a little. The rules, which were once written in stone, can be altered slightly to accomplish the mission. After all, we must put the bomb on target, and if you have to press slightly below the release altitude to do it, then so be it.

The question is, what is "slight?" — What is a minor deviation? It all becomes subjective. What may be a major adjustment to me may be considered minor by someone else. If it's safe to violate the rules of engagement (ROE) "only a little bit" on one sortie, what about on another?

The question is, "Where do you draw the line?" If the ROE on an air-to-air sortie sets a 1,000-foot bubble, you should KIO if the guy is at 900 feet. However, does this depend on the situation? Is he at your 9 o'clock and departing, or at your 12 o'clock and closing?

Safety and the Mission

So how can we make sure the guys like me who are in "the zone" get through it? And how do all of us, no matter what our experience level, make the necessary adjustments to complete our training and the mission but still make safety our *number one priority*?

I wonder if, somewhere along the line, the senior pilots I fly with had a "scare" which made them realize the rules exist for everyone's safety. My DO warns me about complacency, about the little things on the ground and in the air that could make the difference. To date, I haven't "scared" myself into realizing that a single-seat fighter, or any aircraft for that matter, is a place where a lackadaisical attitude can't be tolerated. I hope my judgment never reaches that point. I don't want anyone writing to this magazine telling you what a nice guy I was. ■

FSO'S CORNER

The FLIP side of midair prevention

CAPTAIN DAVE HERNANDEZ
93d Bombardment Wing
Castle Air Force Base, California

■ As more and more people "take to the skies," the potential for midair collisions increases. Each wing's midair collision avoidance (MACA) program is designed to reduce this potential through dissemination of MACA pamphlets, inputs to the air traffic control board, visits to local airports, reviewing near midair collision (NMAC) reports, and publishing "lessons learned" articles. There is, however, another means to help prevent midair collisions which can be easily overlooked — the Flight Information Publication (FLIP) AP/1.

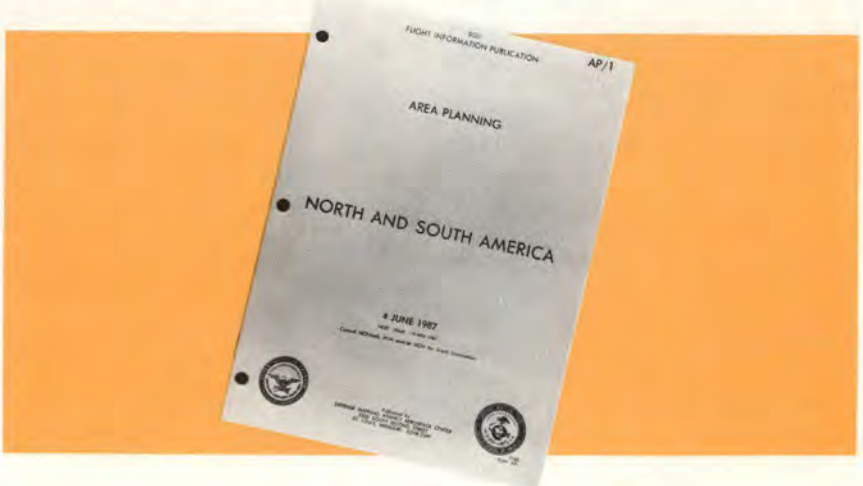
Reviewing the findings of a recent NMAC investigation got us thinking. During that NMAC, a transient military aircraft mistakenly tried to land using Runway 30 at a local civilian airport while a Cessna attempted to depart using Runway 12. The result could have been catastrophic.

That incident caused us to take a look at the supplementary remarks in the AP/1. Other FSOs may wish to do the same, especially if those remarks have not been updated recently to reflect changes in your airfield environment.

When we went into the AP/1, we wanted to address the issues associated with the above incident as well as any others that might result in future problems. The following is the list we used and is provided as a departure point for other FSOs.

- Local airports near the approach path to your base which could disorient transient aircrews.
- Runway conditions which might affect braking (e.g., rubber deposits).
- Migratory bird seasons for your area.
- Taxi and parking lines may be for specific aircraft, i.e., C-141 vs C-5, etc.
- Other information that could be useful to transient aircrews.

The FSO's Corner needs your ideas. What are you doing in your program that could help other FSOs if they knew about it? Call me (Capt Dale Pierce) at AUTOVON 579-7450 (SMOTEC) or send your name, AUTOVON number, and program idea to 919 SOG/SEF, Eglin AFB Aux Fld 3, FL 32542-6005. ■



Update On Foreign Object Damage

MAJOR ALICE A. FENNELL
Directorate of Aerospace Safety

Chart 1
Sources of FOD in 1985 and 1986

CY 85

Undetermined	Hardware	Metal Objects	Equipment	Ramp Debris	Ice	Materiel Failure
34%	37%	11%	11%	2%	4%	1%

CY 86

Undetermined	Hardware	Metal Objects	Equipment	Ramp Debris	Ice	Materiel Failure
26%	32%	18%	15%	3%	5%	2%

■ The number of reported flight and ground FOD mishaps decreased sharply from 337 in 1985 to 174 in 1986. Great you say? Hold on just a minute! Before we start patting ourselves on the back, we need to realize there was not an actual drop in the number of FOD mishaps, but rather a change in cost reporting. The minimum cost criterion of a Class C mishap increased from $1,000 to $10,000.

This change caused some turbulence in the field's reporting of FOD incidents and made obtaining an accurate picture of trends difficult. Nevertheless, we can learn some lessons from what was reported and incorporate these lessons into our FOD prevention programs.

Chart 1 compares the sources of FOD in 1985 and 1986.

In the undetermined category, we can see the impact the higher reporting threshold will have on future investigations. The percentage of FOD mishaps attributed to an undetermined source dropped in 1986, since many of the mishaps in this category involved less than $10,000 damage in 1985.

This is vividly displayed in the C-130's history. Always one of the top 10 aircraft in FOD occurrences, the C-130 had only 3 incidents in 1986, all attributed to ramp debris. In 1985, most of the 27 C-130 engine FODs were from an undetermined source, with damages under $10,000. (See Chart 2 for aircraft experience with FOD in 1986.)

Identifying the Source

Now, with fewer FOD mishaps to investigate, safety and maintenance people can perform more thorough research into causes. Also, the $10,000 minimum cost criterion for a Class C mishap naturally equates to more extensive engine damage, usually from a more identifiable source of FOD. Indepth investigations, identification of sources, and corrective action could lead to FOD prevention.

Hardware

The source of almost half of the mishaps in both years was a small piece of metal (sum of the hardware and metal object categories). The lesson? Tiny objects are dangerous. Most of the hardware items were fasteners, less than 1-inch long and weighing a scant ounce. Yet, they were perfectly capable of inflicting enough damage to cause Class C mishaps.

We must continue programs to

Chart 2
Flight and Ground FOD Mishaps in 1986

Acft	Undetermined		Hardware		Metal Objects		Equipment		Ramp Debris		Ice		Materiel Failure		Totals	
	Flt	Grd	Flt	Grd	Flt	Grd	Flt	Grd	Flt	Grd	Flt	Grd	Flt	Grd	Flt	Grd
A-7	3														3	
A-10	4		3		1		1	1			3				12	1
A-37	1														1	
B-1	3		1				1				1				6	
B-52												1	1		1	1
C-5				1								1				2
C-130									1	2					1	2
C-135	2		2	2				1	1						5	3
C-141	3		1	1	1			2							5	3
F-4	10	1	22	2	9		3								44	3
F-5	2		2		2										6	
F-15	4	1	6		10	1	3		1	1	2		2		28	3
F-16	1	1	1		2		2								6	1
F-111	5		6	1	2	1	3	2			1				17	4
HH-3			1												1	
KC-10							1						1		2	
T-38	2		3				1	3						1	6	4
UH-1	2		1		1										4	
UH-60	1														1	
Totals	43	3	49	7	28	2	15	9	3	3	7	2	4	1	149	27

maintain control of maintenance residue while we work around aircraft. Foreign object walks and other ways to maintain constant surveillance are a must.

Equipment

Under equipment, we find an array of unsecured items such as hats, comm cords, flashlights, and checkbooks. The rise in the percentage of equipment-related mishaps can be attributed to the new threshold. While FOD from undetermined sources may not meet the minimum cost to report it, FOD from the ingestion of equipment usually does. When a headset or a comm cord is swept into an intake, you can bet the damage will go over $10,000. One instance resulted in over $100,000 in damages, meeting Class B mishap criteria. Controlling fasteners is a hard thing to do. Controlling equipment is easy: Use consolidated tool kits, perform intake inspections, show common sense.

Ice

Ice is a natural phenomenon, and engine damage is sometimes inevitable. But FOD due to ice is also often preventable. Protective equipment, proper engine run procedures in cold weather, and thorough postflight intake inspections could have saved engines from ice damage in both 1985 and 1986.

Materiel Failure

The last category certainly doesn't reflect negatively on the field's effort to prevent FOD. But, especially as new weapon systems come on board, remember materiel and quality deficiency reports (MDRs and QDRs). MDRs, QDRs, and service reports on new equipment can also save engines — engines you may need for tomorrow's sorties.

Costs

Finally, let's look at costs. With the fewer number of reported FOD mishaps, one should have expected 1986 to be a record year. Unfortunately, in 1986, FOD led to the destruction of an aircraft. The cost of this aircraft exceeded 1985's 8 million dollars in FOD damage; the price tag for FOD in 1986 topped 15 million dollars. ■

What Would You Do?

Name That Odor

■ Shortly after takeoff in an OA-37, the instructor pilot (IP) noticed an odor in the aircraft. The IP knew the aircraft had been washed the night before and recognized the smell as that of the cleaning solution used to wash engines.

What Would You Do?

a. Consider the odor toxic, select 100 percent oxygen, and terminate the mission.
b. Since you know what the odor is, ignore it and continue the mission.
c. Use 100 percent oxygen until the odor clears and continue the mission.
d. Something else.

What the Crew Did

Since this was a known odor, the IP elected to continue the mission (option b). After the tactical range portion of the mission, the IP developed a headache and nausea. The pilot noticed the odor, but never developed any symptoms. The crew selected 100 percent oxygen, turned off the bleed air, and made an uneventful return to base.

The safest course of action would be option a. You really can't evaluate an odor as to toxicity by smelling it. Also, even a nontoxic odor can be sickening over a period of time. This is especially true in an aircraft. ■

Send your real-life submissions to:
What Would You Do?
Flying Safety magazine
AFISC/SEPP
Norton AFB CA 92409-7001

UNITED STATES AIR FORCE
SEPTEMBER 18, 1947

A Real Safety Warrior

RICHARD H. WOOD
Colonel, USAF (Ret)
USC Safety Center

■ In May of this year, the Air Force lost one of the chief architects of its present flight safety program. Roger G. Crewse passed away in Spokane, Washington, after a long illness.

Roger was a pilot in WW II and saw combat in the Pacific. Following the war, he was retired for medical disability, but was almost immediately reincarnated as a civilian specializing in flight safety. Airplanes were his first love, and he could not be kept away from them. He hung around the Air National Guard and the old Air Defense Command (ADC) and ultimately became editor of *Interceptor,* the ADC's flight safety magazine.

Roger was a prolific writer, and it was there he authored the "Coolstone" series. Coolstone, a corruption of "Hotrock," was the quintessence of all the fighter pilots he had ever known; a pilot who could be counted on to get himself into trouble at least monthly.

Roger's real contribution, though, was in safety analysis. At ADC, Roger became the first and only person in the Air Force engaged full-time in the attempt to turn all the numbers and statistics into something useful — something that would prevent future mishaps.

In 1973, Roger came to the Air Force Inspection and Safety Center. AFISC wanted someone who could analyze aircraft mishaps. A lot of people were talking about it, but Roger was the only one doing it.

At AFISC, Roger built the analysis program the Air Force has today. He was adamant that writing a mishap off as "pilot error" was just *not* good enough. There had to be some second level cause factors (as he called them) that suckered the pilot into a mistake he never wanted to make.

It took many years for that analysis program to pay off. Now, the Air Force can predict its mishaps with uncanny accuracy and target its resources to the problems that destroy planes and kill pilots. To a large degree, that has been the secret of the Air Force's current success in aircraft mishap prevention. Roger would be the last to claim credit for that, but a lot of people who knew him and worked with him would give him their vote.

Roger was buried in his flight suit under an ANG flyby. I don't know what was said at his service, but if I could have been there, I would have read a few paragraphs from the tail end of an article he wrote in 1980. Read these with me now, as a man of Roger Crewse's perception and wisdom may not pass this way again.

from *For Pilots Only*
Roger G. Crewse

Somehow, over the years, it seems to me that it has become unacceptable to enjoy flying. To enjoy it has somehow been equated to complacency, whatever that is. Perhaps you feel guilty when you are enjoying flying a military aircraft on a tough mission. Certainly you don't want anyone to know that really you are having one hell of a good time. But that's the way it should be. Our four-stars right down to our buck pilots who wear wings, flew or fly for only one reason when you get right down to it, and that is because they like to. They had or have pride in their ability to do it and are specifically proud that they have shown it in every war.

Few of our heroes in the flying business died in a dumb accident. Excluding combat losses, those who took pride and had fun doing the mission — those who had confidence that they were able to do the mission, and those who found better ways to do the same mission, are alive, or died of old age. They are the ones, for the most part, we look up to today. You know their names as well as I do. They didn't fly military aircraft because they didn't like to, and neither should you.

So the bottom line of this particular piece is this (I hasten to add, in my opinion): Enjoy flying our aircraft and doing the mission. Be good at it. Look for better ways to do it. Learn your fundamentals and boldly apply your knowledge, common sense, and above all, your basic airmanship in flying our aircraft today. Be proud that you can. As a pilot you have the whole thing. You can't give it to anybody, and if you want to, get out of the business. And finally, develop and maintain that self-discipline which keeps you out of the traps that some mighty fine pilots have fallen into and died. ■

THE EYES DON'T HAVE IT

CMSGT AUGIE HARTUNG
Maintenance Technical Editor

■ Throughout history, the wisest warrior has always been the one who took nothing for granted, and who personally eyeballed his equipment before walking or riding into action. When flying became a part of military movement, early-day pilots took a long look at their fabric and wire contraptions before taking off.

Things are different now. Although pilots perform a walk-around inspection, the big inspection responsibility is shared by the quality control/assurance people, the supervisors, and especially the individual maintainer.

Here are some examples in which the responsibility for inspection was not accepted:

Rag in Flight Controls

On the first attempted flight following a phase inspection, the KC-135A pilot was unable to set the stabilizer trim manually or electrically. An inspection of the tanker's 48 section revealed a pillowcase-size rag entangled in the stabilizer trim cable drum.

Crossed Pitot and Static Lines

During takeoff on a wet runway, the F-4G aircrew discovered they were without any airspeed indications. Having exceeded their wet runway maximum abort speed, the crew continued the takeoff, dumped fuel, and returned safely to land.

When the pitot and static lines were checked, they were cross-connected. The lines had been replaced during a recent phase inspection and inspected by a shift supervisor, who made a forms entry indicating a leak check had been performed and the system was safe for flight. Technical data actually require a functional check, which would have positively detected the improper installation.

Insulation Tape in the Boattail

While on final approach after completing an FCF profile, the T-38 pilot noticed that back stick deflection had little effect on pitch. He declared an emergency and continued the approach to an uneventful landing.

An inspection revealed that a roll of insulation tape was lodged under the stabilator cable quadrant. A previous sheet metal discrepancy on the T-38 required the removal of the boattail fire warning cannon plug located on the aircraft side of the right engine bay. Once the sheet metal work was finished, the wires were taped and the cannon plug installed. The aircraft forms not only reflected the completed maintenance, but also that a post-maintenance tool and foreign object check had been complied with.

It's true that all of these mishaps were the result of inadequate inspection. But where were the conscientious technicians and/or supervisors? They should have corrected or discovered the discrepancies before the components were "operationally checked and inspected," or before the aircraft was released. True control of quality can be accomplished only by the cooperative effort of everyone involved in maintaining aircraft. ■

The Creature of Cancellots

CAPTAIN DALE T. PIERCE
919th Special Operations Group
Eglin AFB Aux Fld 3, Florida

■ Once upon a time in the land of Wing, there lived a king and his aviators of the round table. The king was benevolent and saw to the needs of all in his realm. He knew and treasured each person from his most senior aviator of the round table to the most junior of airpersons. His subjects, in turn, thought he was the best king ever and with respect in their hearts, all in the realm called their king "CC."

The land of Wing was a wonderful place in which to live and work, and almost all was well. I say almost, because in the land, there lived a creature who was surreptitiously slaughtering one by one the aviators of the round table.

When the creature was most effective, it both slaughtered aviators and ate air steeds. When it was less effective, which fortunately was most of the time, it still greatly reduced sortie generation rates and caused extensive damage. Almost daily it seemed, the creature's actions caused ground aborts, air aborts, and canceled essential training missions. Eventually, aviator proficiency began to suffer. So frequent had the aborts become that the aviators of the round table dubbed their base "Cancellots."

As time pased, CC, the King of Cancellots, became gravely concerned. The aviators of the round table who were charged with ensuring the security of the realm were being systematically exterminated, and those who weren't being killed were losing proficiency. He was alarmed because no one, from his most senior aviator to the most junior of airpersons, was able to catch this "Creature of Cancellots" at work, or even to recognize where the creature had been until damage was done. He wondered how they could slay this despoiler of aviators and air steeds if it could not be found?

After some careful consideration, CC called upon the guardian of the aviators of the round table. His name was Joe Cerberus von FSO. Joe FSO was charged with minimizing noncombat losses among the aviators of the round table and their air steeds. So CC charged Joe FSO with the task of eradicating the villainous violator of audacious aviators.

After some careful mission planning, a review of existing tactics, and other miscellaneous preparations, Joe FSO took up his aegis, mounted his trusty air steed, and struck out on the trail of the corrupted "Creature of Cancellots."

In the days that followed, Joe FSO learned much about the creature. He learned it was swift, silent, insidious, and tenacious. He also learned the creature could work simultaneously in several locations, making it impossible for Joe FSO and his trusty air steed to singlehandedly eradicate the creature.

Being frustrated in his efforts to carry out CC's charge, Joe FSO sought Marlin the Magnificent Magus. Marlin's centuries of knowledge and experience had made him wise in many things. It happened his areas of expertise included the mystic arts of astrology, wizardry, sorcery, management, and leadership.

After telling Marlin of his plight, Joe FSO asked Marlin to make it possible for him to be everywhere at once. Then he could carry out CC's charge. Marlin told Joe FSO it was written that FSOs were not permitted to be everywhere at once. Instead of granting Joe's request, Marlin offered a plan guaranteed effective against the most terribly tenacious of creatures. So with plan in hand, Joe FSO mounted his trusty air steed and returned to Cancellots to brief CC.

Marlin's plan outlined the mobilization of all people in the realm to seek and destroy the "Creature of Cancellots." First, everyone from the most senior aviator of the round table to the most junior of airpersons had to become ever vigilant. In their vigilance, they would learn the wrongful ways of the "Creature of Cancellots." Then, based on what they learned of the creature, each would create an individual battle plan tailored to their area of responsibility.

Their plan would specify how they would keep the creature out of their area, how they would recognize when the creature had surreptitiously entered their area despite their best efforts to prevent it, and how to neutralize any efforts of the creature before loss of life or property could result.

Marlin's plan recognized that the stalwart creature might never truly be eradicated; only with constant vigilance on the part of all people in the realm could they successfully suppress its surreptitious subversion; and constant CC emphasis would be necessary to keep the plan in action. While individual responsibility was the key to success, teamwork was very important. Each individual would share their plan with others nearby so they, too, could be watchful for the Creature's approach, lest someone become complacent.

Marlin's plan was immediately implemented by CC, and in the fullness of time, each person in the realm had become ever vigilant. Each came to know the creature, developed their individual battle plan, and shared it with their coworkers.

Following this, the morale of all people in the realm improved as air steeds were launched, missions were completed, and the proficiency of the aviators of the round table returned. In time, the name Cancellots was changed to Fliesalot and all became well in the land of Wing.

To keep things well in the land of Wing, CC continued to support Marlin's plan by traveling throughout the realm asking everyone he met about their individual plan to keep the creature from wreaking havoc in their area of responsibility. Because of this, the populace of the land of Wing knew Marlin's plan continued to have CC's emphasis and support and were encouraged to maintain their vigilance.

As time passed, the aviators of the round table recognized that since their base was now called "Fliesalot," the name "Creature of Cancellots" was no longer appropriate. The creature needed a new name that would be easily recognizable. The old name served that purpose in its time, but something new was needed.

After many staff meetings, the most senior aviator decided upon a fitting name. He announced that henceforth the aviators of the round table would call the creature by the name "Flagitious Old Despoiler." As military people often do when a name is too bothersome to use, they acronymed it. Soon the acronym was accepted far and wide, and the original name was forgotten. The acronym remains with us today as FOD.

Note that most people today think FOD stands for "foreign object damage." Some of us know better. That foreign object damage stuff is just a euphemism for the atrocities of that antediluvian assassin of audacious aviators.

By the way, what would you tell the CC in your land of Wing if he were to ask you about your individual plan to keep FOD from wreaking havoc in your area of responsibility? ■

MAIL CALL

EDITOR
FLYING SAFETY MAGAZINE
AFISC/SEPP
NORTON AFB, CA 92409-7001

"TAXI TALES"

■ Several embarrassments have made movement of aircraft on the ground a very sore subject for us in the last couple of years. You name the ground flub and we in MAC have probably done it lately. Some of the problems have been the crew simply not thinking about what they were doing. But I believe most of them also had a healthy helping of institutional involvement. Not that the DOD or USAF consciously *meant* for these embarrassments to happen, of course. Probably, most people of our printed information and directives believe they are involved in a well-run program carefully designed to get information to flight crews in a timely manner. Those people are wrong. Our guidance (TOs, Regs, FLIP products) are in a hodgepodge of locations and formats. The information is all spread out in an easy-to-miss arrangement that would bewilder anyone used to the coherent arrangement of Jeppesens. If Jepps have a fault, it is in the wealth of information displayed on approach plates. But mention Jepps to the DMAC people at the St Louis Air Force Station and they do not want to talk to you. The lack of a well-focused information conduit to aircrews almost guarantees that crews will miss some information they should have. The number of different FLIP products that must be read is ludicrous.

Then there are the regulations, some of which are not available to crews, and which crews never even heard of anyway. Case in point: The C-141 crew in your Taxi Tales article. Double yellow lines on our ramp at Andrews AFB also mark a vehicle driving road on the edge of our parking ramp. Heavy aircraft, over 300,000 pounds, are taxied and towed across those double yellows regularly. You advise that if we haven't read AFR 88-16 lately, we should take a look. Lately? C'mon. The first time I ever heard of AFR 88-16, or saw it written, was in Taxi Tales. It is not in our FCIF. Base Operations has it, but the dispatcher did not know they had it until checking their office and finding it in the pubs library — a place not normally open to crews. That C-141 crew in Taxi Tales probably never heard of AFR 88-16 either.

Suggestion: Produce a coherent, comprehensive videotape covering airport and taxiway markings shown in AFM 51-37, AFR 88-16, FAA's Airmen's Information Manual, and FAA Advisory Circular AC150/5340-1E, Marking of Paved Areas on Airports. If there is an ICAO publication about markings, include it, too, as we have operations in many of these areas.

Though our mishap rate in MAC is rather good, there will continue to be mishaps, and these mishaps will have institutional contributing causes as long as crews get information in such an incoherent manner.

Major James W. Elder
HQ 89th Military Airlift Wing
Andrews AFB, DC 20331-7004

Thank you for your letter. You have some valid points. There is a lot of information in a variety of places our aircrews are expected to know. Sometimes it seems it is impossible to find it all.

This confusing array of information is something the USAF Instrument Flight Center is working to correct. They welcome your inputs. Give them a call at AUTOVON 487-3077. Their phone is monitored 24 hours a day, 7 days a week.

Not to belittle the Jeppesens, but they are printed by a private corporation and not subject to any federal or military agency's oversight for accuracy of approach depictions. There is a possibility they may not include all terrain or existing obstacles. Remember it is a 55-series requirement to brief significant terrain and obstacle hazards within the terminal area.

I passed your suggestion about making a videotape on to our education branch. They are investigating the feasibility of such a project.

But, in spite of confusing publications, weather, logistics failures, etc., the aircraft commander is the one responsible. It's up to the AC to say "no" to any operation that doesn't look or feel right. It's much easier to stop and get something moved or have the aircraft towed than it is to explain why you bent it. ■

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MAINTENANCE *Matters*

C-130: CRANE OPERATION

■ A 4-man team, assisted by a 7.5 ton crane, was in the process of removing the No. 1 engine of a C-130 aircraft.

Two of the individuals were positioned one on each side of the engine to assist in mounting the lift sling (T-bar) onto the engine, while a third member was inside the aircraft. The crane operator was maneuvering the sling over the No. one engine when the cable suddenly snapped, sending the lift sling and the crane's block and tackle down on the engine.

Fortunately, no one was seriously injured in this ground mishap. Investigators found undue stress was placed on the cable when the crane operator extended the crane boom without simultaneously extending the cable.

Maintenance safety includes an understanding of the equipment we are using. The right equipment, used in the right manner, does the best job in mishap prevention.

Perhaps other crane users can benefit from this mishap.

IT CAN HAPPEN

After taxiing to the quick check area at one of our overseas bases, the fighter pilot discovered a heading problem with his Phantom. The flight was aborted, and the aircraft returned to the TAB VEE (hardened aircraft shelter) where a crew chief and a maintenance technician prepared to winch it back into the shelter. From that point on, good judgment took a holiday.

Without properly pinning the seats after the aircrew departed the jet, the crew chief asked the technician, who was not cockpit qualified, to ride the brakes during the winching operation. Once in the cockpit, the technician closed the canopy because of inclement weather.

Next, the crew chief asked the brake rider to lower the tail hook so he could hook up the winch cable. Unfamiliar with the cockpit, the technician pulled the internal canopy jettison handle, thereby jettisoning the canopy. Fortunately, no one was injured as the canopy bounced off the jet and landed on the ground.

This organization promptly reviewed its procedures to ensure only qualified people perform authorized tasks.

In addition to the monetary loss, there is the more significant potential of death and injury to people. Two technician-supervisor NCOs with 10 years experience were involved in this explosive mishap. Could it happen to you?

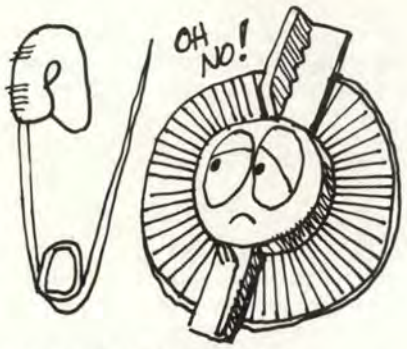
ENGINE INTAKES

This scene was taken during the filming of "Engine Intakes," a 16mm movie stressing safety precautions when working around jet aircraft intakes. This 8-minute film (#605556DF) is now available for loan from your local base film library or film servicing activity.

All maintenance units should make every effort to obtain this film for showing to all people who work around operating jet engines.

more maintenance matters next page

MAINTENANCE Matters



NO FUZE SAFETY PIN

After the F-16 returned from flight with a hung MK-82 general purpose bomb, the load crew downloaded the bomb and positioned it on a MHU-110 trailer, but failed to install the FMU-26B/B fuze safing pins.

A short time later, one of the load crewmembers noticed the battery firing device (BFD) lanyard for the FMU-26 nose fuze had been pulled. An emergency was declared, people evacuated the area, and EOD responded.

Although the investigation could not determine when or how the BFD lanyard was pulled, the load crew violated tech data by not installing the fuze safing pin.

AILING TWEET

After starting the right engine, the T-37 pilot noted the oil pressure was slow to rise. Moments later, the crew chief heard an unusual noise and saw a small flame and smoke coming from the right engine exhaust. After signaling the pilot to shut down and egress the cockpit, the crew chief extinguished the fire.

Investigation revealed the right engine oil return line was disconnected at the engine quick disconnect. To allow access in a congested area to a clamp on the right engine oil tank vent line, a maintenance technician had disconnected the line. But, he forgot to make an entry in the 781A.

Maintenance people continually disconnect hoses, lines, or wires during their work, but most of these actions are written up or discovered during operational checks. However, situations such as this develop now and then, proving disconnected lines can lead to serious mishaps. Those are the ones that hurt. The best solution is careful, documented maintenance.

TIPS FROM THE FIELD

Ever find yourself using a drill motor and wondering if you should really wear safety goggles? You tell yourself the job is a quick one, not requiring much time.

MSgt Greg Carollo, Ground Safety Manager from the 126th Air Refueling Wing, O'Hara Air Reserve Forces Facility, Illinois, sent this photo of a drill bit that broke while a maintenance technician was drilling a hole in some sheet metal. Fortunately, the technician, wearing safety glasses at the time, was not injured when the drill struck his goggles.

OWN INSPECTION

While inspecting the right intake prior to a maintenance trim of the Phantom's engines, the crew chief discovered a missing rivet and a nick to the first stage blade. Since the blade could not be blended, the engine was then removed and torn down in the shop, where further FOD damage was discovered. If you think this is the normal "rivet came loose" story, you might be surprised, so read on.

Prior to this $42,000 FOD mishap, the Phantom's crew chief discovered a loose, right intake rivet, which was replaced by a 7-level sheet metal technician. Contrary to tech data procedures, the technician signed off his own maintenance inspection in the aircraft forms.

The aircraft then flew six uneventful sorties before its next scheduled periodic (PE) maintenance where the engines were removed. During the engine bay inspection, a quality assurance (QA) inspector found the intake skin, where the loose rivet had been replaced by the sheet metal technician, in an abnormal position. Instead of the QA inspector entering the discrepancy in the aircraft forms, he told the engine bay chief to make the forms entry; only the bay chief forgot.

After the engines were installed, the jet was taken to the hush house where the engines were operated for their trim. When the trim procedures continued to the following day, an engine technician discovered the missing rivet and FOD damage.

MAINTENANCE Matters

To those of us in the maintenance business, the many discrepancies leading to this expensive mishap are obvious. One thing to remember is this: Regardless of the skill level performing the maintenance, don't be embarrassed to ask someone else to inspect your work, even if it means going lateral to a sister unit or squadron for support.

MANNY, MOE, AND CURLY

Many mishaps involving ejection cartridges have resulted in unwarranted damage to pylons, dispensers, and other components during ground system checks because of failing to follow prescribed tech data. Here is one such example.

After installing two wing fuel tanks to go with the previously installed centerline tank on the F-4D, the maintenance folks requested a weapons crew to perform an external stores jettison check.

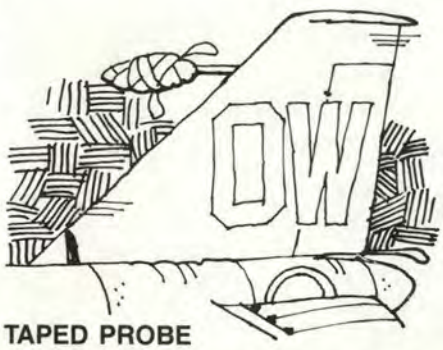
When the three-man crew arrived at the jet, two of them, Manny and Moe, headed for the outboard wing stations to check that the breech caps, explosive carts, and safety pins were removed. The third member, Curly, attempted to connect the external electrical power unit leads to the jet. After realizing the leads were too short, he asked his two buddies for assistance in connecting a second external power unit located on the other side of the aircraft.

Although Manny went under the aircraft and noticed the AERO 27A safety pin was removed, he assumed Curly had performed a safety check for the presence of explosive carts. Yet Manny never confirmed with his coworkers if the centerline AERO 27A rack was checked or mentioned the removed safety pin.

After Moe went up into the cockpit and activated the jettison switch for station No. 1 (outboard wing station), Manny verified a 28-volt signal was present at that station. Next, Manny requested Moe to try the emergency jettison but didn't receive any voltage reading. He then asked Moe to push the armament override and try again. Moe pushed the wing station jettison, and voltage was received in Manny's meter.

When Manny called for the emergency jettison again, the centerline station carts fired and the tank dropped to the ground. Fortunately, no one was injured. Unfortunately, the available checklist was not used in performing these critical tasks.

The lesson here is obvious. Don't assume anything, use the checklist, and be sure of what you're doing — or a similar mishap may happen to you.



TAPED PROBE

Shortly after takeoff, an aircrew suddenly experienced an abrupt uncommanded pitch movement from their F-4E. Although shaken up a bit, the crew recovered from the oscillations and landed their jet safely.

With the aircraft on the ground and engines shut down, it didn't take long to figure out the cause. Maintenance people found the ram air bellows tube on the upper stabilator covered with masking tape. The blocked bellows tube caused the pitch sensitive condition and high "G" oscillations.

Where did the tape come from? On the evening prior to the mishap, the F-4E was prepared for washing. Instead of installing the required red bellows probe cover or alternative barrier paper, the crew chief used masking tape. When the wash was complete, he removed all of the covers and signed off the AFTO 781A, but forgot about the tape on the bellows probe. Although the line supervisor performed his inspection of the completed work, he also missed the tape on the vertical stab probe.

Maintenance people had already completed the preflight card item for the bellows probe anti-ice operational check prior to the wash. Because of poor lighting in the aircraft shelter and lack of contrast with white masking tape over a silver-colored bellows probe, the aircrew didn't detect the taped bellows probe during their preflight. And lastly, the end-of-runway crew missed the taped probe during their inspection prior to the mishap flight.

This unit not only developed new pre-printed 781A forms for the washrack, but also revised their training procedures for the supervisor and workers assigned to the washrack. Perhaps other units may want to review their own procedures.

There's a reason for using designated covers with their "Remove Before Flight" streamers when washing aircraft. Many times, aircraft pitot or bellows probes are located away from ground level sight. Unless these probes have the required covers with their streamers, the potential for mishaps such as this will always exist. Be safe and leave the masking tape for wrapping packages. ■

OPS

Say Again?

■ While the HH-3E instructor pilot (IP) was completing hover checks in a 20 knot headwind, the No. 1 engine fire light illuminated and the warning horn activated. The IP landed the helicopter, and the crew completed the Bold Face for engine compartment fire. The IP requested, "FE confirm No. 1 engine fire." The flight engineer (FE) responded, "No. 1 engine fire." The IP mistakenly understood this to be confirmation of an actual fire. What the FE really meant was, "Roger, sir, I'll check out the No. 1 engine."

In this case, the miscommunication only caused some confusion and needless tension. In other circumstances, the result could have been disastrous. Say what you mean. Don't get fancy with your wording. Keep it simple so everyone can understand.

Bad Air

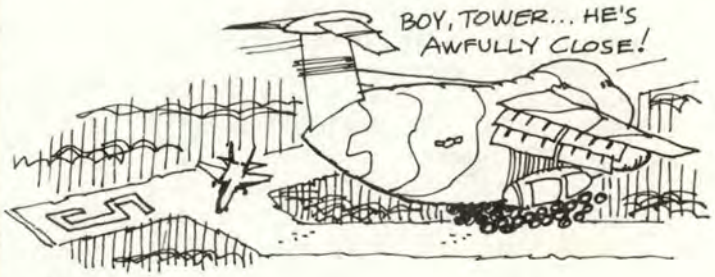
An F-16 pilot noticed a slight nauseous feeling shortly after takeoff, but continued the mission. After descent for the low level, the symptoms became worse. Approximately 5 minutes into the low level, the pilot noticed his symptoms for hypoxia and selected 100 percent and emergency on his oxygen regulator. He declared a knock-it-off and started a climb.

When his symptoms didn't clear, he turned the environmental control system (ECS) to RAM and took off his oxygen mask. His symptoms then went away. The pilot declared an emergency and made an uneventful recovery and landing.

The problem was caused by oil from the ECS leaking into the water separator. The oil saturated the condensing sock and contaminated the air entering the cockpit vents. The contaminated air was then picked up by the cockpit oxygen regulator and passed into the pilot's mask.

Once the pilot selected 100 percent oxygen, the contaminated air was cut off from his mask. He didn't notice immediate relief because of the residual effects of the contaminated air he had breathed. When he selected RAM on the ECS, he stopped the contaminated air from entering the cockpit.

Be aware that contamination of the oxygen system is unlikely, and selecting 100 percent oxygen should be effective in relieving symptoms resulting from breathing contaminated air. However, if you don't get speedy relief, or if you confirm the oxygen is contaminated, use the emergency oxygen supply.



Landing Clearance

A transport aircraft on a 3-mile ILS final was cleared to land by the tower controller and advised there was a fighter on the runway that would be clearing at the end. Approximately 30 seconds later, the transport pilot initiated a go-around because of the fighter on the runway.

The controller told the pilot the fighter was exiting the runway, but the pilot said he was still going around. The fighter had cleared the runway before the transport reached the approach end.

The pilot made a go-around because he didn't understand the controller could issue a clearance based on anticipated separation. This applies for both takeoffs and landings (FAAH 7110.65D).

Don't be in a hurry to go around if the controller issues you a clearance based on anticipated separation. But, don't blindly rely on that clearance. Controllers are human and can make "misteaks" just like you and I. If it doesn't look right, go around.

TOPICS

Hot Rotor Blade

The HH-53 crew completed their ground runs and shut down the aircraft. One main rotor blade (MRB) came to rest directly over the auxiliary power plant (APP) exhaust. The APP was operated for approximately 45 seconds and was then shut down.

When the crew chief completed his walkaround, he saw bubbling on the bottom surface of the titanium MRB.

T.O. 1H-53(H)B-1S-171 Operational Supplement has a caution that reads: "If extended APP operations after shutdown (more than 2 minutes) is anticipated, attempt to stop the rotor with a blade in the approximate 12 o'clock position to avoid blade damage from APP exhaust. If this cannot be accomplished, the blade should be manually repositioned after it has come to a stop."

This incident shows heat damage will occur if a blade is directly exposed to APP exhaust for periods significantly less than 2 minutes. Be very careful to ensure you don't operate the APP with a blade over the exhaust even for short periods.

Careful Preflight

During preflight at a cross-country base, the T-37 instructor pilot noted a stamped entry in the aircraft 781 stating the seat pins had been properly installed and the cockpit and other areas were safe for entry.

The IP had never seen an entry like this before, so he decided to make a careful check of all seat initiators. While checking the left seat, he noticed a piece of a pin sticking out of the lap belt initiator about 1/8 inch.

An egress specialist was able to remove the remaining part of the pin and the aircraft was cleared for flight. The head of the pin was found still attached to its streamer and stowed in the appropriate place.

If an ejection had been required with the broken pin still in place, the lap belt initiator would not have fired. The pilot would have to manually release the lap belt, push away from the seat, and pull the parachute D-ring. A low altitude ejection might not allow time for these actions.

Would you have found the broken pin on preflight? In this case, the IP was alerted by the unusual writeup in the 781 and paid particular attention to this area. Remember, the best time to discover a problem is on the ground, and a careful preflight will help you do this.

C-12 No-Go

A C-12 was preparing for the third sortie of the day. The pilot lined the aircraft up for takeoff on the runway and set the props at 2,000 RPM. He released the brakes and advanced the power to takeoff power. At 2,000 inch pounds, the left engine rolled back to 52 percent N-1, and torque fell off to zero with the ITT at 680 degrees.

The pilot aborted the takeoff and stopped on the runway to troubleshoot the problem. He found he could not move the N-1 RPM from 52 percent using either the power lever or the condition lever. He then taxied back to parking and shut the engines down normally.

Maintenance discovered the left engine compressor turbine had failed. The reason for the failure is unknown.

C-12 drivers take note: The C-12 engine can have turbine failure and continue to run. But, continued operation with this condition can result in engine case rupture and possible fire. If you experience this problem, shut the engine down as soon as possible. Don't try to troubleshoot it. Leave that to maintenance. ■

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.

FIRST LIEUTENANT

Michael H. Quinn

343d Tactical Fighter Wing
Eielson Air Force Base, Alaska

■ On 28 June, 1986, Lieutenant Michael H. Quinn, O-2 pilot, took off as No. 2 in a four-ship formation. After gear retraction, the cockpit indications showed the gear was not fully retracted. A chase aircraft confirmed the gear doors were open, the nose gear was up, and the mains were halfway down.

Lieutenant Quinn went through several checklist procedures attempting to lower the gear. However, no procedures were published for his particular gear configuration. Several alternate gear lowering procedures, coordinated through operations and maintenance experts and engineers at Kelly AFB, Texas, were attempted.

The nose gear came down and locked, but the main gear remained partially extended. The situation was complicated by a 20-gallon fuel imbalance in Lieutenant Quinn's aircraft. Also, negative-G applications while attempting to lower the gear covered the windscreen with oil and reduced forward visibility in the aircraft to nearly zero. At this point, Lieutenant Quinn and his chase aircraft had been airborne for 3-½ hours and were down to bingo fuel.

Lieutenant Quinn decided he had to land with the gear as it was — nose down and mains partially extended. He decided not to feather the propellers until in the flare so he could make a go-around, if needed. The chase aircraft helped him with checklist items and runway lineup, and Lieutenant Quinn set the aircraft down smoothly with minimal sink rate. The aircraft skidded to a halt within 25 feet of runway centerline with minor damage.

Despite having only 2 months of operational experience in the aircraft, Lieutenant Quinn's superb skill and judgment saved a valuable Air Force asset and prevented possible serious injury to himself. Well Done! ■

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UNITED STATES AIR FORCE

Well Done Award

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

CAPTAIN

James D. Collins

3d Tactical Fighter Wing

■ On 6 May 1986, Captain Collins took off in an F-5E on a dissimilar air combat tactics mission against two F-16s. The mission progressed normally until the final engagement. As his aircraft approached bingo fuel, Captain Collins initiated a nose low separation maneuver at 8,000 feet MSL. He then observed an F-16 approaching his 6 o'clock at a range of approximately 12,000 feet and initiated a check turn to the left using aileron and left rudder. Captain Collins called a knock it off for fuel and started to roll the aircraft wings level.

At this time, the aircraft started a slightly nose high roll to the left. Captain Collins immediately applied right aileron, but the aircraft continued to yaw and roll to the left. He simultaneously retarded the throttles to idle. Immediate action was required to regain control and to minimize altitude lost. There was no margin for error.

After the aircraft had completed one roll and started a second, Captain Collins disengaged the pitch and yaw augmentation and checked the rudder trim for center, thinking the aircraft might have a hard over rudder. The aircraft was now inverted and still in a slight roll to the left with full right aileron. Using forward stick and full right aileron, Captain Collins was able to recover the aircraft after 2½ rolls to a slightly nose high and extremely left yawed attitude. Holding a large right aileron input was necessary to control aircraft yaw.

Thoroughly checking the cockpit, Captain Collins noticed the left rudder was depressed about 3 inches and would not return to the neutral position. Captain Collins quickly observed a wire bundle caught between the left rudder flight cable and pulley arm. On his second attempt, he was able to dislodge the wire bundle and free the controls. The rudder returned to the neutral position allowing Captain Collins to make a safe recovery. Well Done! ■

HAPPY BIRTHDAY, AIR FORCE!

From propeller-driven aircraft to the most sophisticated weaponry in the world, our Air Force celebrates 40 years of progress in people programs, doctrine, and technology. We also celebrate 15 years of service by the F-15.

Just as the F-15 shares a common heritage with the P-51, so the Air Force of today is tied to the Air Force of 1947 — similar, yet greatly improved.

UNITED STATES AIR FORCE

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SEPTEMBER 18, 1947