AEROSPACE

SAFETY

UNITED STATES AIR FORCE

SAFETY AND YOU IN '62

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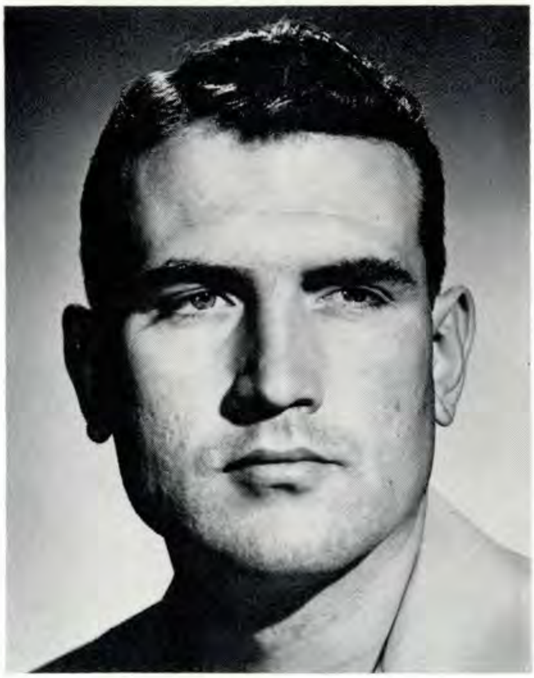
CHECK PAGE FOUR

JANUARY 1962

WELL DONE
Captain Richard D. Besley



Hq 6560 Operations Group, Patrick AFB, Fla.

C-54 No. AF72571, operating from Patrick Air Force Base, Florida, was on a routine scheduled operation for the Air Force Missile Test Center. Passengers and cargo were loaded at Grand Bahama AAF and an uneventful departure made at 1333Z, with 1000 pounds of cargo, 12 passengers and a crew of five. A VFR climbout was begun to the clearance altitude of 3000 feet.

Five minutes after takeoff, just prior to reaching 3000 feet, a severe jolt was felt, accompanied by an abrupt yaw to the left. The old Skymaster rolled sharply into a 30 degree bank. Two or three cycles of extreme vibration shook her violently. The pilot, Captain Richard D. Besley, immediately reduced power on No. 3 and No. 4 engines to maintain directional control as full aileron and forward pressures were applied to the yoke. The Flight Engineer, SSgt Thomas L. Ingram, informed the pilot that engine instruments indicated failure of No. 1 and No. 2 engines.

Captain Besley looked outside and observed No. 2 propeller and nose section missing and the power section drooping 30 degrees. No. 1 engine had been torn from the firewall and was hanging by the bottom engine mounts and oil cooler in the 80 degree position. Large sections were missing from the propeller blades. He immediately ordered the engineer to begin engine failure procedure for No. 1 and No. 2 engines.

As the emergency checklist was being accomplished, a descending right turn was made to return to Grand Bahama AAF. Major Lance W. Sinclaire, copilot, called the tower, reported the emergency and requested crash equipment. Meto power was set on No. 3 and No. 4. Descent was stabilized at 200-300 feet per minute, 130 knots IAS.

Captain Besley notified his crew and passengers to make all necessary preparations for ditching or crash landing. The two loadmasters, SSgt Russell L. Nutter and A1C Hiram Carlock, Jr., tied down and secured all loose objects and prepared the passengers and cabin for either contingency.

To reduce flying time, Captain Besley selected a downwind approach. Winds were light and insignificant when weighed against the importance of landing as quickly as possible. Foaming the runway was decided against because it would be time consuming and maximum power would be required to maintain altitude.

A perfect, uneventful landing terminated the eight-minute flight.

Captain Besley and crew exhibited outstanding professional skill and a thorough knowledge of emergency procedures and techniques. Crew discipline and coordination were unquestionably a factor in accomplishing a safe return under critical conditions.

Well Done, Captain Besley and crew. ★

IN THIS ISSUE

FALLOUT

T-Bird Radio Discrepancy

During one of several flights in the back seat of a T-Bird, prior to checkout, I found a discrepancy new to me; perhaps others may not be aware of it. Pilots becoming re-acquainted with the T-33 may find it particularly valuable.

After carefully tuning the C403/ARN-6 to the proper frequency for IFR departure (while taxiing out), the front seat pilot performed the controls check— stirring the cockpit— and the stick touched and moved the tuning crank enough to alter the frequency. This could become quite important when taking off in foul weather, or in high density areas, flying as single pilot, or low proficiency, and so on.

Capt Carl W. McKenzie
33d Tac Ftr Sq
Seymour Johnson AFB, N.C.

Thank you, Mac!

T-Bird Tips

I would like to see a change in the procedure following the statement, "In the event of failure to one or both main landing gear wheels . . . " in "Tips For T-Bird Drivers" on page 12 of the July issue.

To quote: "The barrier does a right fine job under optimum conditions, but by the time a T-33 rolls the full length of the runway *without power*, the conditions could be altered from optimum."

If a barrier is available, keep conditions optimum by maintaining some power. Do NOT stopcock the throttle until you are assured of maintaining directional control with rudders (50 kts) TO THE BARRIER. If the runway is long and you have strong crosswinds you may need power just to get there. Fifty knots is also in the recommended T-33 barrier engagement speed range of 40-110 kts groundspeed.

Most bases with a barrier have one runway or parallel runways which increase your chances of a crosswind. This procedure was used with good success at this base when a pilot had a complete failure of one brake.

1/Lt Michael D. Hall
3556th Fly-Trng. Sq
Perrin AFB, Texas

The manual, of course, can not cover every conceivable possibility. Your recommendation is fine under favorable field conditions, but remember, there are runways that end at the edge of a cliff, in the ocean, or at a dike.

Bug Mashers

On page 7 of the October issue is a picture of an energetic rubber band winder preparing to start a small bug masher. What happened to the requirement for use of wheel chocks during starting?

Maj. Leroy A. Young
6510th AB Gp
Edwards AFB, Calif.

All bug masher drivers, take note.

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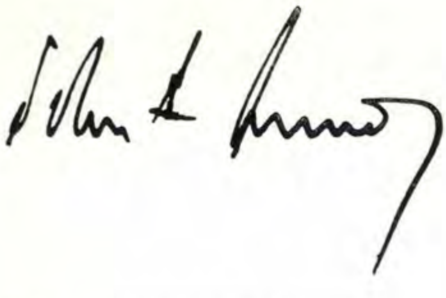
THE WHITE HOUSE
WASHINGTON, D.C.

SAFETY POLICY FOR THE FEDERAL SERVICE



In accord with our national concern for human life and the well being of all citizens, it is the policy of the Federal Government to safeguard from injury all those who work for it.

To carry out this policy, I charge the heads of Executive departments and agencies and, through them, their supervisory staffs to exert leadership in the establishment of vigorous accident prevention programs to achieve safe conditions of employment, and to promote safe practices by civilian and military personnel on and off duty. Safety programs of the Federal Government should also assure the fullest protection to all who visit our Federal buildings, installations, parks, forests, and other public areas. Similarly, these programs should extend to the safety of the public and Government driver alike, in their use of our public highways.

In order that these programs meet current needs and reflect the rapid changes in both technology and character of the working force, the Federal Government will cooperate with management, labor, State and local governments, and safety organizations in developing and applying modern safety standards.

The Government will take all appropriate means to foster the safety of all of those engaged directly or indirectly in the world wide activities of the Government. To this end, I have directed the Secretary of Labor to provide assistance to all agencies through the Federal Safety Council and its field affiliates. ★

Memo to Commanders

Through the medium of the Federal Safety Policy the President of the United States has called upon every one of us for a concentrated and lasting effort to foster the safety of all those engaged directly or indirectly in government service. This policy, which is the cornerstone and kickoff point of our 1962 safety program, reflects the President's concern at the extent of human suffering and the expensive waste attributable to preventable accidental injuries each year.

To the Air Force, handling and maintaining the diverse and deadly weapons of our arsenal, this policy and attendant responsibilities are especially meaningful. It is particularly applicable to the DIG/Safety responsibility of providing guidance and assistance to commanders and supervisors in the conduct of their accident prevention programs. To that end we have reviewed the safety program for 1962 to satisfy ourselves that our plans are geared to carry out the President's instructions.

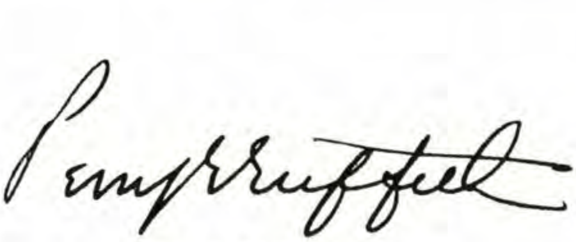
In general the program was found to be directed at the areas of interest referred to in the policy statement.

The entire statement was emphasized at the Second Annual USAF Safety Congress held in October. Some 300 commanders and safety specialists were brought up to date on our program and its relation to the policy. Future Air Force-Industry conferences will be utilized for similar briefings to combine the Air Force-Industry team in a concerted drive to reduce these crippling, costly injuries.

I have sometimes wondered if the problem of "preventable" injuries is not unduly complicated by the feeling of some supervisors that such accidents are the sole result of careless, thoughtless acts. The word itself implies a deliberate act with a related disregard for the consequences. But "preventable" accidents have occurred as the aftermath of commendable attempts to meet rigid deadlines, or to insure on-time takeoffs. "Preventable" accidents have developed from long working hours, under difficult conditions, from the lack of needed tools, or shortages of time-saving equipment. In short, these mishaps have sometimes been set up by unrealistic planning on the part of those supervisors who are also charged with accident prevention. I suggest that when we are tempted into an across-the-board condemnation of the people involved in preventable accidents that we first make sure that we have not created the conditions by unreasonable pressure or unrelenting insistence on an unattainable standard of performance.

For these reasons, among others, the DIG/Safety program for 1962 will place particular emphasis on the paramount importance of aggressive leadership in the prevention of accidents. In the final analysis the effectiveness of any accident prevention program is measured by the top-side support that the program will command. Down through the chain of supervision, the supervisors will be responsive only to the degree that their responsibilities are identified and their authority accepted. Assistance will continue to be provided commanders in the form of safety surveys, staff assistance visits, technical analysis of accidents, accident investigation, and appropriate educational media. Other methods to enhance our safety program are under study.

The President's interest in the military accident area, and his instructions to all Federal agencies to assist in the prevention program, will undoubtedly re-emphasize the importance of the whole of our safety program. These new plans to supplement the present program, forceful leadership and example by supervisors, and vigorous support from commanders are the tools by which the job can be done.



PERRY B. GRIFFITH
Major General, U.S. Air Force
Deputy Inspector General for Safety

A lot of soul searching went into the 1962 safety program at the Second Annual Worldwide Safety Congress at Sandia Base, N.M., 25-29 September. Commanders and safety officers, providing a good cross-section of the Air Force, teamed with specialists from DIG/Safety to probe the areas of Flight, Ground, Missile and Nuclear Safety. Their task was to examine the accident prevention program now in effect and make recommendations for improving it in 1962.

Major General Perry B. Griffith, DIG/Safety, summed up the "why" of safety at the opening of the conference when he said, "The international situation makes it absolutely imperative that our combat readiness posture be maintained at maximum effectiveness."

The "how" of safety was outlined for the four areas by the four directors and hammered into accident prevention battle plans at seminar sessions during the week.

Here are four quick reasons why we must increase our safety effort during 1962:

- For the first time in 14 years the aircraft accident rate took an upward swing.
- The missile inventory is growing, and missile accidents are increasing.
- The loss of personnel from ground accidents was considerably more than that of aircraft accidents, even though the rate decreased.
- A nuclear yield accident could be catastrophic.

Following are brief highlights of the safety problems and programs:

★ FLIGHT SAFETY

As of the convening of the congress, 234 of the 313 aircraft accidents during 1961 could have been prevented had it not been for human error. People caused these 234 accidents by:

- Gear-up landings.
- Poor flight planning.
- Poor techniques.
- Inadequate maintenance.
- Lack of supervision.

Then, too, there were an unknown number of accidents officially recorded as materiel failure which were the indirect result of personnel error.

Here are recommendations, as presented at the conference, designed to stop the upward aircraft accident trend.

- Command attention, direction and enforcement.
- Indoctrination of maintenance and operations officers with the idea that safety is paramount.
- Professional aircrew performance.
- High quality standardization, evaluation programs and operating procedures.
- Positive supervision of flying operations.
- Thorough flight safety surveys, producing objective reports that generate command attention and corrective action.
- Organized CRT flying to insure maximum training from the time allotted.

★ MISSILE SAFETY

Four special emphasis areas were spelled out for the 1962 missile safety program. They are:

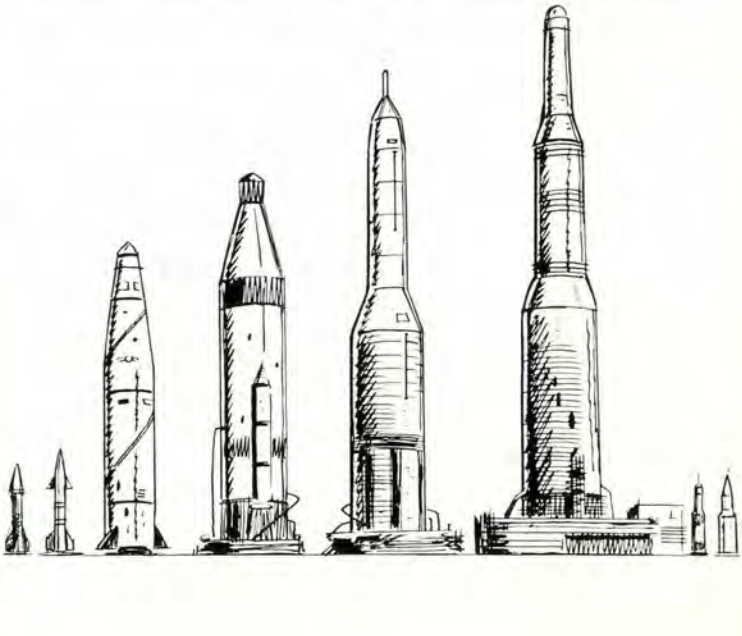
1. To have technical data and adequate instruction available and verified at the time of site acceptance. Failure to do this has had a distinct impact on safe and efficient operations.
2. We must work closely with all levels of the quality control program to eliminate substandard materiel. Quality control techniques and measures applied to missiles, missile test equipment and replacement components have allowed substandard materials to get into our weapons systems and cause accidents.
3. Monitoring of safety responsibilities in site activation will be a primary element of the program from this point on.
4. Human reliability is an area that must continually be stressed. Exacting physical and mental demands of missile operations require that these factors be given serious consideration in the selection and assignment of officers and airmen in the missile field.

SAFETY AND

In addition to the four major areas listed above, other plans are in being to improve the safety posture in the missile field. One of these is an incentive program to recognize outstanding organizations for their contributions to the safe management of missiles.

★ GROUND SAFETY

In addition to continuing programs that have proven effective in the past, ground safety efforts this year are



to be concentrated in five areas where analysis has disclosed 85 per cent of all on-duty accidents occur. These are:

- USAF vehicle operations.
- Systems maintenance activities.
- Civil engineering activities.
- Supply activities.
- Supervised recreation.

These five examples illustrate the value of accident reporting. Such reporting permits accurate analysis of trouble areas and permits gearing the program toward areas where the greatest need exists. Kits have been prepared and distributed for each of the five trouble areas. These will, it is anticipated, provide a basis for attacking the trouble areas. Each unit is expected to modify the kit approach to the local situation, apply supervision, encourage command interest and support and instill in each person the spark that ignites a healthy ground safety attitude.

In the explosives safety area, President Kennedy's policy on limited war capabilities and related conventional explosives has found the Air Force deficient in several areas. These areas are inadequate explosives hazard criteria, standards, technical data, trained personnel and inadequate implementation of the explosives safety program. Recommendations made by conferees

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to assist in resolving these problem areas are as follows:

Each major air command immediately and fully implement the explosives safety program outlined in AFR 32-20.

Accelerate explosives hazard tests and standards for all types of explosives.

Accelerate the publication and distribution of technical data on conventional explosives.

Upgrade and reorient the training of munitions and armament personnel in conventional explosives on an expedited basis.

During the congress, conferees reviewed and approved the printer's proof copy of AFM 32-6, "Explosives Safety Manual." It was scheduled to be distributed on 30 October 1961. This manual is expected to be an invaluable aid to commanders in establishing and conducting their explosives safety program.

★ NUCLEAR SAFETY

Awareness is listed as the key factor in a nuclear safety program that has as its goal the continuance of a record of no nuclear yield accidents, and elimination of all other preventable accidents. This "awareness" is a summation of two concepts, "Nuclear Safety Around the Clock" and "Eternal Vigilance."

In the nuclear area, personnel error again appears as a major cause factor of accidents and incidents. Some accidents and incidents were attributable to the individual concerned, but more were chargeable to a supervisor somewhere in the chain of command.

A manual, "The Air Force Nuclear Safety Program," has been published outlining all elements of the nuclear safety program. Full knowledge of all elements of the program is listed as the first requisite of the 1962 safety campaign. Two adjuncts also highly recommended are the nuclear safety surveys performed by the command itself and nuclear safety councils. All operations personnel are reminded that a thorough knowledge of safety rules, operating procedures and checklists is mandatory, and that short cuts cannot be condoned. The value of reporting hazards is stressed, with UR's and local hazard reports to be utilized for this purpose.

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There it is, the 1962 safety program in brief, as brought out at the Safety Congress. One concern that was evident throughout the congress and that can spell success or failure during the coming year was the human factor. That's where YOU come in. If YOU operate within the safety-established bounds, abide by proven safety concepts, report hazards promptly and refuse to succumb to the temptations of shortcuts, YOU stand an excellent chance of being around at the end of the year. The congress can only attempt to pinpoint accident cause factors and recommend measures to counteract hazards. Application can only be accomplished by YOU. ★

the Problem of

Robert H. Shannon, Safety Officer, Life Sciences

The pilot was Number Two in a two-ship flight on a night profile mission. While descending through broken clouds during an over-water leg of the flight, the lead pilot received a call from the Number Two man, stating that he had lost the lead aircraft and was pulling up. The leader immediately advised him to take lateral separation but received no reply. Subsequent attempts to contact the Number Two aircraft were unsuccessful. The leader switched his IFF to emergency and returned to the base after remaining in the area five to six minutes.

An extensive search was initiated by both surface vessels and aircraft. Search efforts were negative during the night and following day. The pilot's body was located on the second day of the search after being in the water approximately 40 hours.*

The circumstances of the emergency and subsequent actions will never be known. Post mortem examination disclosed that the pilot expired 12 to 18 hours after an apparently successful ejection, descent and landing. The cause of death was exhaustion from overexposure.

When found, the pilot was floating in his LPU-2/P life preserver. He was wearing the regulation summer flying suit over his blue class "B" uniform, low quarter shoes and "G" suit. Helmet and gloves were either lost or discarded. The chute harness, aircraft survival kit and dinghy were not found. A small, locally manufactured survival kit containing one sea dye marker packet, one shark repellent packet, one signal mirror and one day-night flare was attached to the life preserver. The kit was intact and unopened. Sea dye marker stains were found on the pilot's body and clothes indicating that at one time he may have been in the dinghy. The pilot attended a water survival indoctrination class approximately 18 months prior to the accident; however, he did not take advantage of an excellent sea survival school conducted by the organization to which he was assigned.

The accident board surmised that the absence of the chute harness indicated a possible lack of knowledge of how to use survival equipment. The pilot may not have known that removing the chute harness results in loss of the dinghy and survival kit. Had he attended sea survival school, he may have had a better understanding of survival equipment and procedures, thus prolonging his survival. The water temperature in the area was 68°F with eight- to ten-foot waves. The surface air temperature was 40°, and winds were 25 to 30 knots.

With the exception of the cause of death, this case is typical of ejection water landing fatalities. Evidence usually indicates failure to carry necessary equipment to cope with the situation and a general lack of knowledge in survival techniques and use of survival gear.

The following are excerpts of other recent water landing fatalities:

Missing after successful ejection and descent. Seen moving about in water with chute still attached. Disappeared beneath surface before rescue aircraft arrived in approximately five minutes.

Missing following successful ejection. Last observed being dragged through the water by inflated chute canopy.

Drowned approximately 20 minutes after landing in the water. Dinghy tore loose and pilot became exhausted while attempting to swim to it.

Missing following successful ejection over water. Observed attempting to board dinghy. A gust of wind inflated the chute canopy and dragged the pilot across the water. He subsequently disappeared.

Far too many crewmembers are lost each year because of inability to survive parachute water landings. During the first nine months of 1961, 6 of 31 (19 per cent) ejection fatalities were attributed to water landings; in 1960, 6 of 23 (26 per cent); and in 1959, 4 of 34 (12 per cent). Fatalities from this cause are particularly sad since they occurred after the expected hazards of escape from a disabled aircraft in flight had been successfully overcome.

Available information indicates that some organizations have extensive water survival training programs, while others require little or no training. Apparently, there is a large proportion of the USAF population who believe that training is for the "other guy," because "this sort of thing will never happen to me."

**Fatalities such as these can be reduced in number through availability of a personnel locater device. Efforts in this area are continuing under the monitorship of DIG Safety.*

SEA SURVIVAL

If the statistics cited above regarding the ratio of water landing fatalities to the total ejection fatalities are not convincing, here are some more cold, hard facts to consider. First off, if you are flying in a jet trainer, the probability of ejection is four for every 100,000 hours of flying. The same rate is true for jet bomber crewmembers; but if you are a fighter jockey, the ejection rate per 100,000 flying hours jumps to approximately nine. These rates are based on a current 18-month period.

Let's assume you are one of these four or nine crewmembers. You pull the trigger or "D" ring, as the case may be, and you are on your way. Everything works like the book said it would. You separate from the seat, the chute deploys automatically and you start descending. You feel at this point that you have it hacked.

If you are over land, it's likely your analysis of the situation is true, for the record shows that only about 16 per cent or one in six encounter postlanding difficulties on land. These are usually of minor nature and for the most part involve collapsing the canopy. This is not to imply, however, that a thorough knowledge of postlanding procedures on old terra firma is not essential. A substantial number of major injuries have occurred during and subsequent to landing, and recently a pilot was fatally injured as the result of being dragged by high winds.

But what are your chances of ejecting over water? In eleven years of ejection escape experience, 231 or 11 per cent of all USAF ejections terminated in water landings. Of these, approximately 20 per cent (45) drowned, succumbed to the effects of exposure or are missing and presumed drowned.

To illustrate how an unfriendly environment, such as a large body of water, compounds the problem: **over 50 per cent of all water landings result in difficulties that jeopardize survival.** The greatest problem is that of collapsing the chute canopy. Until this is done, you cannot begin to apply your knowledge of survival techniques or use the equipment on hand. Incidentally, the body of water doesn't necessarily have to be a large one; there is one case on record in which a pilot drowned after landing in a stock watering tank.

Typical water landing problems are contained in the following extracts from statements by some of the more fortunate who have been down this road and made it back.

* * *

"I was dragged through the water for approximately 100 yards before I could spill the chute. I had to use both hands to operate the quick release. The raft operated properly but it took me 20 minutes to board it. I experienced extreme cold and shaking during my entire stay in the raft. I had previous survival training on both land and sea survival. This I believe was a prime factor in my being rescued. More attention should be put on survival training. A great deal of the things I did through instinct and had to do little thinking. This I credit to my extensive survival training. I made mistakes while I was out in the raft that could have been prevented if more good training had been given me. I found that this sort of thing does not always happen to the other guy; this time it happened to me."

* * *

"The sudden shock of the 33° water numbed me. My fingers were incapable of removing the mask as I sank to approximately 20 feet. Without surfacing I continued trying to remove the mask. Sank to about 10 feet, began to hurt for air. Spent five futile minutes trying to get face out of water for one good lungful of air. Never successful. Finally pulled mask under chin. Never able to remove it. Sometimes took in 90 per cent water. Drank all water taken in. By grace of God never coughed once. Otherwise could not have survived since face under and awash 70 per cent of time in water. Attempted to open chute chest strap, which was complicated by oxygen hose A-2 cloth adapter which had slipped over buckle. Similarly unable to remove dinghy which was by now waterlogged and pulling me deeper and deeper. Also could not feel chute quick disconnects to get rid of chute. Had to fight urge to go to sleep. While kicking desperately to get mouth out of water, chute linens wrapped around right arm and leg. Stopped kicking to preclude being completely wrapped in chute lines. I would have sunk like a rock. Face awash when rescued, very tired."

"I landed in the ocean which had ten-foot swells and water temperature of 39° and was dragged a con-

SEA SURVIVAL

siderable distance. After chute collapsed, I tried to release the quick release but could not do so. I tried to inflate my life raft but could not find the lanyard. I then tried to get at my knife but found that I would go under every time I stopped treading water to try and unzip the pocket. I again tried the quick release and still could not release it. I was finally picked up by a fishing boat in the area. They had to cut my shroud lines and raft free in order to bring me aboard. Helicopter rescue attempt was tried previously, but I could not remain in the basket because of wind filling the canopy and pulling me back in the water."

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"Sometime during ejection I lost my life raft and survival kit. I hit the water with very little impact with the LPU-2/P inflated. I became entangled in the shroud lines, and as the chute started to sink, I took both the life vest and chute harness off and untangled myself. I then put the life vest and chute back on as best I could. The only comments I have to offer deal with the psychological aspects of water survival without a life raft or survival equipment. I believe that too many men would be inclined to give up hope in a situation such as I was in. If these men in some way could be taught that all that is really necessary to live through a situation such as this is a clear mind to formulate a plan of action, the physical ability to carry out this plan and, most important of all, the self-confidence and desire to withstand any adversities that they may encounter, these men also would be able to successfully survive a similar situation."

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Let's analyze the last statement for a moment. There is no better way of expressing the requirements for successful water survival. The necessity for a clear mind to formulate a plan of action is paramount. Experience shows, too often, the tendency of a crewmember to panic after entering the water, particularly when something goes wrong. You CAN be mentally conditioned to cope with any adversity and you can be trained to the point that a formulated plan of action will become an automatic response.

The need for maintaining a good physical condition is obvious. Your job can, at any time, result in a situation that will extend your physical endurance to the maximum.

Self-confidence and desire are achieved through a thorough knowledge of your equipment and of survival techniques and procedures. In other words, you must maintain a high degree of proficiency in this area; some day it may save your life. Acquisition of this degree of knowledge and mental conditioning is possible through an aggressive and realistic water survival training program. Such a program is currently being established within TAC that takes only six days to complete. This course is being set up by an officer who had much to do with making the 5th AF sea survival school one of the finest in the USAF. It has been reputed that no crewmember attending the 5th AF survival school has been lost to a sea survival situation.

Next month Aerospace Safety will contain a detailed description of the proposed TAC survival school. Should your organization desire additional information concerning this course, TAC would be more than happy to lend assistance. ★

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Within the period of a year, two similar accidents occurred in the U-3 aircraft. In each case the aircraft had just broken ground on the takeoff roll with landing gear in the process of retracting, when the right cabin doors of each aircraft came open. Both pilots immediately chopped power and the aircraft returned to the runway sans landing gear.

The Flight Handbook states that the aircraft can fly the traffic pattern and be landed safely in spite of the buffeting from the open door.

WINTER  WEATHER

Our weather enemy becomes more formidable about this time of year. Low ceilings are more frequent; visibilities are lower and change rapidly; snow and ice really come out fighting, getting into our engines, disrupting lift, sticking on the windshields, reducing visibility and piling up on the runways. With all this, gusty winds come in for a final punch.

Does this mean that accident rates increase in the winter? Not necessarily. We have learned quite a bit about our weather opponent, and when we keep our guard up and plan our offense properly we seldom get K.O.'d. As one of your corner men I've noted that winter weather hazards encountered in flight aren't as big a problem as those experienced in the critical takeoff and landing phases. Let's take a look at some of the weather hazards that contributed to recent major accidents during winter.

• *TAKEOFF*

One chilly morning a C-123 rolled down the runway for an uneventful liftoff. Twenty-five feet in the air, with over 110 knots airspeed, a wing dropped sharply, contacted the ground, and the aircraft bounced from one wing to the other, until the takeoff was aborted. Investigation revealed a thin layer of ice on the wings.

Where did the ice come from? Let's look at some of the possibilities. At preflight, the pilot had the engineer sweep several inches of dry snow from the wings. A layer of ice frequently forms when the initial snow melts on contact and later freezes. *Don't be misled by the texture of the snow on top.* In this accident the engineer was unable to sweep the entire wing surfaces and a high speed taxi run was made in an effort to remove the remaining snow.

To compound the problem, the temperature had rapidly warmed to just below freezing and the falling snow was forming a thin slush on the runway. Here lies another pitfall. Thrown slush and water can freeze on aircraft surfaces and lodge on control surfaces, wheel assemblies and other vital areas and later freeze in colder air.

These sources of trouble are normally noticeable and precautions can be taken. There is another possibility that is not so obvious. Taking off with a little water on the aircraft is no problem (we frequently take off in rain), but let's take a close look at the situation when the temperature is just above or below freezing. Consider where the water came from. Heavy frost can be melted by an early morning sun while the air temperature still is near freezing. A recent rain can be followed by falling temperatures behind a cold front. A wet snow, rain, or even a dry snow falling on a warm aircraft can produce moisture. In any case, this moisture can change to ice on takeoff when the rapid flow of air causes evaporation of part of the moisture and results in immediate cooling of the surface.

• *IN FLIGHT*

A T-33 indicating 115 knots stalled out short, sheared the gear and skidded down the runway, shedding chunks of one-half inch rime ice that had collected on the leading edge. Heavy traffic had prevented a normal penetration. During a radar vectored approach the aircraft was below 20,000 for over 20 minutes prior to landing. The landing was at night with a 700-foot ceiling and the pilot was not aware that he had picked up a load of ice. At high altitudes icing is seldom a problem, due to the low moisture content of the cold air. But penetration of the lower, moisture-laden atmosphere is a dangerous icing hazard.

• *LANDING*

A C-47 lost an engine on takeoff. The old faithful chugged around for a landing and the pilot delayed lowering the gear until the runway was in sight. Sounds fine, except there wasn't time for the gear to lock because the pilot was also fighting one-half mile visibility in snow.

First you have to find the runway, and winter ceilings and visibilities make this difficult at times. The major fair-weather, high pressure areas move south, and the storm tracks move down to the latitudes of most of our bases. As in the case of the Gooney Bird pilot, a frequent hazard that contributes to accidents is reduced visibility due to snow. The snowflake, by its very structure, is an efficient screen for hiding the runway. Slight changes in snowfall intensity can produce rapid and great changes in visibility. These changes sometimes occur so rapidly that the *weather reported at the beginning of your approach can be considerably different from that which exists on landing.*

Strong or gusty winds on landing are a problem throughout the year, but in the winter they contribute to more accidents than any other weather hazard. An F-101 landed on a slushy runway with a 90 degree, 15 knot crosswind. The pilot was unable to maintain directional control and the aircraft skidded off the side of the runway.

Winter weather hazards can't always be avoided but their effect can be reduced if they are anticipated and preparations are made to meet them. Some common sense rules can help swing the odds your way when you tangle with Old Man Winter.

KNOW the all-weather procedures for the aircraft you are flying.

PLAN for the worst weather conditions expected.

CHECK weather en route on Channel 13.

INSIST on the latest weather information prior to penetration or approach.

RECOGNIZE unexpected weather hazards.

DIVERT to an alternate when weather conditions endanger the safe completion of your flight. ★

Lt Col Ferd Curtis, Liaison Officer, Air Weather Service

HITTING DEPARTURE TIMES . . .

. . . or Chumley does it again.

The colonel leaned forward and flipped a switch on the intercom. "Mazie, get Base Operations on the phone."

Moments later, "BASOPS, Waters."

"Major Waters, the base commander would like to talk to you, one moment, please."

"Hello, Jack, Colonel Allaman. How're the boys doing in hitting their proposed departure times?"

"Uh, why I guess all right, sir."

"Well guess again. I've just spent an hour talking to an FAA liaison man and I didn't like what I heard. Seems like some of our pilots are missing their departure times by half an hour or more. That's not all, they are also goofing on other items. Here's what I want you to do. . . . "

Forty-eight hours later Major Waters was laying a thin layer of paper on his boss's desk. "Here are the figures you asked for, Colonel. For the most part the pilots have been doing a pretty good job. You'll see that we have one primary problem. I can't say how long this has been going on, but experience tells me it has been a long time. The problem is Captain Chumley."

The commander perused the figures confronting him. He glared at the paper for several moments, then, finally he relaxed; he almost smiled.

"Waters, I have an idea. I want you to arrange for a visit to the Air Route Traffic Control Center by one of our officers, namely, Chumley. Be sure to tell them that this officer is the man responsible for most of the trouble the controllers in this area have been having with military aircraft. Ask them not to reveal that they know this, but to give him the works when he arrives. Got that?"

"Yessir," said Waters. "Anything else, sir?"

"I have some other plans, however I'll just give you this much for now," said the Colonel.

At that moment the object of the commander's ire was walking away from the dispatcher's desk after filing a '175. With him was a young pilot recently assigned to the squadron.

"Enough of that Captain stuff, lad. Just call me C.Z.," said Chumley to his partner. "Now let's a cup of coffee have and then off to yon bird."

"But Capt. . uh, C.Z., don't you think we'd better forget the coffee? Our proposed departure was one minute ago. Your conversation with the WAF took quite a while."

"Think nothing of it, lad, we have plenty of time. Them moles in the Center are probably drinkin' coffee themselves. They won't have a clearance ready for twenty minutes yet. After you, boy."

C.Z.'s leisurely pace indicated that he had all the time in the world, that here was a bold aviator replete with confidence, savoir-fairé and urbanity far beyond the norm. The lieutenant with him was anything but relaxed. He kept looking at his watch and twice burned his tongue drinking coffee.

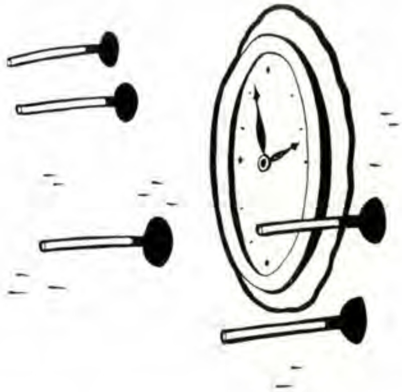
What's the matter son. . uh, what'd you say your name is?"

"My name's Bill, Captain. . I mean C.Z. That is my name is Bill; yours is C.Z."

"I KNOW my name," said Chumley, "just curious as to what you go by. Helps on the interphone, you know. Bill, is it. What's the matter? You act nervous. Girl trouble? If so, tell old Dad. I excell in handling of the fairer sex. Jove, I remem. . . "

The lieutenant interrupted—they'd never get airborne if C.Z. got going on his favorite pastime. "It's just that we're now 20 minutes overdue for takeoff. This may be unimportant to you, but I've always been taught to be punctual."

"Tell you what, laddie. These



grease soaked chicken balls are hard enough to digest when eaten slowly. Suppose you go out to the bird and run through the tire kicking bit. I'll be with you shortly." He mashed grease from another bite of egg, then slid it up on the rim of his plate to drain.

Ten minutes later, picking thoughtfully at his teeth, Capt C.Z. Chumley emerged from the snack bar and ambled across the ramp toward T-Bird 65799. He gazed around, ran his eyes over the sky and held up a wet finger. C.Z. hadn't trusted a weather man since rain had cancelled out a picnic for two three years ago. And at Las Vegas yet; it almost never rains there, and she was the cutest one in the chorus line, too.

As he approached the aircraft the lieutenant emerged from under a wing and pronounced the bird ready to go.

Minutes later, Chumley announced sagely, "See, what did I tell you, Bill, no clearance. Knew it

would happen—should have had another cup of coffee."

"Sir," said the rear seat occupant, timidly, "the clearance came in but was cancelled. They told me in dispatch when I was on my way out to the plane."

"Cancelled, you say? Now why would they do that? Ya never know what those guys will do next, but you can bet it won't be what you plan on."

At that moment the tower called and requested that the pilot of 65799 report to operations.

Chumley shrugged, resignedly, "One of the penalties of being an expert in many fields, can't even get away for a relaxing flight without someone cries for help. Bill, run in and get us two coffees while I find out what this is all about."

He breezed into Maj Waters' office with a "What dragon-slaying demands my skill this time, Jack, my lad?"

"The Old Man has a special mission and thinks you are best qualified to handle it," the ops officer said. "I'll get someone else to ride with the lieutenant."

The lieutenant had come in with the coffee. Chumley took his with his best flourish and humbly remarked, "Sorry, my boy, I'd have enjoyed demonstrating some finer points of T-Bird taming but the Old Man needs me again."

A couple of hours later a Capt C.Z. Chumley was introducing himself to the watch supervisor at the nearby ARTCC.

"It's a pleasure to have you with us, Captain Chumley. My name is Jones, I'm supervisor on this shift. I've taken the liberty of laying out an itinerary for your visit which I think might help in explaining anything you'd like to know. We'll try to answer all your questions. Shall we get started?"

As they made their way through the center, Chumley was amazed at the organization and smooth flow of work. His host had picked up a teletyped clearance request that had arrived as they started their tour and they followed the message.

"Now this pilot has asked for an 1130 departure via the routes indicated here," said Jones. "This controller has the strips for the initial portion of his flight. It's now 1125 and the clearance is just now being issued to Filbert Rapcon. They will pass it to the control tower at the base where this aircraft is located. Let's see if he gets off on time."

The pair slowly made their way to other stations in the center, Jones carefully explaining the procedures being followed. After 15 minutes they returned to the controller handling the aircraft they were checking on. It was still on the ground, 10 past proposed departure.

"If he gets off right away it won't be too bad," said Jones, "but if he takes any more time it's a good bet the clearance will be cancelled."

C.Z. began to get the picture. They wanted his help but he wasn't going to tip his hand just yet. It was beginning to pay off too. His host led the way to the snack bar. As they sipped coffee, Chumley made a mental note to hereafter make his consultant calls at cocktail hour. After a 10-minute break they returned to the controller.

"Still not off?" Jones asked.

"No, sir. I've cancelled him."

Back in the office Jones explained how several cases of the kind they had just observed could tie up huge blocks of air space and slow traffic all over the area.

"We recently ran a survey for a period of a few days in which we checked all military flights originating at bases in our area," said Jones. "Perhaps you'd be interested in seeing the results. Here is one base at which actual takeoff times were as much as 55 minutes after proposed takeoff. It's possible that the airspace required for this aircraft could have been tied up all that time. Meanwhile other aircraft may have had to wait for clearance. As a pilot I'm sure that you realize the seriousness of this."

Chumley agreed that this was a heinous practice and that he would never be guilty of such a thing. Of

course, he opined, a certain amount of fluidity in operations helps to keep people on their toes. He couldn't shake the memory, however, of his own actions that very morning. In his mind he could hear the young lieutenant urging him to hurry.

"Now to another problem. We have found that pilots often just don't know the procedures they're to follow. Surely they have been educated on air traffic procedures but they either forget or somehow don't get the word. I don't wish to embarrass you in anyway, Captain, but if you don't mind I'll ask you a few questions. I'm sure you can answer them or Colonel Allaman wouldn't have sent you here to represent him."

An hour later a shaken Chumley muttered a weak goodbye and made his way to the racy Jag in the parking lot. His host had mentioned no specific incidents but he seemed to have had an uncanny insight into the very things that Chumley had been grossly guilty of. Some of the points Jones had made were:

• When asked to monitor a frequency, don't initiate a lengthy conversation with the controller. Monitor means just that, not to contact the center. (C.Z. usually liked to enter into a bit of light chit-chat—"brightens the day for the headset hobbled crossword puzzle players," he said one time.)

• When cleared for a Standard Instrument Departure, stick to it. Don't take it upon yourself to deviate just because you think there's a better route. (Chumley remembered swishing past a U-3A a few days previously, when he eliminated a couple "unnecessary" maneuvers during climbout.)

• Remember that when you accept a clearance you are acknowledging receipt and confirming that you have the capability of carrying out its provisions. (Chum figured once he'd read a clearance back correctly he'd passed the test; if he couldn't fly the departure plan he made sure he had the transponder off and usually his receiver would be "inoperative" until he got out of the area.)

• On initial contact on a center discrete frequency give your position. And it should be accurate and make sense to the controller. (Chumley thought of the times when, just to be funny, he had reported "over the river," "passing the mountain," "approaching the coast.")

• When flying VFR on top, give your anticipated cruising altitude on the first contact after departure. This enables the controller to advise the next center, which may have IFR traffic at the altitude you select. (Chumley never did this, it didn't fit in his philosophy of "never commit yourself.")

• At your last reporting point prior to penetration, advise the center of the specific penetration you wish to make. (Our boy shrugged this off—planning ahead takes all the adventure out of flying.)

• At bases where SIDs exist, request a specific SID. (This was wasted too—government language that had no meaning.)

• Where there is no SID, request the route you want prior to takeoff. It will be approved or disapproved depending on the traffic situation.

• If you are on a short clearance and experience air-to-ground communications failure, proceed on your intended route, but give the controller time to clear the airspace for you. (Chum had this one down pat—he'd used it lots of times when things got too confusing.)

These and other points brought out by Jones had momentarily dampened the customary Chumley ebullience. Although Jones had never pointed the finger, C. Z. had the uncomfortable feeling that the FAA man had an intimate knowledge of the Chumley shortcomings.

Back at the base he was himself again. With a flourish he patted Mazie on the head and asked her to announce his arrival to the boss.

"Well, Chumley, how was your visit to the center?"

"Top hat, sir." "But I could tell them a few things. They didn't come up with a thing we don't all know and follow as SOP. Now if it was up to me . . . ."

The Colonel's expression stopped our hero in mid-sentence.

"Chumley, in the next room is a big pad of paper and several pencils. Get in there and write out a one-hour presentation on air traffic procedures. You're going to give it tomorrow morning at the flying safety meeting."

"But, sir, it's four-thirty. And tonight's free beer night at the club."

"CHUMLEY!"

"Uh, yes, sir, right away, sir." ★

PUNCHOUT POLL

The loss of an aircraft is unfortunate; the loss of a life a tragedy. But the loss of a pilot resulting from his lack of knowledge and use of emergency equipment is folly.

Determined that such losses must be curtailed, the Air Training Command set out to learn whether its pilots knew their ejection equipment and its proper use. ATC asked a cross-section of its pilots five questions concerning ejection systems and procedures. The answers indicated.

1. A serious lack of knowledge of the subject.
2. The need for an aggressive educational program.

The questions, with multiple choice answers, were:

1. The automatic survival features available after seat ejection include:

   a. One second automatic lap belt.
   One second parachute timer.
   Zero second lanyard.

   b. One Second automatic lap belt.
   Two second parachute timer.
   Zero second lanyard.

   c. Two second automatic lap belt.
   One second parachute timer.
   Zero second lanyard.

   d. None of the above.

2. The zero second lanyard should be unhooked from the parachute D-ring at:

   a. 5000 ft above the ground.
   b. 3500 ft above the ground.
   c. At any altitude over 7000 ft.
   d. If none of the above, specify local procedure.

3. The pilot will reach a higher altitude when seat ejection is initiated during:

   a. A climb.
   b. Level flight.
   c. Slight descent.
   d. Inverted.

4. The automatic opening safety belt should not be opened prior to ejection because:

   a. Automatic parachute deployment will be inoperative.
   b. Less desirable deceleration will occur.
   c. Hazard exists in that the parachute pack will blow open at high speeds.
   d. All of the above.

5. If the ejection seat fails to eject, you should:

   a. Release safety belt, shoulder harness, radio and oxygen connections.
   b. Trim full nose down, pull stick back, roll inverted.
   c. Keep positive G load, abruptly release stick and push free.
   d. All of the above.

Questions 2, 3, and 5 were the areas best understood, although about 10 per cent of the 689 pilots queried gave the wrong answers. Questions 1 and 4 revealed some serious deficiencies with, respectively, 34 and 63 per cent wrong answers.

On three of the five questions (1, 3, and 5) proficiency pilots made the most mistakes. In general the graduate students—pilots undergoing additional training—did the best. Surprisingly, supervisors and instructors didn't do so well, and *their lack of knowledge was reflected by the undergraduate students under their surveillance.*

Approximately 15 per cent of the ATC pilot population was polled. Of the total, 32 per cent were instructor pilots, 13 per cent flying supervisors, six per cent mission pilots, 15 per cent undergraduate students, and eight per cent graduate students.

ATC reached these conclusions:

Additional educational effort must be directed toward supervisors and instructors concerning automatic survival equipment.

All pilots are not fully aware of the proper utilization and minimum altitude capabilities of the zero lanyard.

The training program does not provide student pilots with a sound understanding of all automatic ejection procedures.

There was indication of inadequate training on low altitude ejection. The basic laws of physics and logic govern the seat trajectory in climb versus level flight, descent, and so on.

Continued emphasis must be placed on bailout in event the automatic ejection features fail.

Recent graduate results were generally better than those of other groups.

Results reveal the command fatality forecast is valid. Several of these fatalities will result from improper use of ejection equipment. Positive action aimed toward education in these areas will help to disprove the forecast.

As a result of the survey findings, ATC recommended immediate corrective action by all supervisors. *This is an example of the kind of aggressive program that can produce more flying safety for the Air Force.*

(Ed Note: Answers are on page 17. This quiz applicable for pilots of Air Training Command type aircraft.)

Lt Col John A. Sollars, 531st commander, briefs pilots for buddy refueling flight.

Ground crewmen install equipment for refueling mission by an F-100 tanker.

BUDDY

"Skyscan, this is Screamer One, over."

"Screamer One, Skyscan, over." "Roger, Skyscan. Screamer One. Advise Homeplate I have insufficient fuel to get home. Request buddy refueling. Over."

"Roger, Screamer One. Stand by."

This was the gist of radio transmissions between Captain Richard Hale, 531st Tactical Fighter Squadron F-100 pilot, and a GCI site. Captain Hale was returning to Misawa from a training mission and unforecast winds had caused him to use excessive fuel. His plight was transmitted to Misawa by the GCI site. A fighter pilot was alerted, an intercept point set up and Hale was notified.

Minutes later, Captain Wallis Calvert was at the controls as an F-100, carrying two cigar-shaped tanks slung under the wings, lumbered down the runway. Traveling 1000 feet, he made two clicks of the aileron trim to compensate for the unequal tank weights, then lifted off the runway at Misawa and climbed out toward the rendezvous point.

Minutes later, with the aid of a TACAN fix, Calvert made contact with the receiver. Calvert transmitted altitude and airspeed information to Hale, who maneuvered into a loose trail formation and called for drogue extension.

One of the underwing tanks of Calvert's F-100 carried 600 gallons of fuel; the other, 300 gallons of fuel and a 57 foot hose, a hydraulic reeling system and electrical equipment for transferring the fuel or dumping it in an emergency. Calvert flipped a switch and the hose paid out, angling down from the slipstream. Slowly, at an acceleration of four to five knots, Hale inched up on the hose. With a sud-

A loading team eases a special 300-gallon tank under the wing of an F-100 tanker.

den thump in the lines, the hookup was made.

Coordination between tanker and receiver was a must now. Slack in the hose could completely nullify efforts up to this point. The automatic take-up system in the reel mechanism of Calvert's tanker was designed to prevent excessive slack, but only within rather narrow limits. Any hose slack in excess of 15 feet could cause a violent whipping action which would snap the receiver's probe.

With the hookup complete an amber guide light in the cockpit of the tanker flicked off and Hale reported he was ready to accept fuel. Calvert switched a three-position refueling switch to "ON." Green lights told both pilots that fuel was being transferred into the receiver at 650 pounds per minute. Cross controlling was necessary because the right wing of Hale's F-100 was in strong jet-wash during the transfer.

Refueling completed, Hale, at a two to four knot deceleration rate, carefully backed off to disconnect. Calvert, his fuel control switch off now, reeled in the hose, much like an oversized fishing line being wound onto a reel.

REFUELING

The pilots obtained headings for return to their base and maneuvered into a loose wing formation.

Although useful in training missions such as that just described, aerial refueling has much broader use implications. This is particularly true in the vast Pacific area where mobility and versatility are essential if airpower is to reach threatened areas in minimum time. Aerial refueling in the Pacific was initiated in January 1952 when the Air Force directed that a wing-scale, inflight, refueling test be accomplished in Korea. F-84Gs with probe tip tanks and KB-29 tankers were used. By May of that year more than 70 pilots of the Far East Air Forces had become proficient in aerial refueling and had accomplished more than 1200 actual contacts with the tankers. The practicability of inflight refueling was proved during the Korean conflict when long range strikes were made possible by this technique.

Today's triple threat tanker pilot—pilot, navigator and boom operator—performs a planned, precision operation with little margin for error. This capability serves to augment the normal inflight refueling of the regular tankers. These F-100 tankers can refuel buddy aircraft at high altitudes and speeds over 300 miles per hour. Versatility and capability of Pacific Air Forces airpower has been further enhanced through "Buddy Refueling." ★

SSGT IRVIN H. LEE, HEADQUARTERS, PACIFIC AIR FORCES

HALFWAY HOME....

"Zero niner zero, Lakeside Approach Control, over."

"Zero niner zero, Lakeside Approach Control."

"Zero niner zero, Lakeside Approach Control. If you read, come up three-one eight point four."

Zero nine zero, a C-47, couldn't answer because it was scattered across a hillside and three of its six-man crew were dead. The other three, miraculously, escaped with only minor injuries.

The flight was a routine night proficiency exercise for the purpose of allowing the crew to meet their quarterly requirements. Aboard were four pilots, one of them a qualified IP, a navigator and an engineer. All were experienced, although the pilots were assigned to non-flying jobs and keeping up with flying requirements was difficult because of the demands of their other work and the distance from their duty stations to the air base.

Takeoff was shortly before dark, and the aircraft flew to another base approximately 50 miles away for practice approaches. Departure weather was reported 1500 scattered, 3000 broken, seven miles.

On arrival at the other base, several approaches were made before heading back for home base. Throughout the flight the IP remained in the right seat. Everything seemed routine; the aircraft, instruments and radio were operating normally.

At 2115 contact was established with the home base tower, advising that the aircraft was over the station at 5000. Practice approaches were requested. After receiving the weather as 3000 overcast, six miles visibility with haze, altimeter 29.89, the pilot acknowledged and asked if GCA was available. He was informed that it was on standby but could be alerted within a few minutes. The pilot replied "negative" and asked permission to make several ILS approaches. The tower then cleared 090 to Approach Control for the ILS approaches.

After contact with the aircraft, APC asked whether the pilot wished IFR or VFR and received the reply that the 3000 overcast had been received, but that from 5000 feet over the base the field could be seen clearly. The pilot said he would remain VFR. APC then cleared the aircraft for practice ILS approaches to remain VFR at all times. Three minutes later 090 reported starting procedure turn and was cleared to the base tower. After another three minutes the pilot reported to the tower that he was turning inbound on procedure turn and was requested to report over the outer marker.

That was the last contact with 090.

It was determined from survivors and stopped watches that the crash occurred about six minutes after initial contact with the tower. The crash site was approximately 25 nautical miles *east* of the home base. (ILS procedure turn at this base is *west* of the field.)

What happened?

Obviously the pilots were disoriented and were actually over some other city or airport when they reported over their home base. All the evidence indicates that they were near an airport approximately 25 miles east of their own base. Then, using the back course of the ILS of their own base, they attempted an approach to the other airport. The aircraft hit while descending in landing configuration. Weather conditions at the point of impact were very close to zero-zero.

It seems highly probable that the pilots thought they were over the ocean, which is where they would have been if they had been correctly set up for their own ILS. Instead they were over mountains rising to nearly 4000 feet and hidden by heavy fog. Thinking they were over water, they let down into the fog-hidden hills, even though instructed to maintain VFR at all times.

Prior to striking the ground, the aircraft struck several trees, some up to one foot in diameter. At impact, the gear, parts of the wing and one engine were ripped off. The cockpit area was completely destroyed and the tail torn off. Two of the survivors were in the main cabin, while the third was in the navigator's compartment.

Analysis of the flight revealed that the crew filed a local VFR clearance in violation of instructions; the crew was briefed that the weather might deteriorate. There is also reason to suspect fatigue. (The instructor pilot had only four hours sleep the previous night, had worked a normal day and driven nearly 50 miles through heavy traffic to the air base.)

All probable flight paths, using different navigational aids, along with the probable sequence of actions, were considered by the accident investigation board. It was assumed that the pilot tracked inbound on a VOR located near the home station, in order to let the navigator listen to a broadcast of a ball game on the ADF. This was based on statements by the survivors. At 2102 the aircraft departed the base where the pilots had been making practice approaches and climbed to a flight altitude of 6500 feet. It would have been, therefore, impossible for the aircraft to have been over its home station 13 minutes later, the time when the pilot reported over the station and requested practice approaches. Actually the plane had flown approximately half way home. It was also impossible for the pilots to have seen the home base because of the solid undercast, which was verified by pilot reports.

It appears obvious that the pilots thought they saw their home base, were tuned in to its ILS, and made their approach visually while using the back course of the ILS, thinking they were on the front course. Probably they were not concerned, thinking they were over water, while actually they were 25 miles to the east of where they thought they were and letting down into fog-covered mountains.

The ID 249 had 80 degrees set in the course selector window, the heading of the runway, indicating the pilot thought he was approaching the runway. Although the IP acknowledged an altimeter setting of 29.89, the figure in the window after the crash was 29.82, the setting for the base where they had been making practice approaches.

Assured by his visual sense, and convinced of his position, the pilot's actions after this reflect the pattern of many previous practice VFR approaches in that he was positioning himself visually while obtaining clearance first for GCA, and subsequently for VFR/ILS practice approaches.

There were no false indications to alarm him after initiating the approach. The sequence which began with marginal weather and progressed through incorrect visual identification, no positive radio fix, positioning for VFR-ILS and letting down on the back course resulted in the aircraft striking the ground at an elevation of 3200 feet, approximately 25 miles east of its home station.

The supervisor on board the aircraft caught the brunt of the blame. This accident again emphasized the hazard of filing, then trying to fly, VFR in marginal VFR or IFR conditions. Other discrepancies (none of these being new either) included:

An incorrect visual identification of position.

No use of basic navigation principles (time and distance).

Lack of full use of all available navigation aids to verify position.

Initiation of an ILS procedure without positive position identification.

Insufficient rest by the supervisory aircrew member in the 36 hours prior to the accident.

Available crewmembers not fully utilized.

Inadequate flight preparation (no navigation logs and flight to a base outside the local area).

. . . . Enough said! ★

Answers for Punchout Poll quiz.

1. a 3. a
2. a 4. d
5. d

• • •

• • •

Safety is an essential element of good business, and regardless of its motive (humanitarian or economic) the cost is much more easily sustained than the price paid for the lack of it.

Col Allison C. Brooks, Commander, 62d Troop Carrier Wing, McChord AFB, Wash.

The OHR is a good safety weapon. The operational hazards reports continue to serve as effective safety weapons, particularly when followed up by proper action. Here's one that describes a condition which could have cost the Air Force an F-104 and perhaps even its pilot, had the circumstances been just a little different.

During a gentle left turn at 29,000 feet, .8 Mach, the engine compressor stalled. The stall was indicated by RPM drop to 80 per cent, EGT rise to 750-800°, nozzle open to 10. The pilot attempted to clear the stall by advancing the throttle to military then back to idle. However, the RPM remained at 80 per cent so he stopcocked, restarted, and the engine accelerated to 100 per cent.

Approximately two minutes later the engine stalled again. The pilot stopcocked again, restarted, and the engine returned to 100 per cent. Meanwhile the pilot had placed himself in a precautionary pattern for his home base. Three more stalls occurred in the pattern, two of them cleared by the procedure previously used. The last stall occurred on final; the pilot stopcocked and landed flamed out, without further complications.

Investigation revealed that the engine had ingested some type of foreign object and received severe compressor damage. The first through ninth stages had minor damage; the 10th through 15th had severe damage, and the 16th and 17th, only slight damage.

Complete teardown of the engine failed to locate the foreign object and it was assumed that it had been consumed in the hot section of the engine. The turbine rotors were not damaged and the turbine blades had only very light spotting of metal deposits. Evidence found in the left intake indicated foreign object damage. FOD again! Generally speaking, since the F-104 doesn't take such objects into the intake on the ramp, it was felt that ingestion occurred during takeoff when an object was kicked up by the lead aircraft's exhaust. Inasmuch as this was the fourth flight in two days between the aircraft's home base and another base and the engine had functioned properly on previous flights, it was felt that the foreign object was ingested on takeoff at the *other* base. Furthermore, the pilot stated that the taxiways and runway at the other base were "filthy."

FOD continues to be a serious problem. Try balancing the cost of keeping ramps, taxiways and runways clean—against the cost of one lost aircraft and possibly the life of a pilot. The answer isn't hard to come by. ★

C-NOTES

THE ONE THAT GOT AWAY. Recently, due to a big flap (normal), your old dad was required to review all F-104 accidents and incidents dating back to the first one reported. The picture was quite confusing—some of the lads did everything right, yet failed. Others just held on and made it. Try this one on for size:

Take two F-104s clean, two old pros, a sunny day, 8000 feet of hard surface—no barriers—and mix gently with an emergency. This should be a goodie! After the usual preparation for flight, our intrepid airmen find themselves at the end of the runway eager to do battle with the elements. Full military thrust, heads nodding, afterburner lights, brakes released, and off they go! Takeoff looks good. No. 1 observing No. 2's position, speed about right, start rotating—FIRE. No. 1 has both fire lights illuminated. Too late now—no barrier—downward ejection seat. What a spot for our hero! Frantically grabbing his eyeballs from the wind screen, he zooms for altitude. The cockpit is getting warm, some smoke, but not too bad. Gear up, out of afterburner, call No. 2: "Fire light on, how do I look?" The usual answer, "No sweat, you're clean." That boy is all heart. The flight lead starts a left turn at 500 feet, takeoff flaps still down, maybe he can make the runway for a downwind landing. She's heavy and too slow—stick shaker, can't make it. Cockpit instruments read normal, but the lights stay on. By now the leader is on downwind leg for the active runway; No. 2 confirms no sign of fire or excessive smoke. No. 1 decides to try and bring 'er in; No. 2 takes over the radio and transmits the situation to the tower. Holding 350KIAS the lead aircraft turns base. The smoke is getting heavier and the cockpit is more than somewhat hot. No. 2 is staying right with him, giving the old moral support. By now the leader can't see and requests No. 2 to talk him down. No. 2 calls for "gear down—slow 'er up a bit—you're on final." No. 1 has only one thing in mind, get that mother down.

To make a long story short, he touches down at approximately 290 KIAS, stopcock, and drag chute 280KIAS. Believe it or not, the chute holds, and the aircraft is stopped in less than 7000 feet. The cause of this fiasco was that the 17th and ninth stage air bleed lines failed causing the hot air and smoke to be piped into the cockpit. Other than a few blisters and two gallons of sweat, the pilot was okay and could be heard that night at the bar singing loudly over multi-martinis.

Looking back, we can say, "How about the ram air door—unlocking the canopy—using landing flaps? Why stopcock the engine? and he should have slowed down a bit before deploying the chute." So you see, sometimes you can make mistakes and come out smellin' like a rose, or should I say, shamrock? I thought you'd like to read about one that made it instead of one that didn't—for a change. Cheers! ★

Maj Daniel D. Hagarty, Tactical Branch, Fighter Division

CROSS COUNTRY NOTES FROM REX RILEY

Last September Rex made a trip down to the land of hominy grits, hush puppies, ham 'n red-eye gravy—for the benefit of Northerners, this is the Deep South country—and stopped at a base that used to be notorious for its lousy transient servicing. Sure 'nough, it's still a bad place for transients. Rex had to climb in and out of his T-Bird without the use of a ladder, and was delayed an hour unnecessarily in getting fuel, plus checking a few other little items like a loose dipstick and tightened fuel caps in 110° temperatures. Anyway, while Rex was cooling his heels he took a peek at the NOTAM board just to see if this base had made a change for the better, since, as he remembered it, this base was known to be one of the worst.

Whenever Rex runs across a NOTAM mess he immediately becomes suspicious of the base ops officer, who, he says, can be one of three types: (1) he flys around the flagpole so he never looks at the NOTAMs; (2) he's retired on active duty, and (3) he doesn't know his job. All this leads Rex to another thought:

Here we have a base with substandard transient facilities, poor NOTAMs, dirty operations building, and so on. Wonder if the base commander takes an interest in these matters? I doubt it. If he did, the conditions wouldn't last but a few days.

One thing sure, Rex will avoid this place like the purple plague (bet he'll wonder, though, if this base just might improve in '62).

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At another Southern base—Duncan and Heinz recommended too—Rex and traveling companion stayed a couple of days to attend a meeting. After they pulled in, the airplane had some malfunctions, like a weak left brake, fuel counter inoperative and so on, though not too complicated. The next day a check with transient maintenance showed everything cleared up, but when Rex went to the airplane, the 781-2 Form hadn't been cleared; in fact, not a darned bit of maintenance had been performed. Lt Heinz and Sgt Duncan have had a couple of other bad reports about this same base—a few more, and watch out! ★

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Recently Rex heard from an FSO requesting clarification of Paragraph 3-13c of Section III, T.O. 35E 8-2-2-1, which states, "Several pilots have lost control of their aircraft in attempting to 'aim' their aircraft toward the center of the barrier. This maneuver has also resulted in failure to accomplish other important actions, such as raising the speed brakes where this is necessary to accomplish the engagement." Further, "Paragraph 4, page 3-9, Sec III, 1F-105B-1; Paragraph 5, page 3-12, Sec III, T.O. 1F-105B-1, and Paragraph 5, page 3-12, Sec III, T.O. 1T-33A-1, instruct the pilot to steer toward the center."

The FSO also stated that the pilots at his base are being advised according to the Dash One; therefore, the conflict of instructions should be eliminated.

Rex received information that the conflict between the T.O. concerning the barrier and the Dash One aircraft T.O. is being resolved. Also, that ASD has recommended to MOAMA and AFLC that Paragraph 3c, Section III, T.O. 35E8-2-2-1 be deleted. In view of the above, it is okay to steer toward the center of the barrier.

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Rex welcomes the exchange of information from pilots about their particular aircraft. Remember, you don't always have to agree with him to write; in fact, he may not always agree with you, but he'll make every effort to present your information for the benefit of other pilots flying your type of aircraft. For example, here's a letter from Captain Richard S. Peterson, FSO of the 526th Fighter Interceptor Squadron, 86th Air Division, of interest to T-Bird pilots:

"With the installation of the C-1904/ARC-27 and the C-1057/ARC-34 Control Panels in our T-33 aircraft, it is possible to preset 20 frequencies in the front cockpit and 20 different frequencies in the rear cockpit. With 40 preset frequencies aboard, we have not only doubled the capability of the UHF communication system but have substantially reduced the flight safety hazard associated with manual tuning."

Now Rex admits this capability exists but it required a little investigating down on the line to confirm it. Discrete frequencies most commonly used in a locale could be set into the rear cockpit control panel, but you would still have to check the frequency card to determine the channel number for a preset frequency. Of course, the controller will probably slip you an oddball frequency. Might be just as easy and safe to manually set in a frequency.

Anyone else have a comment?

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Did you hear about the T-Bird incident involving the ejection of the rear seat pilot, and a deadstick landing of the aircraft by the front seat pilot?

Prior to the emergency, the pilot in the rear moved the instrument hood forward and wrapped it around the forward hood support to prevent its blocking the stand pipe air conditioning duct. When the canopy was jettisoned, the windblast tore the hood off and forced it against the face of the rear seat pilot. He tried to remove it—he tried for several seconds—but was unable to do so. He then ejected blind and was unable to remove the hood until after the chute opened.

All features of the parachute worked properly. Had the pilot been forced to manually pull the T-handle, he might have experienced difficulty with the hood wrapped around his head. In most cases, snaps or fasteners are installed on the rear of the canopy and hood to prevent the rear of the hood from moving forward.

Just for kicks—and to avoid a second incident—how about checking your T-33 to be sure the hoods are attached to the rear of the canopy. Might advise the jocks to push the hood to the rear when not in use. ★

Breaking the Think Barrier

Occasionally we receive ideas from troops who have broken the think barrier and have put a lot of gray matter to work in developing something that might save some lives. Such effort is indeed commendable and we present these suggestions for your consideration. Here are a couple: one dealing with a Low Altitude Rotary Airstart Switch (LARAS) by 1/Lt Thomas C. Bunn, Jr., of the 9th Tactical Fighter Squadron, USAFE, and the other with a takeoff timer by Capt Robert W. Lamb, Barksdale AFB (SAC). First to the LARAS.

The LARAS works on the principle that while we may not be able to make our aircraft pilot-proof, we can furnish the pilot with a cockpit environment that makes correct action the line of least resistance.

Combining all the circuitry involved in an airstart into one multiple position switch, LARAS is a simple device mounted on the panel within easy reach and view of the pilot. It has multiple ganged wafers, each a switch in itself assigned to one circuit. In air-starting the F-100 one wafer controls shutoff of the afterburner, another actuates the airstart ignition unit, one switches the emergency fuel on, and still another jettisons the external stores, if desired. The wafers are wired to accomplish these steps in a click-by-click sequence as the control knob is rotated through its several positions. There is no chance for incorrect sequencing or omission of an essential switch. It is reliable and uses no relays.

One nice thing about the LARAS: While it has all the speed of the T-Bird's gangstart device, it also provides selectivity. For speed, the pilot in a really sticky situation can make one quick sweep of the switch, instantly actuating all circuitry necessary for an airstart attempt, plus jettisoning stores. When time permits the

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TWO POINTS OF VIEW

"Very careful in my flight planning, y'know."

"Flight planning, my derriere. He thinks 21A is a new night club, uses 1946 Radio Fac Charts for headings, flies until tiptanks run down and then looks for some place to land!"

airstart can be made step-by-step, pausing to allow possible response from each step taken. Yet no step can be overlooked.

Let's see how the LARAS works in an emergency. Fifty feet in the air at 170 knots, the engine quits. Grab the LARAS knob. Is it the afterburner? Try the first click.

If that had not been right, click, click, two more and you have the airstart procedure—a light, great! If no light, get the stores off, click, get out or land straight ahead. That's the only choice you have left. The important thing is that you got to that choice seconds earlier than if you had gone through the standard procedure in normal memorized order.

In situations where the pilot is faced with the alternative of writing off the aircraft immediately or attempting an airstart before ejecting, ONE sweep of a single switch resolves the question. If there is no response, the pilot is then free to concentrate on the ejection. He *knows* he has done all he can.

The LARAS removes the burden from the pilot's mind of producing an instantaneous and flawless checklist in a critical moment.

The system can be used for other purposes as well. One of these is runway abort where the multi-position switch can take care of nosewheel steering engagement, drag chute deployment, flap and speed brake retraction, shoulder harness locking safety, tail hook release and jettisoning of external stores. Information on the LARAS has been forwarded to the appropriate AMA for evaluation.

• GO *NO* GO

Undoubtedly the best and now most widely used go no go takeoff system is the new S_1-S_2 acceleration speed check. The S_1-S_2 system relies not on any earthbound markers but uses speed versus time to check acceleration.

However, in using the S_1-S_2 system, a bothersome and somewhat dangerous interphone conversation occurs at a most critical phase of flight: *takeoff*. The S_1-S_2 procedure requires that at a fixed speed (70 KIAS for B-52s and KC-135s) the pilot announces over interphone: "70 Knots-Now." At this time the navigator starts his stop watch. When the acceleration time (predetermined during mission planning) expires, the navigator replies "Time—Now." At this time the pilot checks indicated airspeed and the "Go No Go" decision is made.

To eliminate these interphone conversations and costly human reaction time relays, an S_1-S_2 timer was devised. The prototype is an extremely simple device built into an empty Band Aid can. While such a timer should be permanently mounted and operated from aircraft power, the prototype was battery powered and portable. It has been used several times during actual takeoffs by the Chief of our Standardization Division and received his highest approval. It has also been demonstrated to and received the approval of the 3908th Strategic Standardization Group and Second Air Force.

Operation of the timer is a simple procedure. During the "Before Line Up" checklist, the copilot turns on the master switch, checks the light bulb, and presets the required acceleration time into the timer. At the fixed speed (70 KIAS), the copilot depresses the timer release button. When the preset time expires, an amber (or green) light illuminates and the pilots check the indicated airspeed. The "Go No Go" decision is thereby made with only two instead of four human reaction delays and no interphone chatter. The result is a safer all around "To Go or Not to Go" condition.

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USAF Film List

• **LIFE SCIENCES.** FR 155. 12½ min., color. Demonstrates, through hypothetical examples, how man's behavior can cause serious ground and flight accidents, and how overall accident rate can be reduced if management recognizes behavior hazards and takes remedial action.

• **ATLAS FLIGHT CONTROL SYSTEM.** FTA 449b. 14 min., B&W. Flight Control Component Checkout. Describes the units and functions of CAPCHE checkout system.

• **FLIGHT SAFETY F-105D.** FTA 494b. 9 min., B&W. Outlines action for following emergencies: fire and electrical, hydraulic and air turbine motor failure.

• **FLIGHT SAFETY F-105D.** FTA 494c. 7½ min., B&W. Variable Air inlet system failure, malfunction and engine failure after takeoff, during flight and at low altitude.

• **FLIGHT SAFETY F-105D.** FTA 494e. 10 min., B&W. Mechanic's postflight inspection; servicing fuel tanks and hydraulic systems; installing drag chute, and checking exhaust and AB areas; cartridge starter and engine air intake.

• **PROJECT ECHO.** SFP 1088. 27 min., color. Story of Echo I, first communication satellite to orbit.

• **AF NEWS REVIEW.** AFNR 68. 14 min., B&W. B-58 and F-105D in Europe. ★

DA VINCI'S PRIDE
...or a bucket of worms

• ***Major R. C. Kirkland, Chief, Helicopter Stanboard, Stead AFB, Nev.***

The young pilot stared hypnotically at his red paneled parachute where it lay crumpled in the snow. He raised one hand slowly and wiped congealing blood from his face, then glanced down at the grotesque shape of his leg. The snow had looked so soft while he was floating down. Oh well, no matter, he was beginning to feel numb all over anyway, and so very tired. Then the silence was broken by a distinctive sound: the whirling beat of helicopter blades.

The report read: " . . . the seriously injured pilot was rescued from an isolated area by a helicopter from . . . "

And then another time:

"No sweat, Colonel!" assured the major, then turned to the young helicopter pilot standing beside him. "The colonel wants some cargo flown up to the radar site in a hurry. No problems are there?"

An anxious frown passed over the lieutenant's face then quickly disappeared as he replied confidently, "Why no, no sir! Ah, what is the site elevation?"

"I'm not sure . . . " began the colonel.

"It's okay," interrupted the fixed-wing-type major, "doesn't matter, we'll handle it. These choppers can do anything!"

And the accident report read: "While attempting to land at a high density altitude with maximum gross load, the helicopter crashed and burned . . . "

The extremes in these two incidents are significant when it is recognized that the helicopter is the least understood and most misunderstood of all flying machines. Originally designed by Leonardo da Vinci in the 15th Century, it is capable of weird aeronautical contortions and, although seemingly in defiance of the rudiments of aerodynamics, is versatile, safe and capable of unequaled maneuverability and performance. However, the helicopter is a specialized system with many operating variables and can be a bucket of worms to commanders and supervisors who are unfamiliar with its capabilities and limitations.

In one of the cited incidents, lack of professionalism and unfamiliarity combined, under not too unusual circumstances, to result in an unsuccessful mission and a fatal accident. While in the other incident, knowledge of the system and professional skill combined to effect a successful life saving mission, and in this case, probably the only earthly means by which this pilot's life could have been saved.

Fundamentally, a helicopter is just another flying machine, and the problems of eliminating accidents are the same as in fixed wing aircraft. Also, the same basic factors determine effective mission accomplishment, namely, aircrew proficiency, professionalism and effective operational supervision.

The sixty-four dollar question, of course, is: "Can a supervisor, who is non-helicopter qualified, become sufficiently familiar with this specialized system to make adequate and proper operational decisions?" We say yes. But let's recognize at the outset that supervisors must solicit and consider the experience and judgment of helicopter-qualified personnel. They, in turn, must accept a responsibility to not only operate the birds in a professional manner, but also provide supervisors with sound advice and recommendations based upon factual knowledge of the system, and not on personal preference or a desire to impress.

Although the same principles of supervision and flight safety apply to helicopters as to fixed wing, one major exception presents a unique situation:

The Air Force utilizes helicopters primarily in a rescue function, and helicopter rescue is a mission where procedure is often determined on-the-spot, with no hard and fast rules to guarantee safe and successful mission accomplishment.

The reason? Aircraft emergencies, bailouts and crashes occur under widely varying conditions. Choppers, therefore, must respond without delay, day or night, and proceed to any one of an indefinite number of rescue sites. These sites may be in isolated areas, where landings and takeoffs are required on mountain ridges, in wooded areas, swamps, on ice or snow. In each case, the factors which determine procedure may vary. For example, at a rescue site, the height of trees, slope of terrain, density altitude, depth of snow and sur-

Approach all helicopters from the front! Retouched photos show what could happen.

face winds must be considered, for each will have an effect on the angle of approach, airspeed, attitude, hover altitude and power to be used. In conventional flying, takeoff and landing data can be pre-computed. This is impractical for a rescue chopper pilot since an infinite number of geographical and climatic conditions can exist within a given area of responsibility.

Fundamentals, such as pilot and crew proficiency, good maintenance, system knowledge, flight safety consciousness, and just plain good judgment constitute the best formula for application in all helicopter operations, as well as the rescue function.

But even sound fundamentals do not provide the complete answer. Supervisors and flying safety officers must be familiarized with the requirements, capabilities, limitations, and peculiarities of the helicopter in its assigned mission. To help accomplish this, a special "Helicopter Indoctrination Kit," containing written briefs, lesson guides, suggestions, accident statistics, pictures and slides has been prepared by Air Training Command, to be distributed in the near future to all helicopter assigned bases.

For the interim, here are some valuable hints from chopper operations personnel:

• If the chopper is parked on a busy ramp, designate a specific area and mark it with warning barriers and/or danger lines. Both the H-19 and H-43 blades can part a bystander's hair. Also, make it standard published procedure that *all helicopters should be approached from the front.*

• Chopper drivers should select, for supervisory approval, a safe, practical entry and exit pattern to their parking area. The bird is too slow to integrate with normal traffic, but it can safely exit and enter the ramp without interfering with fixed wing patterns. Drivers should not select routes over areas designated for parking, assigned for taxiing aircraft, or where buildings are located. Remember, choppers kick up a big wind.

• A specific helicopter flight training area should be designated on base. This can be accomplished on most installations with safety and without interfering with fixed wing traffic. It may take a little bending here and there, but proficiency training must be accomplished, and rescue alert choppers must remain on, or near, the air base.

• On bases with a rescue mission, supervisors should insure that definite procedures are established for coordination between the rescue unit, base operations, the control tower, base medical facilities, base fire department, and the alert crew. Then, should an emergency occur, each agency will know exactly what part it plays in the rescue mission.

• The criteria for response to emergencies by rescue helicopters are well defined in ARS Manual 55-4. However, local procedure should also be established with flight safety considerations for local terrain features, field and area elevation, obstacles and weather.

• AFR 60-16 specifies provisional exceptions for helicopters relative to flight rules, and this is justified since a chopper may proceed safely at low altitudes and reduced forward speeds. However, helicopters in the present USAF inventory are not suited for all weather flying and *should not* be flown during icing conditions or in heavy turbulence.

• Determination of capability to operate at high density altitudes and/or high gross weights, should include an evaluation of all applicable factors, particularly pilot experience and proficiency, and flight manual performance data, including blade stall computations.

• The helicopter doesn't excel in speed or range. Fuel is limited, and surface winds play havoc with ground speed. For example, a 30-knot wind (which is not unusual) can affect a chopper's range by almost 200 per cent. Navigational aids are also limited in most choppers. The important point here is that when cross-country flying is conducted, accurate flight planning and fuel management are paramount.

• Helicopter night operations are generally feasible, bearing in mind, of course, that low flying over, or landing and taking off from unprepared areas at night is a risky business. Night missions should be individually evaluated on a risk versus gain basis.

• Leave airborne fire fighting to the H-43 and its specially trained crew, and provide an adequate area for fire fighting proficiency training.

• Although choppers are capable of and often are required to perform a variety of special and utility missions, don't turn it into a dump truck or free air taxi. It is specialized and expensive hardware.

During the past several years, certain areas seem to collect the lion's share of blame for helicopter accidents. Here are some comments and recommendations regarding certain of those areas:

• There is not much doubt as to the necessity for chopper pilots to be proficient in autorotative landings. With the H-43 and H-21, touchdowns are practical and *highly beneficial*, although structural limitations make power recoveries advisable in the H-19. If pilots will maintain proficiency, and utilize standard Flight Manual autorotation procedure, there should be no problem in this area. The chopper school logs thousands of touchdown autorotations yearly without incident.

• Speaking of autorotations, helicopters are "bent" on emergency autorotative landings where just a little more altitude might have permitted a landing without incident. Don't cruise in the yellow area! (And if pilots are unfamiliar with "the yellow area," refer to section five of the appropriate flight manual.)

• Nonstandard "cowboy" maneuvers for the local airshow, or just chasing rabbits and four-legged deer may be real fun, but like the P-38, it's for an era gone by. Utilize flying time wisely, and practice and demonstrate only standard maneuvers.

• Lack of pilot and crew proficiency is a real booster to the accident rate. Pilots should conscientiously accomplish all required training, and if hoisting, over water operations, cargo slings, or internal cargo mission requirements exist, each member of the crew should be thoroughly familiar with the standard procedures and with the preflight and operation of appropriate equipment.

• Speed-into-action is an urgent requirement for rescue helicopters, but there is an optimum. *Too much speed will compromise flying safety.* For H-43 drivers, the handbook provides a cocking checklist for scramble takeoffs. The important point here is that the alert pilot be exacting and thorough in his pre-starting check and insure that once the alert chopper is cocked, it is placarded and remains undisturbed. It is embarrassing—and also difficult—to start a scramble takeoff, then discover that someone has removed the rotor blades.

• A couple of charter members to the "clobbered bird, flubbed mission" club are "over-confident" and "over-extended," and about everything that's ever been said on this subject aptly applies to choppers.

Inherent with helicopter flying is a latitude in action and procedure which is unique in today's regimented flying. This freedom creates and precipitates strong professional pride in chopper pilots and crew members. However, with the bird's unusual characteristics and varying operational requirements, a harmonious understanding between supervisors and operators is necessary for mission accomplishment and flight safety. The comments and suggestions presented are intended to provide means of realizing this understanding, that *all* of us may think of the chopper as "da Vinci's pride," instead of a "bucket of worms." ★

C-124 PROP SHAFT FAILURES

If you've been flying the C-124A, you're probably aware that the gremlins are again active on the prop shaft. This is an old problem that has never been resolved. All we did was shift the location of the failure on the shaft.

Early shaft failures nucleated from a threaded portion of the shaft which engaged a thrust nut. The nut and threads were eliminated and the failures moved to another location where they nucleated from an oil hole. The oil hole was eliminated, the internal diameter of the shaft was decreased (this increased the shaft wall thickness) and a silver shear fit was used on the drive spline.

Beginning in January 1961 the shaft failures moved to the propeller spline area. Research into this problem indicated the torque applied to the propeller nut as a likely area for corrective action. In June 1961, torque values were raised from 1600 ft-lbs to 2100-2300 ft-lbs. Still, in September 1961, reports of cracked shafts increased. This has resulted in a special Air Force/Industry team going to the field to see just what the situation is. What is the problem? Is it poor maintenance? Is it poor quality control on manufactured parts? Or, is it a resonant vibration that is loosening the prop nut and resulting in friction burns on the spline and cone areas of the shaft?

Fortunately the foresight of the personnel responsible for the shaft modifications has provided an effective warning of shaft failure. The shaft was left hollow and filled with oil under pressure. Thus, when a crack occurs, oil leaking from the spline area has so far proved effective in alerting crews to the impending loss of propellers. The seriousness of the situation has been recognized. Corrective action is now being taken as a safety of flight item rather than on an operational improvement basis.

The most desirable action, unfortunately, requires both time and money. In the long run, however, both flight safety and operational efficiency will be enhanced. We're happy to report that the controlling authorities have approved retrofitting the C-124A fleet with the same engine and propeller currently used on the C-124C.

Standardization of logistic support is always a step in the right direction, particularly if the items have also been through the test of service.

Robert B. Shanks, Engineer,
Transport Branch

TO GO, OR NOT TO GO

or

THE PILOT'S DILEMMA—"GETHOMEITIS"

(With profuse apologies to Prince Hamlet and his Sponsor, William Shakespeare, Esq., both long since deceased)

To go or not to go: That is the question:
Whether 'tis nobler in the mind to suffer
The harassments and frustrations of outrageous delay
Or to take off into a sky full of troubles
And by this daring avoid them. To go, to dare:
To dare; and by this boldness to say we end
The anguish and the thousand aggravations
That delay is heir to; 'tis a consummation
Devoutly to be wished. To go, to dare;
To dare: Perchance to fail: Ay, there's the rub,
For in that flight of brashness what evils may come,
When we have shuffled off the bonds of reason
Must give us pause; there's the consideration
That can make disaster of such a course.
For who would bear the pain and chagrin of plans nullified,
The weather officer's evil, the AO's arrogance,
The ATC's procrastination, the insolence of dispatchers,
The pangs of deferred pleasures, and, lastly (but not leastly) the
Scorn that some Fair Ladies cast on lengthy explanations;—
When he himself might his exitus make
With a mad dash? Who would flight cancellations bear
To pace and sweat under a dismal forecast,
But that the dread of something after Death,
The Undiscovered Country from whose bourn
No traveller returns, tempers the will,
And makes us rather bear those ills we have
Than fly to others that we know not of?
Thus conscience can bring reason to us all,
And thus the rash hue of impatience
Can be sickl'd o'er with the pale cast of thought,
And pilots of great worth—and aircraft, too,
May be saved for better action.

☆ ☆ ☆ ☆

Ah, Thou Fair Ophelia! Nymph, tonight in thy dreams
Be all my sins remembered!

Col James F. Risher, Jr, Asst. Executive, DIG/Safety

NEW HOLDING PROCEDURES

With the coming of the new year, new holding pattern procedures will go into effect. The major changes will be the business of ATC controllers, but some will effect pilots. All concerned should become familiar with the new procedures no later than 1 January.

The following information is excerpted from FLIP Planning Section II: Pilots will continue to fly the elliptical, race track pattern, but indicated airspeeds will be different.

1. AIRSPEED

The holding airspeed is determined from the following criteria:

a. Maximum holding airspeeds for prop-driven aircraft (to include turboprop).

(1) Minimum altitude through 14,000 feet. 170-KIAS.

(2) Above 14,000. 175KIAS.

b. Maximum holding airspeeds for turbojet aircraft.

(1) Subsonic. 230KIAS.

(2) Supersonic (except F-105 and B-58). 265-KIAS. Until 1 Jan 1962, 250K maximum remains in effect.

2. DEVIATIONS

a. If an urgent situation dictates that an airspeed greater than maximum allowed for altitude/flight level, or less than the prescribed degree of bank at maximum holding airspeed is required, air traffic control shall be notified in order that appropriate separation may be applied.

b. When instructions are received specifying the time of departure from the holding fix, the pilot should adjust his flight path within the established limits in order to leave the fix at as near the time specified as is practicable.

3. LENGTH OF OUTBOUND HOLDING LEGS

a. When holding at or below 14,000 feet the outbound leg will be flown for not more than one minute, except when necessary to compensate for outbound head wind as permitted in paragraph **c** below.

b. When holding above 14,000 feet the outbound leg will be flown for not more than one and one-half minutes, except when necessary to compensate for outbound headwind as permitted in paragraph **c** below.

c. If it is known that a headwind will exist when outbound, all outbound time values may be increased by not more than 30 seconds when holding above 130-KIAS or by not more than one minute when holding at 130K or below.

d. DME/TACAN leg lengths are specified in nautical miles.

4. VOR STATION PASSAGE

When holding at a VOR station, pilots should use the first definite indication that the aircraft has arrived over the VOR in determining when to commence the 180-degree turn to the outbound heading from the fix. This will be the time at which the first complete reversal of the To-From indicator is accomplished.

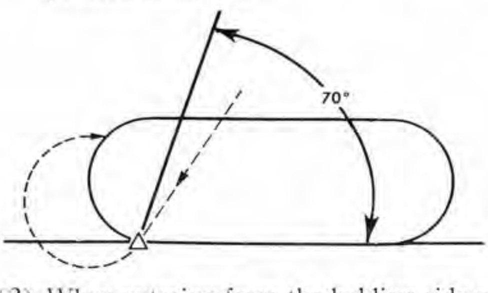
5. HOLDING PATTERN ENTRY

When instructions to hold have been received, the aircraft is considered to be in the holding pattern at the time of arrival over the fix. Therefore, pilots should reduce airspeed to the designated maximum holding airspeed or less within three minutes prior to the estimated time of arrival at the holding fix. If the pilot receives holding instructions for other than the course on which he approaches the fix, the entry into the pattern will be governed by the direction of the initial approach to the fix.

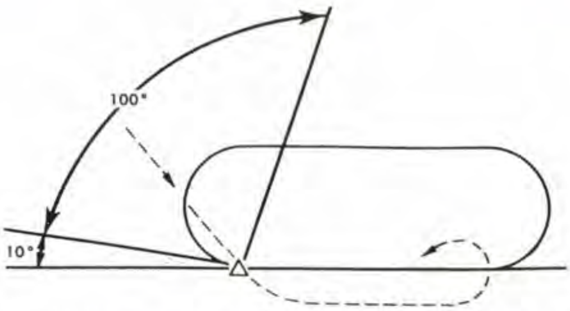
NOTE: In the event the pilot arrives at a clearance limit without having received either a clearance beyond or holding instructions at such fix, he should immediately request further clearance and hold at the clearance limit in a standard pattern on the course on which he approaches the fix, maintaining the last assigned altitude, until further clearance is received. The procedure to apply when lost communications are experienced is covered elsewhere in flip planning.

a. Specific instructions.

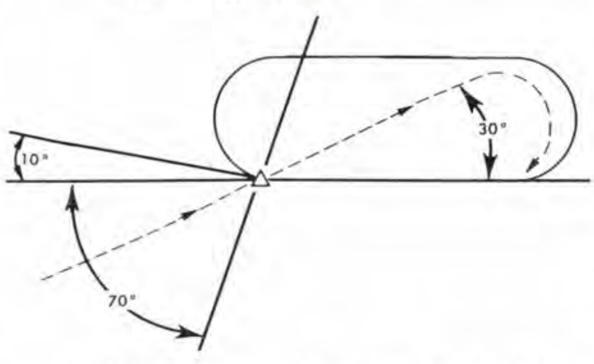
(1) When entering from the holding side and the aircraft heading on arrival at the fix is at an angle of less than 70 degrees to the holding course, turn toward the holding side and proceed outbound.



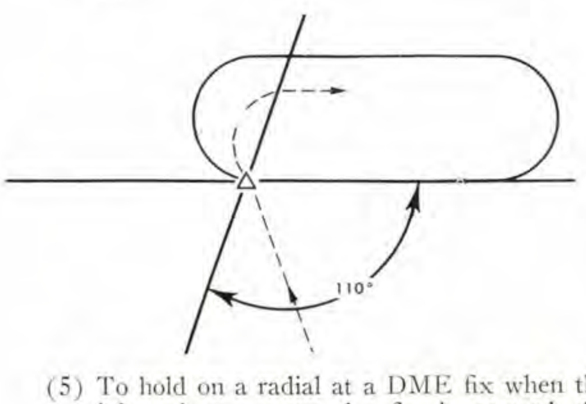
(2) When entering from the holding side and the aircraft heading on arrival at the fix will be at an angle of 70 degrees or more to the holding course up to within 10 degrees of the reciprocal, turn to proceed outbound on the non-holding side approximately parallel to the holding course. After completion of the turn, maintain this course for one minute or less at or below 14,000 feet (plus standard time increase when headwinds are known to exist), one minute and one-half or less above 14,000 feet (plus standard time increase when headwinds are known to exist); or fly outbound from the fix for 75 per cent of the specified DME leg length, as appropriate, then turn toward, intercept, and follow the inbound course to the fix.



(3) When entering along the reciprocal of the holding course or when the heading upon arrival at the fix will be at an angle of 10 degrees or less to the reciprocal on the holding side or less than 70 degrees to the reciprocal on the non-holding side, a teardrop procedure turn will be flown on the holding side, beginning at the fix, so as to approximate an outbound track 30 degrees or less to the holding course for not more than one minute (below 14,000 feet) or one and one-half minutes (above 14,000 feet), plus the standard time increase if headwinds are known to exist, or the specified DME leg length as appropriate.

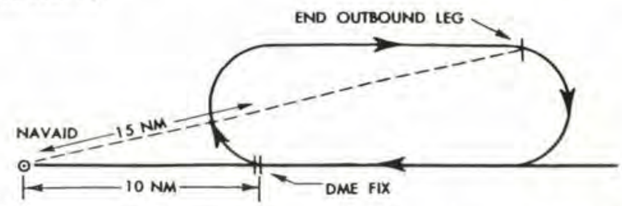


(4) When entering from the non-holding side and the heading on arrival at the fix will be at an angle of 110 degrees or less to the holding course, turn to proceed outbound on the holding side, and then return to the holding fix.



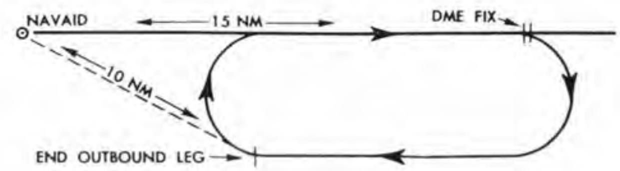
(5) To hold on a radial at a DME fix when the inbound course to the fix is toward the NAVAID, the pilot will make a turn at the fix and fly outbound in the pattern on the holding side until reaching a point equal to the distance from the NAVAID to the fix, plus the leg length, make another turn and return to the fix.

(Typical pattern, assuming use of a five-mile leg—not to scale.)

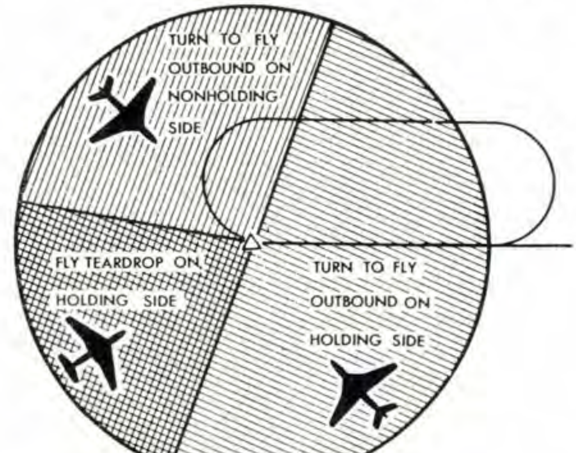


(6) To hold on a radial at a DME fix when the inbound course to the fix is away from the NAVAID, the pilot will make a turn at the fix and fly outbound in the pattern on the holding side until reaching a point equal to the distance from the NAVAID to the fix, minus the leg length, make another turn and return to the fix.

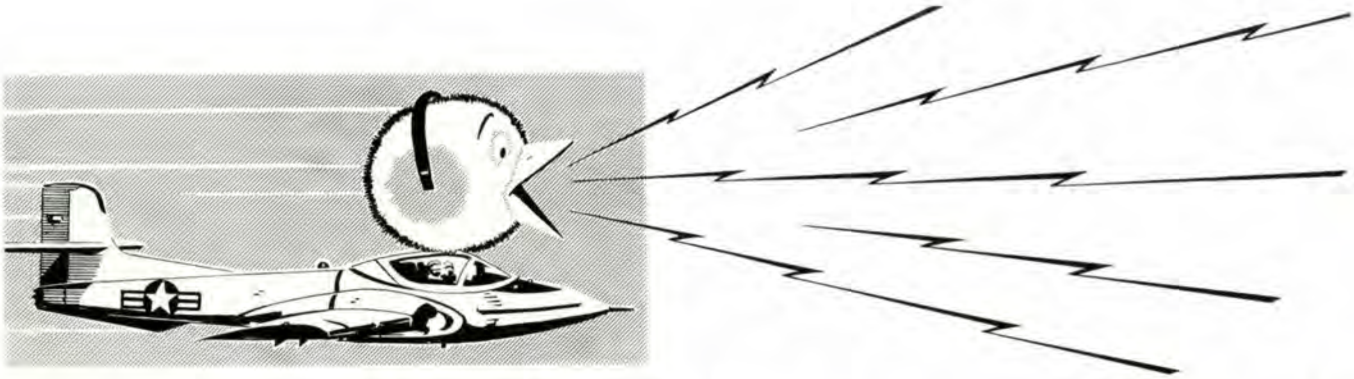
(Typical pattern, assuming use of a five-mile leg—not to scale.)



(7) A pictorial summary of the three areas of entry and the entry principle associated with each is shown for quick reference. ★



(See page 29 for more on holding procedures.)



Song of the Tweetie Bird

Captain V. E. Schulze, Jr., USAF MC, Hq Air Training Command

The Cessna T-37 primary jet trainer is a small bird, but it has a loud voice. None who have heard it will ever forget the high pitched shriek of its two Continental J-69 engines. These Tweetie Birds presently are roosting at the seven Undergraduate Pilot Training (UPT) bases within Air Training Command, but soon they will be seen frequenting other bases throughout the U.S. For this reason, it is important that all bases in the U.S. be aware of the T-37 noise problem so appropriate hazardous noise control programs can be initiated.

When measuring noise, two things are important. First, overall noise must be measured. For you Hi-Fi fans, this is the total sound output, or the total of the acoustic energy generated in all frequencies. Next, an octave band analysis is done. This is a procedure whereby each frequency band, or octave, is singled out and the sound energy in that particular frequency band is measured.

Jet noise, or so called "white" noise, has its total energy distributed fairly evenly throughout all frequency bands, so there is about the same amount of acoustic energy in each octave band from 20 to 15,000 cycles per second.

There is one exception to this and that is the J-69 engine in the T-37 aircraft. At all power settings from 40 per cent to 80 per cent, the majority of the acoustic energy is centered in one frequency. At 100 per cent power, the acoustic energy of the J-69 engine is fairly well distributed in all frequencies like other jet engines. Figure 1 compares the noise levels of the J-69 engine with the J-33 engine that is in the T-33.

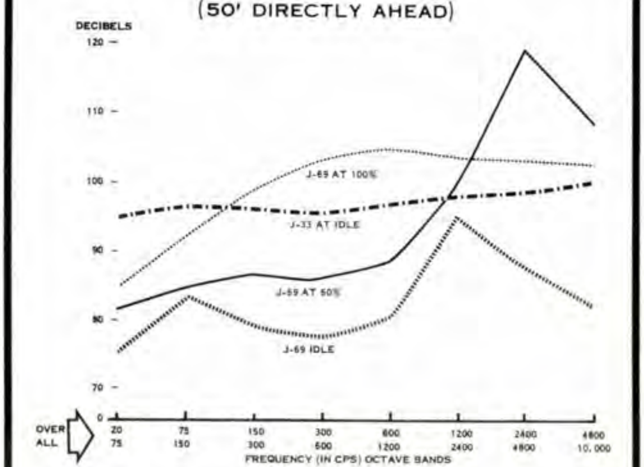
It is seen that the J-33 engine has a fairly constant noise level in all frequencies. This is true at all power settings. On the other hand, the J-69 engine has a large portion of its acoustic energy centered in the 2400-4800 cycles per second octave band at power settings from idle to about 80 per cent. This relatively pure tone noise represents the hazard presented by T-37 noise. Pure tone noise is more damaging to hearing than "white" noise of the same intensity.

There is one other unusual characteristic about T-37 noise that needs mention. That is the pattern of the noise from the aircraft at different power settings. At throttle settings below 80 per cent, most of the engine noise is forward of the aircraft. At 100 per cent, again, the T-37 simulates other jets and the noise is mainly behind the aircraft. Figure 2 shows these patterns at idle, 60 per cent, and 100 per cent.

Air Force Regulation 160-3, "Hazardous Noise Exposure," completely outlines a comprehensive program designed to preserve the hearing of all personnel exposed to noise. Naturally, one would expect the approach to this problem to be straightforward and simple. That is, (1) decrease the noise at the source, and (2) protect individuals from the effects of the noise. This, in effect, is exactly what is attempted, but frequently it does not achieve the desired effect.

The noise generated by the T-37 is a characteristic that cannot, for all practical purposes, be altered. Attenuation of this noise can be accomplished, in a man-

FIGURE ONE



ner of speaking, by operating and parking the T-37 at a distance from populated areas. A minimum of 400 feet should be allowed between flight line buildings and T-37 taxiways and parking areas. This distance should be even greater if the flight line buildings are not sound-proofed.

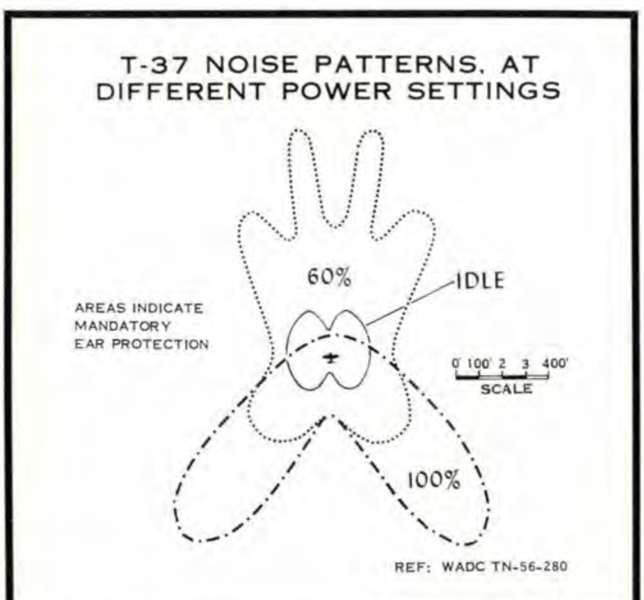
Parking areas for the T-37 should be so designated that the aircraft face away from inhabited areas, and so that aircraft taxiing to and from the parking area will not direct noise into populated areas. Brick, concrete, or concrete block buildings will generally offer sufficient protection to the high frequency noise of the T-37, although these buildings, if within 200 feet of the parking area, may not sufficiently deaden the noise to prevent annoyance and interference with speech and telephonic communication. Wooden flight line buildings that are used for classrooms, private offices or conference rooms, should be sound-proofed if T-37s are to be parked or taxied within 400 feet.

Flight line personnel should be furnished with protective equipment, including ear defenders ("ear plugs") and ear muffs. Not only should this equipment be furnished, but personnel should be educated to use it. All personnel should have a baseline audiogram, preferably by an automatic audiometer, then periodic audiometric examinations to detect those who are showing effects of noise exposure. Those who show hearing loss should be removed from noisy areas.

Certain areas should be designated as primary and secondary noise areas, or red and orange areas. In the primary, or red area, ear plugs and muffs should be mandatory for all persons. In the secondary, or orange area, ear plugs alone should be mandatory. Typically, all areas within 400 feet of the T-37 parking areas and taxiways are primary areas. Secondary areas are generally designated as the parking ramp, the airfield proper, and the flight line as far back as 100 feet from the ramp.

After designating T-37 taxiways and parking areas noise control should include: (1) sound proofing appropriate buildings as may be necessary, (2) outlining primary and secondary noise zones, (3) obtaining baseline audiograms, and (4) supplying protective equipment. The most important step is next. That is education of personnel and enforcement of the program. This education program should be aimed directly at the men exposed to noise hazard.

FIGURE TWO



Normally the base Flight Surgeons, Ground Safety Officers, and Preventive Medicine personnel handle the major portion of the educational aspects, which must be thorough and well publicized.

It should be emphasized that noise exposures can produce a permanent hearing loss due to destruction of certain ear structures which cannot be replaced. It should also be stressed that the first damage to the hearing apparatus results in loss of hearing acuity in sound frequencies not necessary for speech communication, thus making the audiometric examination of primary importance in detecting hearing damage.

Enforcement of policies and procedures designed to operate an effective hearing conservation program is the responsibility of the Base Commander. Base Flight Surgeons will handle the program. The Preventive, Aviation, Occupational Medicine Service (PAOM) will be charged with getting baseline audiograms on all personnel, with follow-ups at periodic intervals. They will also conduct basewide noise surveys, insure proper fitting and use of protective equipment, and monitor all hazardous noise areas.

Finally, it should be mentioned that the Tweetie Birds are not the only birds in the inventory that can cause hearing damage from noise. Few, if any USAF aircraft are completely innocuous in this respect. So, whether or not the song of the Tweetie Bird is to be heard on your base, it might be well to give some thought to the songs sung by the T-Birds and their bigger brothers also. ★

A handy method of remembering how to enter the new holding patterns has been devised by Capt John May, OIC of the T-33 section at Eglin AFB. He disassembled his E-6B computer and drew the appropriate angles on the plate behind the wind face. The lines are positioned so that the inbound leg of the holding pattern is directly under the index mark and the other angles measured and marked off. The pilot can then set the inbound holding course under the index and read his entry from the angle in which his heading to the station falls.

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