flying SAFETY

DECEMBER 1985

The Rest Of The Story

Prudent Lifestyle

The Best Seat In The House

DIRECTOR'S HOLIDAY MESSAGE

The Christmas and New Year holidays are traditionally a time of thanksgiving, well-wishing, and dedication to doing better in the coming year. The season brings out the best in people and produces warm feelings toward each other that may not be so evident during other parts of the year.

Over the past few years, safety has become one of the Air Force's real success stories. The best year ever was 1983 with a Class A mishap rate of 1.73 per 100,000 hours. In 1984, we came close again with a rate of 1.77, and so far in 1985, we've done better than 1983's record. The equipment and number of lives lost have been drastically reduced for which we should all give thanks.

Success, however, must not lead to complacency. The status quo has a way of changing for the worse if we do not continue the effort to improve. Our challenge is to improve the mishap record and reduce losses while increasing readiness and combat capability necessary to accomplish the mission.

The 1985 success story has been demonstrated throughout the Air Force. To continue this in 1986 will mean a lot of hard work, attention to detail, and strong management and leadership at every level. We must attack the *preventable* mishaps.

All of us at the Directorate of Aerospace Safety wish you the happiest of holidays and a great 1986. Working together we can make the New Year superb *and* safe!

Albert L. Pruden Jr.

ALBERT L. PRUDEN, Jr., Brig Gen, USAF
Director of Aerospace Safety

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SPECIAL FEATURES

REGULAR FEATURES

DEPARTMENT OF THE AIR FORCE • THE INSPECTOR GENERAL, USAF

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The Rest Of The Story

LT COL JIMMIE D. MARTIN
Editor

■ The cargo aircraft's student copilot had been having difficulty lining up on the runway and landing on the centerline. This approach was the hardest one so far because the tower controller had him turn base early for traffic separation. Now he was on a short, steep final and using all his concentration to get everything right. He crossed the threshold on centerline, on glidepath, and on air speed.

The smooth flare ended in a normal touchdown — normal except for the unusual noise. At first the crew thought it was a blown tire. Then the IP noticed the landing gear handle was in the "up" position, and the red light in the gear handle was on. At the same time, the landing gear warning horn was sounding in their headsets. A perfect gear-up landing!

A simple case of "head up and locked — gear likewise," you say. Maybe not. Let's go back and look at the rest of the story.

The mission was initial upgrade training for copilots. The crew included an instructor pilot (IP), two student copilots (CPs), and a flight engineer. The crew was accomplishing a local sortie to a nearby satellite base. The mission was to provide copilot upgrade training consisting of instrument approaches and visual pattern work.

The crew completed 7 instrument approaches, 9 visual patterns, and 12 landings. The IP occupied the left seat during the first 2-½ hours of training with a CP upgrade student in the right seat. The aircraft full stopped, the other CP upgrade student got in the left seat, and the IP got in the right seat IAW training requirements.

The mission proceeded normally for the next 1-½ hours until the last visual pattern prior to departing for the home base. The mishap crew completed a simulated engine-out landing pattern and go-around. During the three-engine go-around, the IP raised the gear. Since the No.

How could this happen? "How could primary crewmembers miss such an obvious and basic action as putting the gear down before landing?" "Why didn't the tower controller see the gear wasn't down or at least remind the pilot to check gear down?" "What was wrong with the aircraft?" Sometimes it takes a second or third look to learn the rest of the story.

1 throttle was within 5 degrees of idle, raising the gear activated the landing gear warning horn. The IP silenced the landing gear warning horn, raised the flaps, and completed all after-takeoff clean-up items. The CP maneuvered the aircraft to a closed downwind for another simulated engine-out touch and go. The No. 1 throttle remained within 5 degrees of idle, so the landing gear warning horn remained silenced.

The CP briefed the landing and directed the IP to lower the flaps to approach setting. As the aircraft approached midfield downwind, tower directed them to make a left, 360-degree turn. After completing the turn, the aircraft re-entered on downwind. The tower controller then directed the mishap aircraft to turn to base leg earlier than normal. This was to establish spacing between them and other landing aircraft.

The mishap aircraft configuration was flaps 50 percent for approach and gear up with the landing gear warning horn still quiet. After completing the turn to final and final approach, the aircraft landed approximately 1,000 feet down the runway near the centerline and slid almost straight down the runway for about 3,100 feet. The crewmembers egressed safely.

I'm sure this mishap immediately raises some questions in your mind. Questions such as "How could these primary crewmembers miss such an obvious and basic action as putting the gear down before landing?" "Why didn't the tower controller see the gear wasn't down or *at least* remind the pilot to check gear down?" or "What was wrong with the aircraft?"

More than one crewmember in the cockpit doesn't eliminate all chance for error. Sometimes we tend to rely on the other person too much and don't take the proper initiative to ensure everything is done.

The answer to the last question is the easiest. The landing gear system and the landing gear warning system were both working properly before, during, and after the mishap. In short, there were no aircraft malfunctions. So, we can't blame maintenance.

Can we blame the tower personnel? No. It's true the tower controller at this noncargo aircraft base didn't visually check the gear down on the aircraft. But, controllers aren't required to do so. Most controllers do visually check landing gear as time permits. However, during the time immediately preceding this mishap, the controllers were busy with other traffic. The controller also didn't tell the pilot to "check gear down." But, the FAA handbook only requires the controller to remind the pilot to "check wheels down" if the pilot hasn't previously reported wheels down. The IP had reported gear down.

So, that leaves the crew. The IP was highly experienced and well qualified for the mission as was the flight engineer. Both student CPs were one sortie away from their end-of-course evaluation. Before you start making disparaging remarks about the crew, let's look at how this mishap developed. Put yourself in their place, and you may just realize you could have done the same thing.

The landing gear warning system is designed to back up the crew if they forget to lower the landing gear by providing aural and visual warnings. The technical order says two things will cause the landing gear warning horn to sound: Retarding a throttle to within 5 degrees of the idle position with the landing gear up, and extending the flaps more

continued

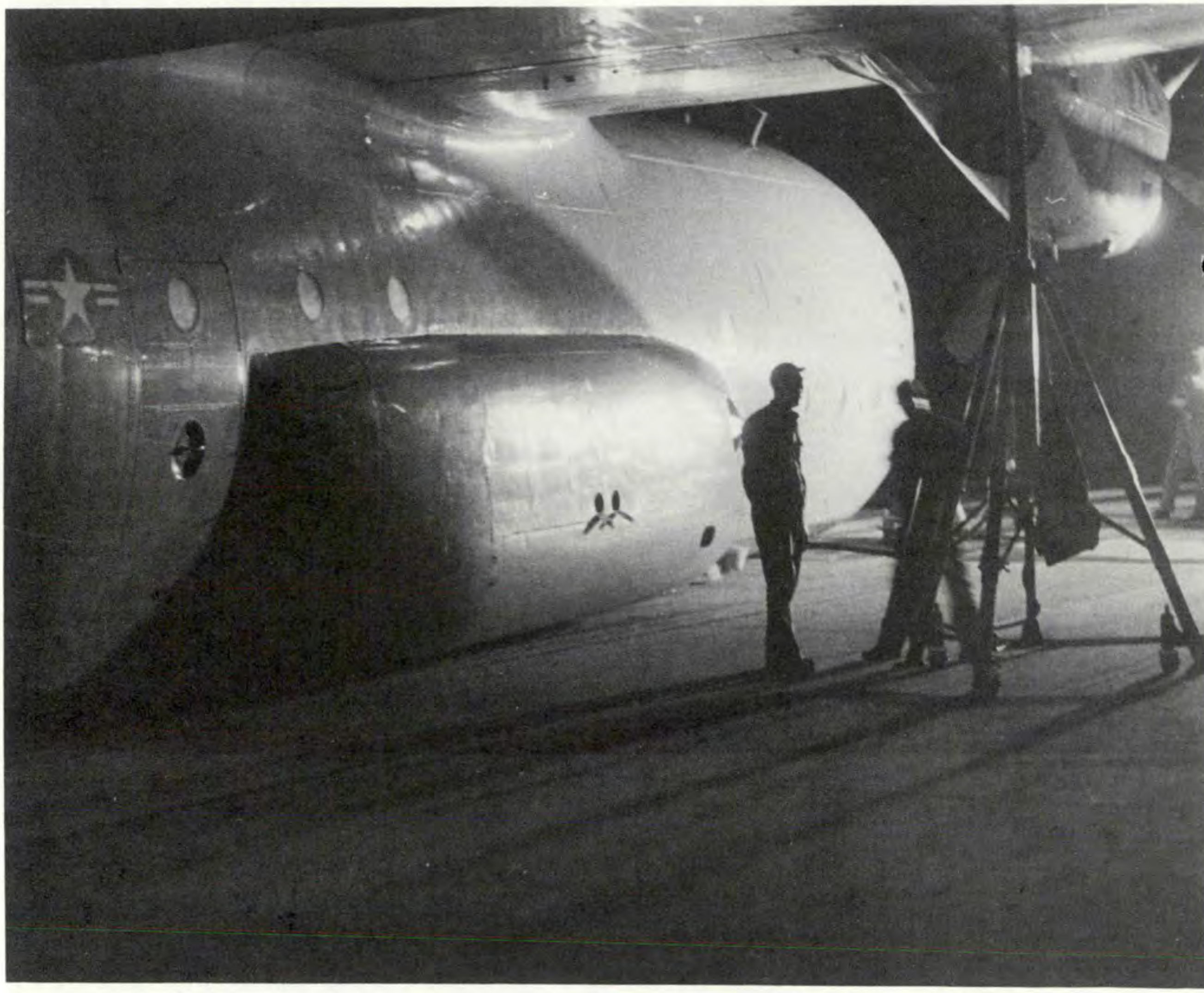
The Rest Of The Story continued

than approximately 70 percent with the landing gear up.

After the mishap, investigators flew numerous approaches in the aircraft simulator programmed with the operating parameters of the mishap aircraft as well as the atmospheric conditions existing at the time of the mishap. They discovered the power required to fly a pattern with less than full flaps and gear up, using either three or four engines, doesn't require the throttles to be retarded far enough to activate the landing gear warning horn until *at least* over the threshold and slowing to touchdown speed. In some cases, it never came on at all. Thus, they discovered the landing gear warning system won't provide warning signals under all conditions.

In this case, the landing gear warning horn sounded when the gear was raised on the three-engine go-around prior to the mishap pattern because the No. 1 throttle was within 5 degrees of the idle position. Analysts feel the red light in the gear handle was also on at this time and remained on throughout the subsequent pattern. This situation resulted in the warning light's effectiveness as a warning being lowered due to "habituation." In other words, the light was on so long the crew subconsciously accepted it as a normal indication. With the aural portion of the landing gear warning system not activating and the visual portion being reduced in effectiveness, the crew was deprived of this important backup.

Furthermore, the CP flying the aircraft became very busy during the critical phases of this last pattern and approach. After turning onto downwind leg, the CP briefed the approach and landing and called for flaps. Tower cleared another aircraft



To remove the aircraft from the runway after a gear-up landing, it must be jacked up so the gear can be lowered if the aircraft damage isn't too severe.

for an opposite direction takeoff and instructed the mishap aircraft to accomplish a left, 360-degree turn to provide spacing for the departure. Entering the turn interrupted the CP's prelanding habit patterns and resulted in his failure to call for landing gear extension and checklist initiation. Approximately 15 seconds after re-entering the downwind leg when the aircraft was roughly abeam the runway threshold, tower instructed the mishap crew to turn base leg. Tower's intent was to allow the mishap crew to complete their touch-and-go landing ahead of other landing aircraft.

Due to the closeness of the mishap aircraft to the runway, the IP directed the CP to extend downwind a few seconds and reduce the power to a minimum. As the CP started his turn to base, the IP made the radio call, ". . . base, gear down, simulated engine out, option." The CP reduced the power, but the throttles were never pulled back far enough to activate the landing gear warning horn switches.

The early turn to base resulted in a ½-mile final which, for a pilot of the CP's experience, required a substantial amount of concentration. This is especially true considering the CP had been having difficulty landing on centerline on this and previous missions. Due to his preoccupation with flying the aircraft and aligning it with the runway, the CP never directed lowering the landing gear.

The IP was occupied by clearing and monitoring the CP's progression through the 360-degree turn and instructing this relatively difficult short approach. In addition, he was occupied with opposite direction takeoff traffic which was a potential conflict in the traffic pattern. Review of the tower tapes indicates frequent radio transmissions from the tower and two other aircraft from the time the mishap aircraft turned base until touchdown. The IP was concentrating on the approach, coaching the student, and mentally preparing for the departure to home base. This combination of events contributed to the IP not being aware the gear had not been lowered nor the checklist completed.

The flight engineer was subject to the same distractions. Throughout the 360-degree turn and base leg, the flight engineer was occupied with clearing for other traffic in the pattern. When the CP failed to initiate the checklist, the flight engineer was deprived of a cue that would have prompted his own routine check of the landing gear configuration. During final approach,

After 16 approaches and 12 landings, the crew forgot, just once, to lower the landing gear. Sure, it was the crew's error, but a series of unusual circumstances working together led to this mishap. Could it happen again?

the flight engineer was observing the runway to prepare for a hard landing, if necessary. Any check of the cockpit would not necessarily reveal an illuminated landing gear warning light due to "habituation."

As the aircraft crossed the threshold, the CP had it on centerline, on glidepath, and on airspeed. The unusual noise after touchdown initially confused the crew, and they thought they had a blown tire. As the CP reduced power, the landing gear warning horn came on. The IP then saw the landing gear handle in the "up" position and the warning light in the handle illuminated and realized they had made a gear-up landing. Approximately halfway through the slide, the IP told the tower the aircraft had landed gear up.

After 16 approaches and 12 landings the crew forgot, *just once*, to lower the landing gear. Sure, it was the crew's error, but a series of unusual circumstances working together led to this mishap.

■ First, the 360-degree turn on downwind immediately after lowering the flaps interrupted a habit pattern at a critical time. The direction to turn base early was also a contributing distraction.

■ Second, the possibility of conflict with the departing traffic as well as fitting in with other landing aircraft created another distraction for the crew.

■ Third, the landing gear warning system, operating as designed, didn't provide the expected warning. If the warning horn had sounded any time after turning base leg, the mishap may not have happened.

■ Fourth, the copilot had a history of difficulty with landing on the runway centerline. This was compounded by the fact they were now on a short, steep final. This caused the CP, IP, and flight engineer to closely monitor the final approach and landing.

All of this shows how a series of unremarkable events can combine to create a serious mishap. In this case, a gear-up landing that cost the Air Force over $250,000.

Could it happen to you? What can you do to ensure habit patterns, channelized attention, distractions, or any of many other human factors don't work against you? The purpose of this article is not to condemn the crew, but to stimulate thought. There are two kinds of pilots, those who *have* landed gear up, and those who *may*. Rather than thinking it couldn't happen to you, think about how you can make sure *it doesn't*! ■

PRUDENT LIFESTYLE

LT COL DAVID E. PORTERFIELD, MC
Directorate of Aerospace Safety

■ The rationale for worrying about diet is a sound one; and it's one that has received a lot of attention, especially with the emphasis on various forms of personal prevention we've seen in this country. On the other hand, it is well known that a variety of factors have contributed to the decrease in deaths due to coronary artery disease since the late 1950s. Among these factors are important changes in basic lifestyle concerns such as smoking and exercise, along with dietary habits. Improvements in all three areas have led to improvement in the overall mortality rate as well as the incidence rate of coronary artery disease in particular.

It's important to remember these measures do have an impact on things other than just coronary artery disease. Cancer is a major concern in terms of cause of death and increasingly so with longer life spans and more exposure to environmental contributors. Although the fate of cancer is not likely to befall most people while on active duty simply because of their age, it will become a concern for many of us with advancing age. For that reason, it should receive some of our attention.

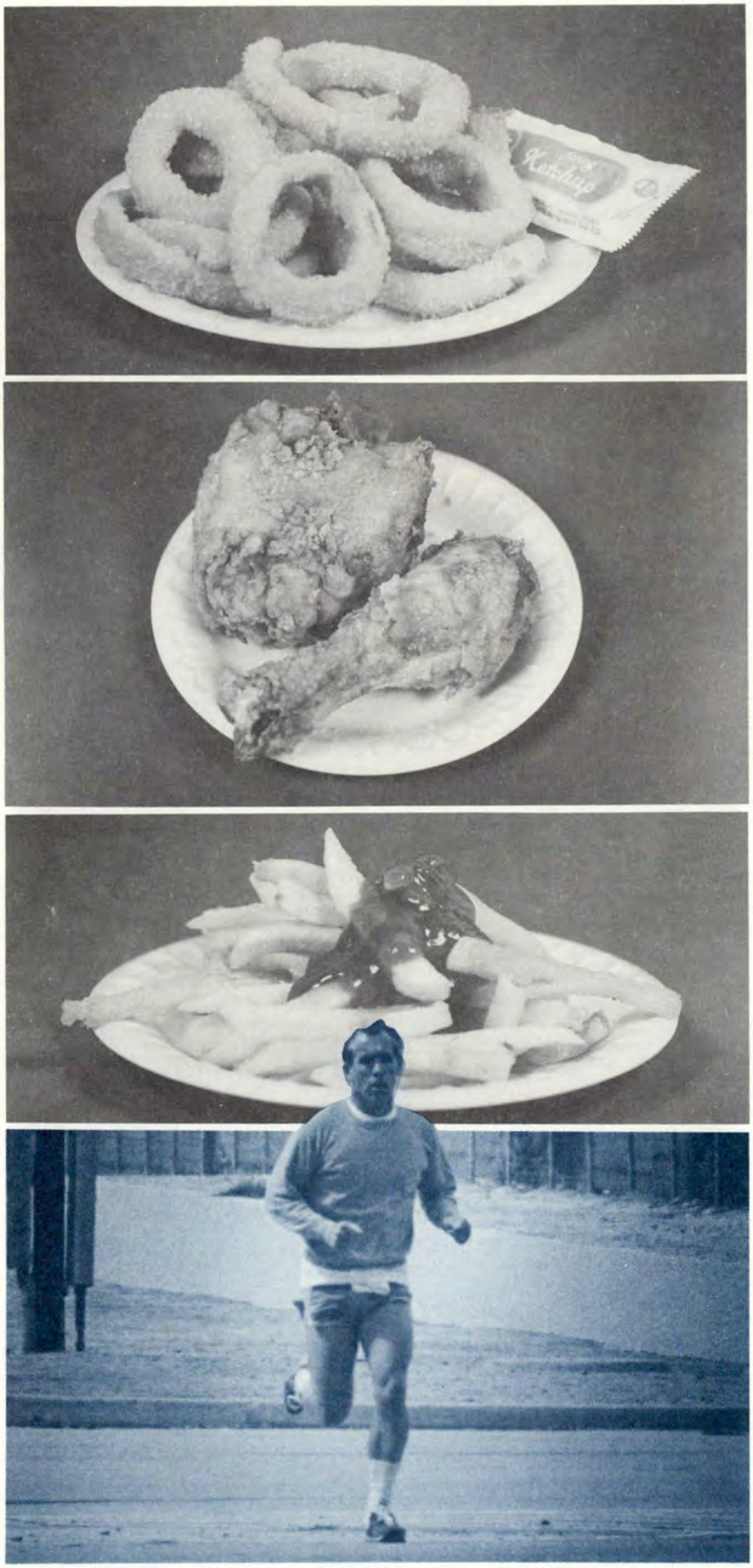
Many of the preventive measures are only effective in the long term, *and that means we must worry about them now*. This is true regardless of one's age. There is a way we can discuss lifestyle that will not only help address these two major causes of death, but will allow us enhanced enjoyment of those extended active years. Again, the three key areas of concern involve diet, cigarette smoking, and exercise.

Dietary Concern

The National Cancer Institute has published a diet that really is the core of all the various fad diets you may have heard about. The many fad diets encourage elements of sound basic nutrition that contribute to one's physical well-being, but they are embellished by a number of other techniques which focus on the sense of psychological well-being that one has from taking care of oneself. The National Cancer Institute's diet is called "The Prudent Diet."

We know diet is more a problem than has been recognized in the past. Its significance is something we can observe by looking at migratory patterns. (Yes, people have them, too.) Incidence rates of various kinds of cancer among immigrants into our culture reflect those of *our* culture rather than those of the individual's native environment. Dietary problems encountered in the United States generally focus around the total caloric intake, the amount of fat or cholesterol in the diet, as well as salt and alcohol intake.

During a remote tour in Korea a few years ago, I enjoyed a stopover in Hawaii. I decided to visit the monument of the sunken battleship Arizona. While awaiting a ferry to the monument, I looked along a railing lined with passengers anticipating the trip. I noticed a long line of very plump bellies hanging over into the empty space. It certainly was a sight that awakened me to a slightly different perspective on many of our dietary habits. After spending a year in Korea, I became aware of the nutritional problems experienced by the average citizen there, and I had noticed that, indeed, the well-to-do, and therefore



Many people who have trouble controlling their dietary habits find them easier to manage after developing a habit of regular exercise.

better nourished Koreans are often nearly as large in physical stature as many Americans.

There is not only the problem of the weight itself (which causes one to lead a more sedentary lifestyle and contributes to more musculo-skeletal problems such as low back pain), but there is also a correlation between the weight and the incidence of many kinds of cancers. It is this finding which has brought the National Cancer Institute's focus to dietary habits.

Their prudent diet includes measures that would also very adequately meet the needs of cardiovascular disease prevention advocates. It includes nine basic steps.

Maintain Weight

Weight is a product of the caloric intake for a given individual. We all understand there are great variations in metabolisms allowing certain people to eat a wide range of food in great quantities without gaining excess weight. However, it is incumbent upon people who do have what are really very efficient metabolisms to reduce their caloric intake to maintain an appropriate weight. (Yes, that's right, very efficient . . . these people would be the last to die of starvation.)

As a "junkfood junkie," I can certainly understand this is easier said than done, and it does require continued attention on our part. Some can get along on so few calories that a multivitamin/mineral supplement would be a wise habit.

Reduce Fat Intake

The second element of the prudent diet involves fat intake which should be reduced from 40 percent (the average characteristic of most American diets) to something less than 30 percent of total caloric intake. This step is felt to be necessary for a variety of reasons, among which are the metabolic pathways which relate this to cholesterol.

continued

Reduce Cholesterol

Cholesterol should be reduced to what most people suggest should be less than 300 milligrams per day. However, this is certainly not a lone key to cholesterol control since the metabolic pathways are intimately interrelated. A factor very important in cholesterol control — perhaps even more important than the intake of cholesterol itself — is the intake of saturated fats.

Reduce Saturated Fats

Saturated fats are considered precursors in the metabolic pathways of cholesterol. Cholesterol can be readily manufactured from these "building blocks." This is part of the reason why we attempt to encourage everyone to increase the ratio of polyunsaturated fat to saturated fat in the diet. It is felt no more than 10 percent of the total calories should be saturated fat (animal fats of various kinds) which equates to no more than one-third of the total fat intake. This increase in ratio of polyunsaturates to saturates in the fat intake is the fourth step in the prudent diet.

Increase Vegetable Protein

The fifth step is to increase the vegetable protein proportion of the total protein intake from 30 percent to 50 percent. It is felt there is some relationship between various animal meats and cancer. Red meats are both increasingly suspect for this and have more fat content. There are a variety of ways people have chosen to trace down this link in the food chain, but the bottom line is that vegetable protein is considered a little more healthy and can adequately meet many of the protein needs of our bodies.

Decrease Smoked and Pickled Foods

We can see the impact of this in some cross-cultural comparisons in the dietary intake. It is by this kind of comparison we also identify the necessity for the sixth step which is

to reduce the amount of smoked and pickled foods in the diet. This is something that is a very significant public health problem of many oriental cultures and continues to be a focus of concern. Nitrosamines are a special concern in certain gastrointestinal cancers. They are high in smoked and pickled foods, and as a result, it is thought wise to moderate the dietary intake of these food varieties.

Increase Fiber Intake

Another major component of the prudent diet with implications beyond cancer is that of fiber. Increased fiber from food, vegetable, or whole grain cereal sources functions in a fairly straightforward fashion to expedite bowel emptying. Anyone with a history of constipation (or hemorrhoids) has probably been counseled on the significance of fiber in the diet.

One of the more common afflictions of older Americans has been diverticulosis. This is a disease which is a consequence of the outpouching of the bowel walls not unlike the way an inner tube will fail at a weak spot. These diverticuli are extremely common in older Americans and are thought to be preventable in part by increasing the fiber in the diet. The fiber simply provides additional bulk in the stool. Because this additional bulk fills the lower colon more rapidly, the automatic emptying signals come more frequently. Because of that, the stool tends to be a little softer because less time is allowed for water reabsorption by the colon.

From the perspective of cancer prevention, this is significant because some by-products of bacterial digestion, as well as incidental by-products and irritants from the digestive process, are allowed less exposure to the bowel wall. The hypothesis is very simply that with less exposure to the bowel wall, there is less time to do damage.

So, if cancer seems like a remote reason to increase the fiber intake from a variety of sources, consider the fact you will experience less constipation. Indeed you will have a considerably reduced chance of developing hemorrhoids and certainly a much reduced chance of developing diverticulosis which may begin to appear in the fifth decade of life.

Reduce Salt Intake

The eighth component of the prudent diet is one commonly associated with cardiovascular risk and that is salt intake. For most people, a severe restriction in salt is a waste of time (our kidneys do a nice job). However, in general, it is good practice to avoid adding salt to food and to cultivate a taste that will eventually accommodate to that diminished

salt intake. We know a variety of fast foods are high in salt so you might wish to take the time to shop for some newer forms of fast foods that don't contain quite so much salt.

An excess of salt is known, at least in hypertensives, to contribute to increased volume within the blood vessels. This increased volume, of course, is one of the factors that leads to increased blood pressure. The blood pressure then, in turn, causes damage to the blood vessels which then later culminates in a diagnosis of some form of cardiovascular disease whether it be "stroke," "heart attack," or peripheral vascular in its manifestations.

Moderate Alcohol Use

The final point of the prudent diet is alcohol. There have been a number of recent arguments about alcohol even being of some potential benefit, but certainly only in moderate use. One must be very skeptical of such claims because there are so many variables that are difficult to control in this type of analysis. The relationships are often not at all clear.

For example, the claim that alcohol caused a rise in a certain fraction of cholesterol (associated with diminished cardiovascular risk) was clearly invalidated by the discovery that the beneficial subfraction was not the one being raised. In any event, it can be determined with certainty that alcohol to excess has a wide range of adverse effects including nervous system tissue, the liver, and a somewhat increased incidence of certain kinds of malignancy.

The prudent diet in basic terms encompasses everything a flyer or anyone with normal metabolism really needs to know about dietary measures that may be contributory to one's sense of well-being and longevity. However, there are still a couple of other things to talk about very briefly that are at least as important as anything we can do with our diet.

Cigarette Smoking

The first of these is cigarette smoking, which is, in some peoples' minds, the number one health problem in our country today because it is unnecessary. It has been shown that cigarette smoke is not only related just to lung cancer, but has been in some way associated with 50 percent of all malignancies. Although the link is not clearly established in many cases, the overall implications of poisoning oneself through the means of smoking seems an unwise practice to begin. Certainly, it is with education and increased awareness of the hazards of smoking, especially at early ages, that we may be able to impact this trend.

Certainly, smoking has diminished across the population in recent years, but the bottom line is those who choose to smoke must also become convinced in their own minds there is reason enough to kick the habit. It seems to be pretty much a personal matter — one which requires personal dedication. One cannot quit smoking for anyone else. That is not because smoking is not a hazard to anyone else.

Smoking has been shown to have an association with ill health in those closely associated with smokers if exposure is maintained over a long period of time. Indeed, this data is not strong enough for many individuals to consider further strengthening of public regulations because we like to promote individual freedoms.

However, this data is likely to get stronger in the future. Even with the smokers themselves, there was a 20-year lag period between in-

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creased smoking and the increased incidence of lung cancer that was seen in past years. Nonsmokers should receive some sort of commendation for their tolerance of these habits over the years. Indeed, if we applied the same stringent control measures to cigarette smoke that OSHA and AFOSH routinely apply to other forms of air contamination in the workplace, we would likely see fewer smoke-filled offices and cockpits.

On the other hand, we should notice that an adversary relationship with the smokers doesn't seem to have contributed to the decision on the part of any individual to quit smoking. The decision is strictly a personal one, the possibility of which may even be diminished by a confrontation.

A popular and interesting form of confrontation includes citing cigarette smoking as a slow form of suicide. Another is encouraging smokers to continue on the basis of the fact that social security and old age care programs would be even more costly were these self-sacrificing cigarette smokers not to continue to do away with themselves. (So much for humor!)

Aerobic Exercise

Aerobic exercise is certainly a concern that's as much worth discussing in relation to longevity as our relationship with both smoking and dietary habits. Many people find dietary habits difficult to control are more easily managed when one develops one's own exercise capacity to the point of being able to feel some of the exhilaration that goes with a good aerobic workout in whatever form. It's been shown that exercise promotes a natural high based on brain chemistry that accounts for the feeling of euphoria or generalized well-being in the hours following a good workout. This is a healthy pattern to try to establish although it does take considerable investment in discipline and effort.

Many people who don't like to jog enjoy the widely available aerobic exercise classes.

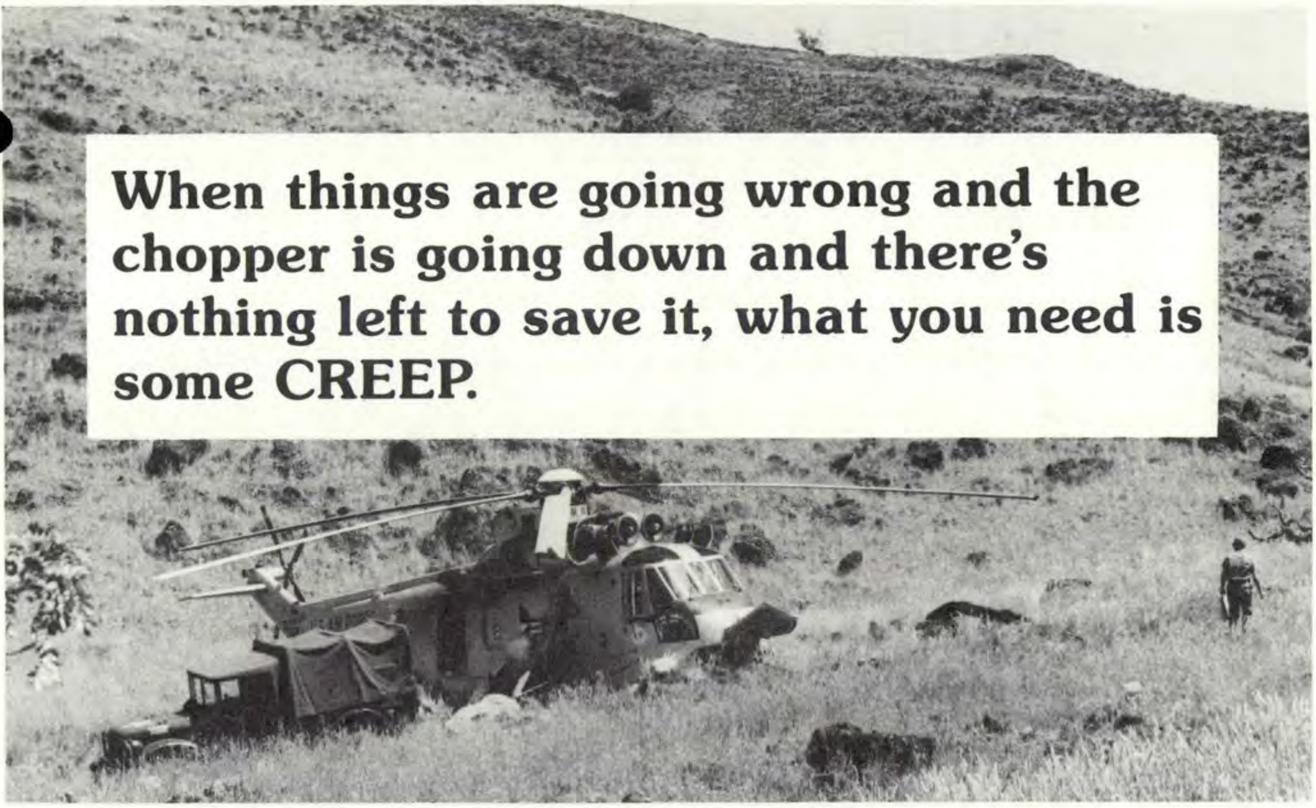
Once established, it can certainly serve to counterbalance some more pathologic biochemical processes that are known to be related to the dietary habits of some individuals. The feeling of well-being that comes with exercise certainly makes it easier to maintain the program once it's moving, but cannot contribute to the process of getting it started and of breaking the common old pattern of eating almost as a reflex.

Whole books have been written on many of these topics, and yet it is far easier to read about any of these things than it is to actually accomplish a change in your personal lifestyle. The ingredients of longevity from a dietary standpoint are consequential. They are also effectively summarized in the prudent diet.

The nine steps once again are maintaining weight, diminishing the total dietary fat from 40 percent to 30 percent of the total, diminishing cholesterol intake, increasing the ratio of polyunsaturates to saturated fats in the diet, increasing the vegetable protein proportion of total protein intake, diminishing the intake of smoked and pickled foods, increasing various sources of fiber in the diet, avoiding excess salt, and using alcohol only in moderation.

If you combine the application of that knowledge with the cessation of cigarette smoking, you have essentially done what you personally can do in terms of cancer prevention. If you wish to do a little bit more in terms both of lowering cardiovascular disease risk and feeling a little bit more vigorous on a daily basis, you should consider adding a regular, moderate aerobic exercise program. We can do something for ourselves in improving the quality and quantity of what we have.

The bottom line is a prudent lifestyle. ■



When things are going wrong and the chopper is going down and there's nothing left to save it, what you need is some CREEP.

This CREEP Can Save Your Life

JOSEPH F. TILSON
Directorate of Aerospace Safety

■ The term crashworthiness is one which smacks of motherhood and apple pie. Few people are aware that it is a regimented design discipline used by engineers who devote attention to the crash survival of the crewmember/occupant. Thanks to years of extensive research and development by the US Army, this technology has been formalized into standards (MIL-STD-1290, MIL-S-58095) and actual hardware design. The Army Blackhawk, Navy Seahawk, and Air Force Nighthawk are beneficiaries of these design criteria.

If you wish to assess the crashworthiness of an aircraft, we suggest you start with the acronym CREEP. Each of these letters represents a major design area which is addressed to improve the chances of crash survival and reduce injuries.

The acronym CREEP directs design attention as follows:

C — Container:	Design the shell surrounding the occupant so it will not collapse or allow outside hazards to penetrate and reach the occupant directly.
R — Restraint:	Design the occupant/seat system so they stay firmly anchored inside the protective container.
E — Energy Absorption:	Design the entire aircraft system so fatal crash energy is absorbed and dissipated before it reaches the occupant.
E — Environment:	Design the interior environment so the occupant is not injured by secondary impacts from things such as gunsights, control columns, glare shields, and instruments.
P — Post-Crash Factors:	Design the aircraft system so the occupant has ready egress area and is not futher subjected to post-crash hazards such as fire or escaping gases.

continued

This CREEP Can Save Your Life

continued

Now before you do a CREEP evaluation of your aircraft, it is important you understand something about crash energy. The energy of a crash increases with the square of the velocity and directly with the mass of the aircraft. Without a lot of engineering snow, this means your chances of surviving the crash of a heavy, high-speed aircraft aren't much. The energy levels are generally too high for the designer to manage. However, there is a group of aircraft which consistently crash at manageable energy levels. These are light fixed-wing and rotary-winged aircraft. It is this group that best benefits from crashworthy design. You jet jocks may prefer to think of them as creep aircraft.

The CREEP principles of crashworthiness only have meaning when the crash is ruled "survivable" in a technical sense. This does not mean there were survivors nor does a "nonsurvivable" crash mean there were no survivors. When the crashworthy designer speaks of a survivable crash, he means the container retained its shape without invading the occupant's space, and the impact or G forces were not high enough to produce fatal injuries to the occupant.

Occasionally, we encounter a nonsurvivable crash where the vehicle is subjected to fatal G levels but the occupant is thrown free and into some energy-absorbing medium and survives. Conversely, we have the survivable crash where the forces are low and the container stays intact but the occupant dies from a post-crash fire.

Large aircraft crashes which occur during landing or takeoff are usually considered survivable except for failure of the container to protect the occupants. Large aircraft crashes occurring during the in-flight phase are nonsurvivable due to high-impact forces. Consequently, we can conclude that fighter/attack aircraft offer little application for crashworthy design and large aircraft offer applications for protection during the landing and takeoff phase only.

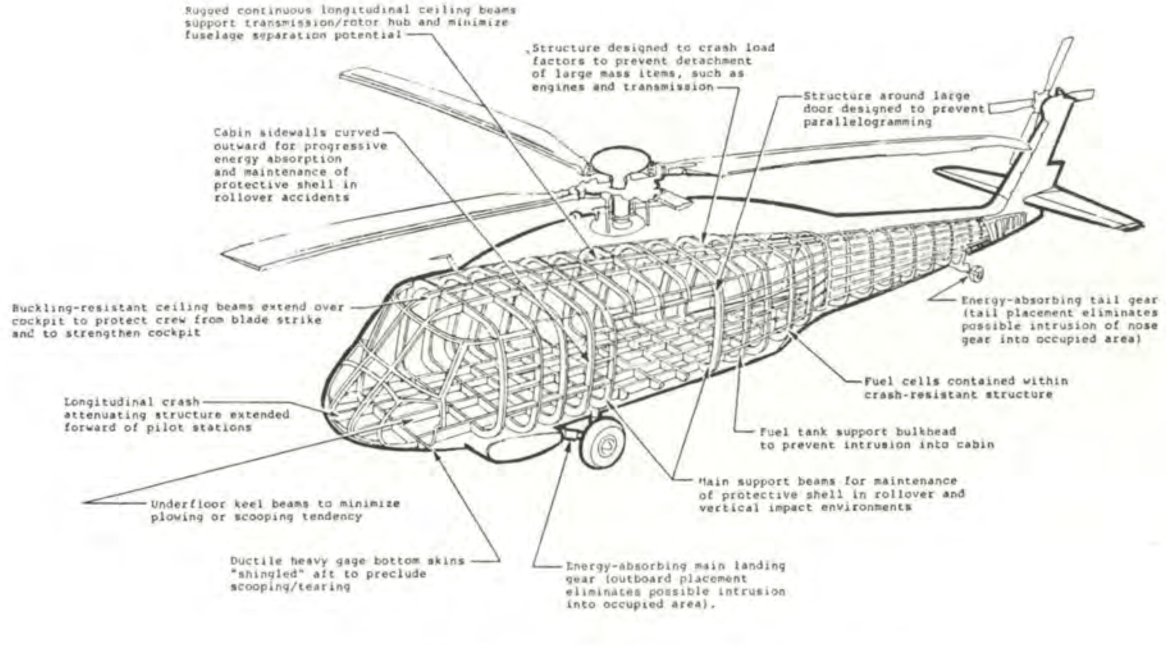
Light, fixed-wing and rotary-winged aircraft usually impact at weights and velocities which put them in the survivable range. These energy levels (60-80 G) are considered manageable, and careful attention to design will not only aid in the survival of the occupant but will go a long way toward lowering the severity of injuries so he or she may fly another day. Any doubts about all these good words are removed when one does even a casual review of the excellent injury/survival statistics resulting from crashes of the Blackhawk helicopter.

Let's take a look at the special crashworthy features which make the Blackhawk different from its predecessors.

☐ The fuselage is designed to prevent cabin intrusion and redistribute crash energy.

▪ Ductile rather than brittle aluminum construction.

▪ Rounded forward fuselage prevents "plowing."



Structural layout for occupant protection in a crash environment.

Like the Army's Blackhawk, the Air Force's Nighthawk incorporates the latest in crashworthiness designs.

- Landing gear located outboard of fuselage to prevent cabin penetration.
- Continuous keel beams from nose to aft of fuel cells.
- Underfloor "grid structure" prevents cabin deformation and allows energy absorption.
- Sidewalls curved for energy attenuation in rollovers. (Cabin to retain 85-percent livable area in 30 ft/sec lateral impact.)

☐ High mass item retention during impact.

- Engine and transmission tiedown restraints withstand 20 G forward, 20 G downward, and 18 G lateral.
- Transmission restrained from forward tilt during impact to prevent main rotor intrusion into the cabin.

☐ Energy-absorbing landing gear.

- Dual oleo strut provides 23 inches of stroke at 9 G average fuselage deceleration.
- Can absorb 35 ft/sec (2,100 ft/min) sink rates without allowing fuselage-ground contact.

☐ Energy-absorbing crew seats.

- Five-point harness to hold occupant in seat.
- Seat designed to "stroke" 12 inches during the principal crash pulse (seat tested at levels as high as 50 ft/sec (3,000 ft/min) and 48 G).
- Seat and occupant restrained inside the container at 48 G vertical, 30 G forward, and 20 G lateral.

☐ Crashworthy fuel system.

- Main cells puncture-resistant and flexible (capable of surviving 65-foot drop).
- Self-sealing breakaway fuel lines.
- Poppet valve vent lines.
- Short-length flexible fuel lines.
- Foam internal protection.

☐ Fire extinguishing system.

- Located in each engine compartment.
- Triggered by omni-directional inertial switch set at 5 G load factor.

If you're interested in the cost of these crashworthiness features, the US Army (AVSCOM) has conducted some cost-benefit studies and finds the level of crashworthiness identified in MIL-STD-1290 produces a financial return (in reduced losses) just about equal to the cost increases attributed to the crashworthiness features. The net benefit realized is increased availability of equipment and personnel (not to mention operator morale).

One example of reduced maintenance cost is graphically shown on a film depicting two separate helicopter crashes. The first crash is a UH-1 which impacted the runway at 16 ft/sec. It broke completely in half and totally destroyed the aircraft. Fortunately, the bouncing and flailing main rotor blade did not strike the cockpit, which could have been fatal.

The second crash was a UH-60 which impacted the runway at 22 ft/sec. This is over twice the impact energy of the UH-1. It broke the tail wheel and stabilator but caused no other serious damage. At no time was the crew seriously threatened.

Logically, there is a limit as to how much crashworthiness we should buy, but the level defined by MIL-STD-1290 does not appear to be pressing that limit in any way.

While each of the CREEP elements is important, initial attention is generally focused on eliminating post-crash fire through the incorporation of crashworthy fuel systems. This is appropriate and has reaped huge rewards in reduced fatalities and injuries.

Another large contributor to survival and injury reduction is the energy-absorbing crew seat. Over 14 years of solid research and development have produced some very viable seat designs and a newly revised specification (MIL-S-58095) for use in seat procurement.

The crashworthy concepts described here have proven themselves both in extensive testing and actual experience. They are the product of a small community of persevering engineers and technicians in government and industry; people who refused to accept crash survival as the "luck of the draw." They are the people who insisted that low energy-level crashes can be controlled and incapacitated survivors need not burn to death. They sleep well at night knowing they are personally responsible for reducing lifetime disabling injuries to some of our finest men and women. I feel privileged each time I encounter these people, and we in the safety community salute them. ■

Out of Control!

SMSGT MICHAEL A. CARBONNEAU
1986 Information Systems Squadron

■ "Hey, Wildman, how about another brew?" "Aw right! That's what *I'm* talking about!" Technical Sergeant Wildman Jones was on his tenth beer of the night, and the hour was rapidly closing in on 2 a.m. Wildman was scheduled to work a day shift the next morning. Someone noticed: "Don't you have to work tomorrow, Wildman?" "Yeah, but no problem, it's Saturday and the wing's not flying. Besides, the reg says, 'no drinking within 12 feet of the RAPCON,' right?" Everyone at the Final Approach Bar enjoyed a good laugh, and ol' Wildman could always be counted on to provide one.

The weather Saturday morning was not good. The weather folks were calling the ceiling 100 feet with a half-mile visibility, rain, and fog. The pace in the RAPCON was slow, and Wildman was thankful for the necessity of keeping the room dark. Wildman's face was very close to the same green color as the six radar scopes that were blinking in the darkness. Because of the lack of traffic, only one scope was in use. Manned by Airman D.J. Records, he was flight following a few overflights with an occasional approach being made to the base.

Wildman's normal crew was made up of 10 fully rated controllers. Today, however, anticipating the slow workload, Wildman had let everyone go except himself, D.J. Records, and Sergeant L.O. Cloud.

It was about midmorning when Wildman, stretched out between three chairs, got his first apprehensive feeling of the day. The Command Post had called and told D.J. Records that due to the bad weather at Shiloh AFB, the possibility existed they would be getting some F-4 diverts and perhaps a C-141 or two. Not to worry, though, because it's not for sure. D.J. decided not to bother Wildman about this possibility until he was sure they were indeed diverting.

Wildman, meanwhile, was debating on whether or not to finish off his last two Alka-Seltzers and start in on the aspirin. It was on the third aspirin that the speakers above the scope began to crackle. "Podunk Approach, Jax center on the 77 line, handoff." D.J. Records picked up the receiver. "Go ahead, Jax." "Yeah, about 5 east of Santos intersection is Rocky 11, flight of four F-4s, heading 240 degrees, descending to niner thousand, squawking 2511, looking for split-ups, your control." "Roger, Jax, Rocky 11 is radar contact. Send them up 344.0, D.J." "Coming at you, and there's a bunch more behind them." It was about this time that Wildman got his second apprehensive feeling of the day.

"Hey, Wildman," D.J. yelled, "How about opening up the arrival scope? We're starting to pick up traffic, and I need some help." As Wildman was untangling himself from the three chairs and his headset cord, the speakers came alive again. "Podunk Approach, Jax on the 77 line. Got another flight of four for you and a MAC heavy 141."

Wildman was starting to perspire. Holy cow, he thought, what are they trying to do, hand off the entire Air Force inventory?

D.J. Record, by this time, was overloading at the approach scope. Without an assistant to help him, his voice was beginning to get higher and higher with each aircraft that was handed off to him.

"Wildman," he yelled, "are you ready to take these arrivals yet? I'm picking up some more overflights!"

"Um, yeah, I guess I've got them. You sure they all want split ups?"

"Hey, L.O., make sure the PAR is aligned. The weather is below the ILS minimums."

"Podunk Approach, Jax Center 77 line. Got some more traffic for you. Another flight of four."

D.J. Records screamed to Wildman that he needed some help. Wildman was trying to split up the second flight of four and had forgotten about MAC 61446, the C-141, heading 270 degrees level 5,000 feet.

"Podunk Approach, Rocky 11, we're emergency fuel and need to get down, now!!"

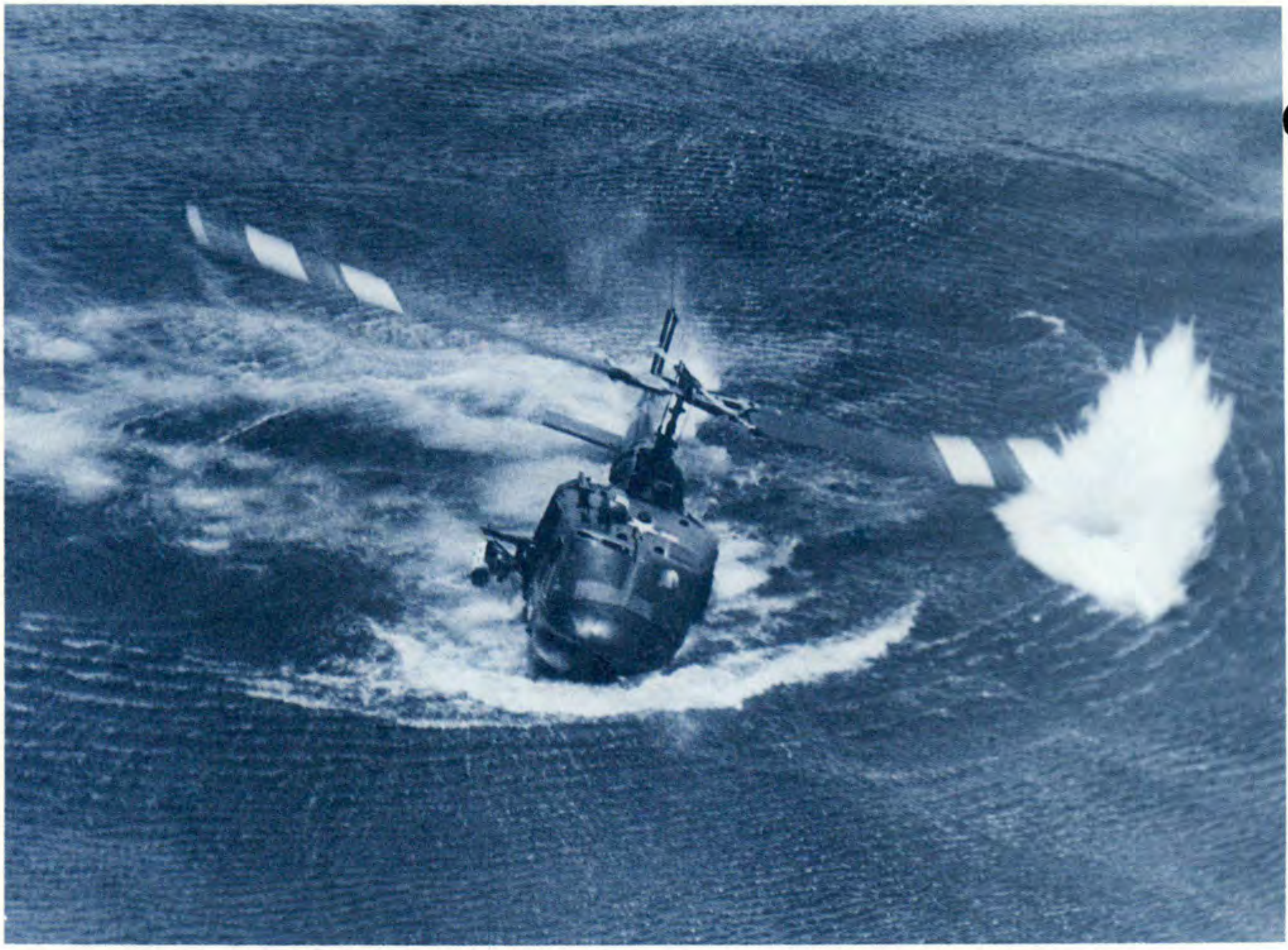
"Podunk Approach, Rocky 12 . . ." "Approach, Rocky 14 . . ." Wildman felt it start in his toes. It rose rapidly through his body until it reached the top of his head. It was that dreaded feeling of sheer and utter panic. Wildman had completely lost the picture.

Wildman keyed his foot pedal, "Um, MAC 61446, Podunk Approach." And again, "MAC 61446 Approach, what is your position?" Wildman's eyes began to glaze over, and his heart was beating like a snare drum.

MAC 61446 was not answering. He was at the 4,950-foot point of 6,000-foot Mt. Hiatus. Wildman's headset again came to life: "Podunk Approach, Rocky 11, we've flamed out and are punching out!" "Podunk Approach, Rocky 14, emergency fuel . . . Podunk Approach . . ."

". . . Hey, Wildman, come on, wake up! Relief is here. You going to sleep through their shift, too?" D.J. Records was shaking Wildman on the break room couch. Wildman sat straight up, sweat dripping from his face, eyes wide and frightened. "Hey, buddy, you look like you just saw a ghost! You OK?" D.J. was amused. "Let's go tip a few cool ones down at the Final Approach Bar. What do you say?"

Wildman didn't say anything. He got up and walked straight out of the RAPCON to his car. He had another dayshift the next morning. He was never seen at the Final Approach Bar again before a shift. Technical Sergeant Wildman Jones would *never* be out of control again. ■



THE BEST SEAT IN THE HOUSE

JOSEPH F. TILSON
Directorate of Aerospace Safety

■ Do you helo pilots know that in 1970 the Army determined that 40 percent of all rotary-winged fatalities occurred in *survivable* mishaps?

"This CREEP Can Save Your Life," page 11, defined survivable mishaps as those situations where the aircraft shell retains its integrity protecting the occupant from external hazards, and the impact forces (Gs) to the occupants are nonfatal.

The principal causes of these fatalities are fire, head impact, and spinal fracture in that order. Since that time, the fire fatality rate has been reduced to near zero through very aggressive crashworthy fuel system developmental work by the Army Aviation Systems Command and the Army Safety Center. Head impacts are a continuing area of research. Spinal injuries have been addressed through the development of energy-absorbing seat specifications and actual seat hardware. The Air Force has been the beneficiary of this work. The HH-60D Nighthawk helicopter is a variant of the UH-60 Blackhawk which was the first helo designed from the ground up with crashworthiness in mind (This CREEP Can Save Your Life," page 11).

One of the principal tenets of crashworthy design is absorption and dissipation of crash energy before it reaches the crewmember. This is usually done piecemeal in separate portions of the aircraft. In a typical helo crash, the aircraft is slightly nose high, level, falling from a height of 50 to 100 feet, and impacting at 60 to 100 Gs. A crashworthy aircraft such as the Nighthawk will dissipate up to 50 percent of the crash energy through the stroking action of its specially designed landing gear. An additional 15 percent will be absorbed through controlled crash of the subfloor fuselage structure. At this point, whatever is left is going to reach the pilot's seat. Here's where you want "the best seat in the house." This article will explore the designs of the new seats which prevent the residual G forces from becoming fatal or crippling.

We have all heard the joking remark, "It isn't the fall that gets you, it's the sudden stop." This is a very accurate statement. If the *suddenness* of the stop can be reduced, the G forces the occupant experiences will be equally reduced. In a typical crash, forces as high as 50 Gs at the seat attachment can be reduced to levels below 20 Gs at the seat pan by allowing the seat to move in a controlled manner through a distance of 12 inches. This stretches out the stopping distance. Forces along the human spine start to become damaging around 23 Gs. At 30 Gs, the spinal fractures are very severe, and at 40 Gs, most are fatal through damage to both the spine and cardiovascular system.

Fortunately, the typical crash pulse has a very short duration, usually lasting around .100 seconds. Therefore, a crash-absorbing seat must be designed so it does not reach the end of its stroke before the principal crash pulse is complete. Our new seats can usually stroke up to .150 seconds. Of course, there will be much thrashing and flailing in any crash, and the injuries from these can be considerable. Gloves, helmets, and tight restraint systems will mitigate much of this damage, but it is usually not fatal or crippling. The fatal force is usually over in .100 seconds, and that is what the new seat designs are aiming at.

These seats are designed so there is an energy-absorber (E/A) device between the occupant and the seat attachment point. The E/As are rock solid during normal maneuvers, but when they experience a load approaching the pilot injury level, they allow the seat to move in such a way as to prevent the G force one experiences from going any higher. Much like catching a baseball barehanded, if you hold your hand rigid, the force is severe and you change to tennis. However, if you allow your hand to move back ever so slightly during the moment of impact, you find it isn't bad at all.

Unlike a spring or soft cushion, the E/As must dispose of the absorbed energy in some way or they will only store it momentarily until they rebound, returning it to the occupant's seat. The process of energy disposal may be accomplished in many ways, but there are three designs which are more commonly favored. These designs employ inverting a metal tube, rolling a wire torus along a sleeve, and pulling heavy wire around a series of tight corners.

The blackhawk helicopter uses both the *inverted tube* and *rolling torus* type of designs.

Photo 1 shows both of these seats. The inverted tube seat is in the upper right and rolling torus seat in the lower left. continued

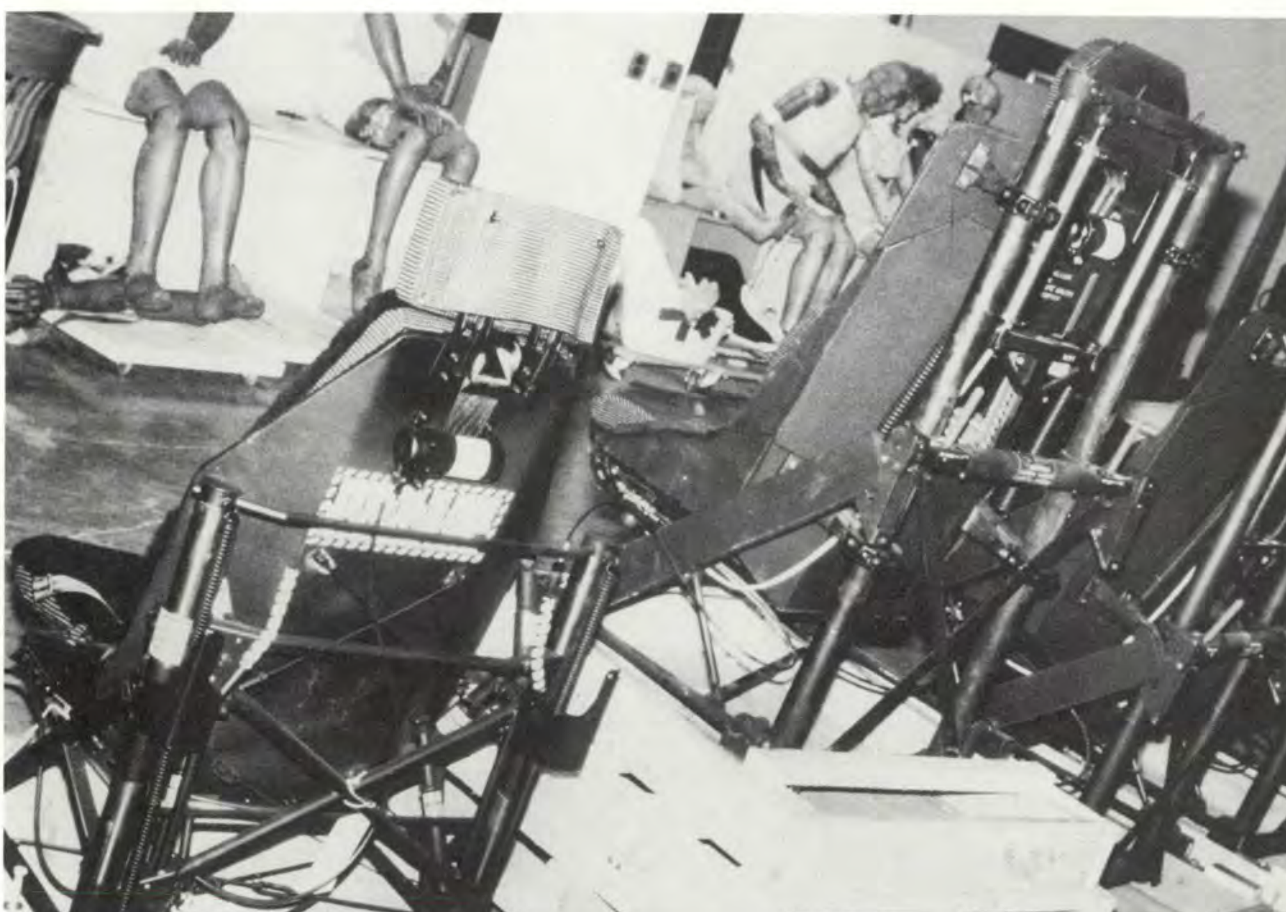


Photo 1

The Best Seat In The House

Photo 2 is a rearward view of the inverted tube seat. The two large outer tubes act as rails to guide the seat down into a well in the floor. The E/As are the two smaller vertical cylinders in the top center. The seat hangs by the E/As from the upper horizontal bar, and when the downward load exceeds 14.5 Gs, the E/As start stretching and allow the seat to move down the guide rails.

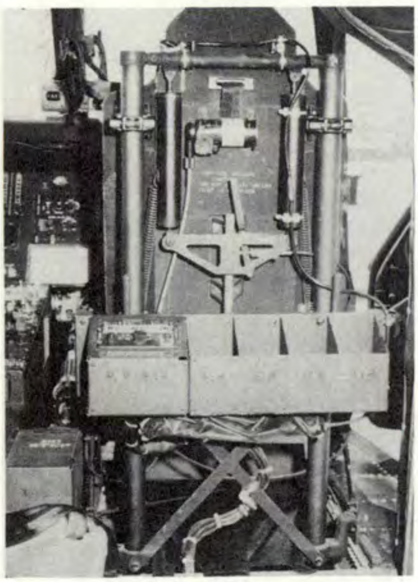


Photo 2

Photo 3 is a closeup of an inverted tube E/A and a cutaway view of partially extended inverted tubes. The stretching process actually turns an aluminum tube inside out and expends a great amount of energy in the process. The process is very similar to pulling a coat sleeve inside out.

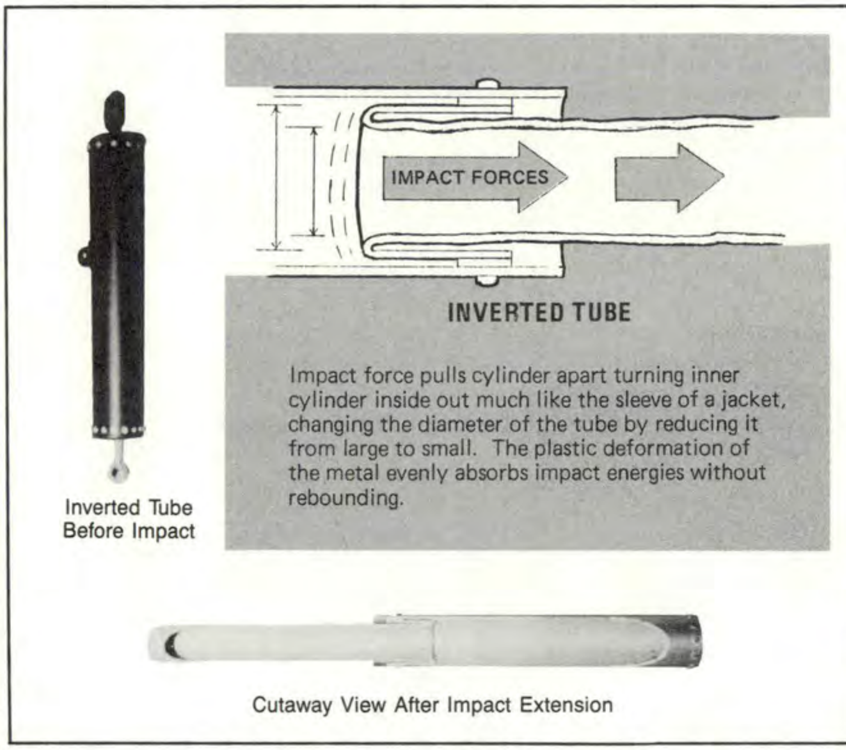


Photo 3

Figure 1 is a diagram of an outward and cutaway view of a rolling torus E/A. This E/A expends energy by pulling two concentric cylinders apart. The pulling action is resisted by several layers of stainless steel wire wrapped around the inner tube causing a force fit with the outer tube. The result is much like trying to roll a rubberband over a rolled-up newspaper where your hand is replaced by a tight-fitting outer sleeve. However, since we are dealing with stainless steel tubes and wire, the force to accomplish this approaches 2,600 pounds per seat.

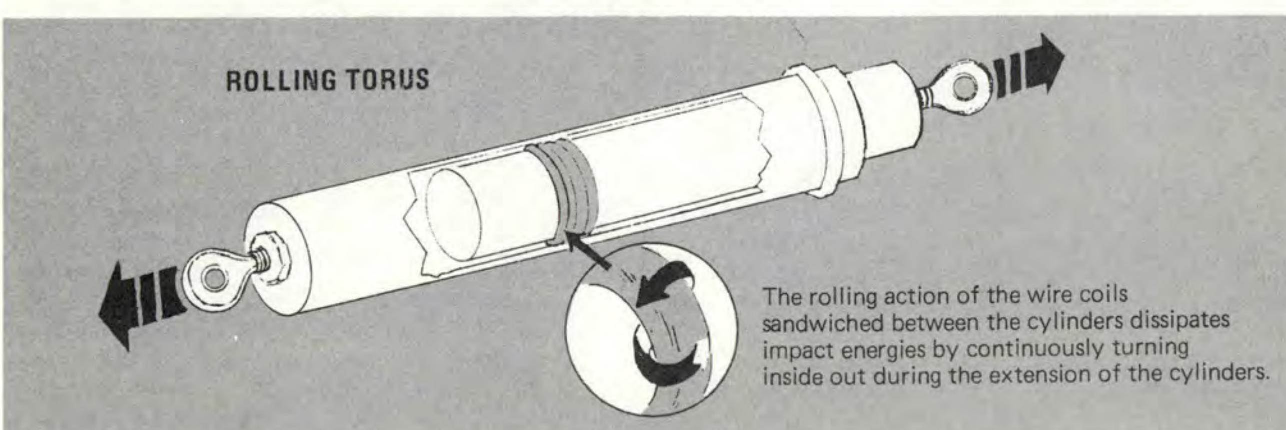


Figure 1

Figure 2A shows a sketch of a typical wire bending design. It expends energy by drawing heavy wire around some tight bend radii. The energy is consumed in the process of plastically deforming the wire. The design holds some promise for lightweight troop seats and cargo tiedown restraints.

The US Navy has developed a retrofit kit to give some energy absorption capability to the SH-3 and SH-53 pilot/copilot seats (Figure 2B). The upper E/As provide restraint in the vertical direction, and the lower E/As provide restraint in the forward direction (Figure 3).

The USAF is presently evaluating these kits for use in the H-53.

Energy absorbing seats are typically tested by mounting them hori-

continued

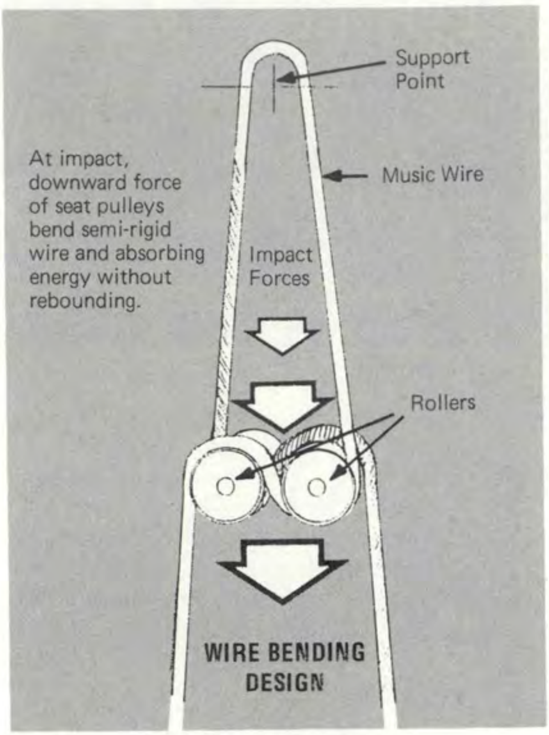


Figure 2A

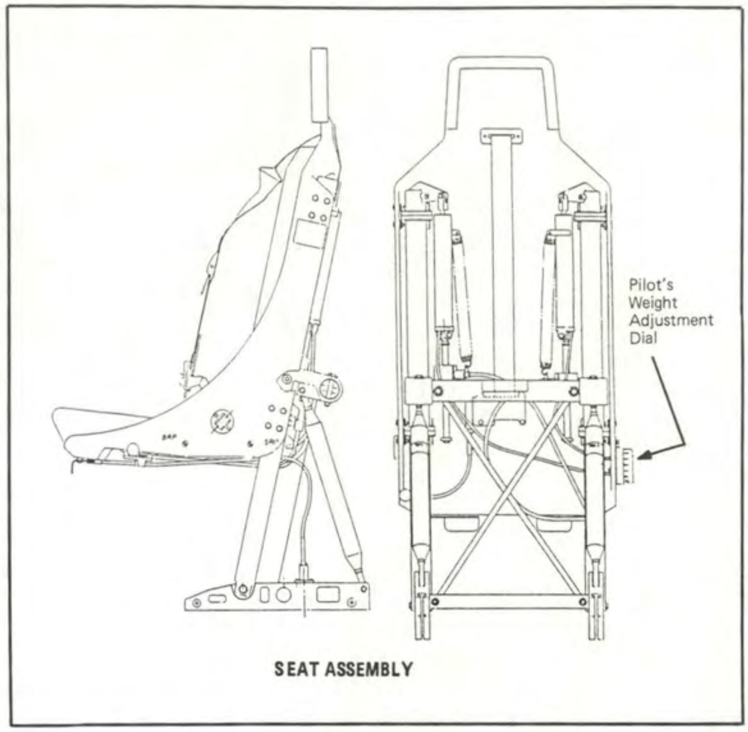


Figure 2B

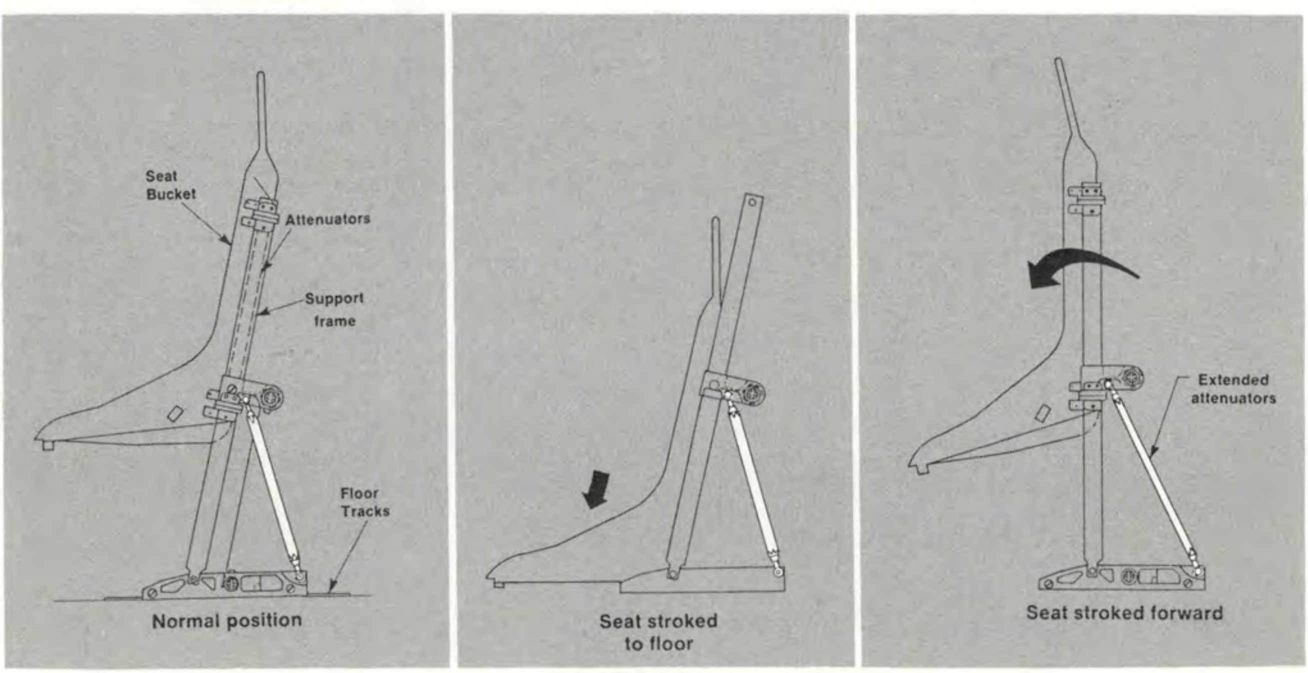


Figure 3

zontally on a sled, placing a 5-95-percentile anthropomorphic dummy in them and propelling the sled down a track into a set of catcher wires which are set to produce the specified stopping G pulse (Figure 4). This test for the Blackhawk has gone as high as 52 Gs from a velocity of 50 ft/sec (3,000 fpm). Most of the testing has been accomplished by a highly professional staff at the FAA Civil Aeromedical Institute at Oklahoma City.

While energy absorption is important, there are two other elements equally important in the crashworthy process. First, the seat must stay attached to the airframe, and second, the crewmember must stay attached to the seat. The E/A seats are designed so the floor may warp and fracture, but the seat will remain attached through flexible fittings and still perform its function. The crewmember is restrained in the seat by a 5,000-lb, 5-point harness (Figure 5) which has a strap between the legs to prevent *submarining* out from under the belt. Those of you who are in the habit of flying around with your harness loose and in the unlocked position would do well to note the spinal position in Figure 6.

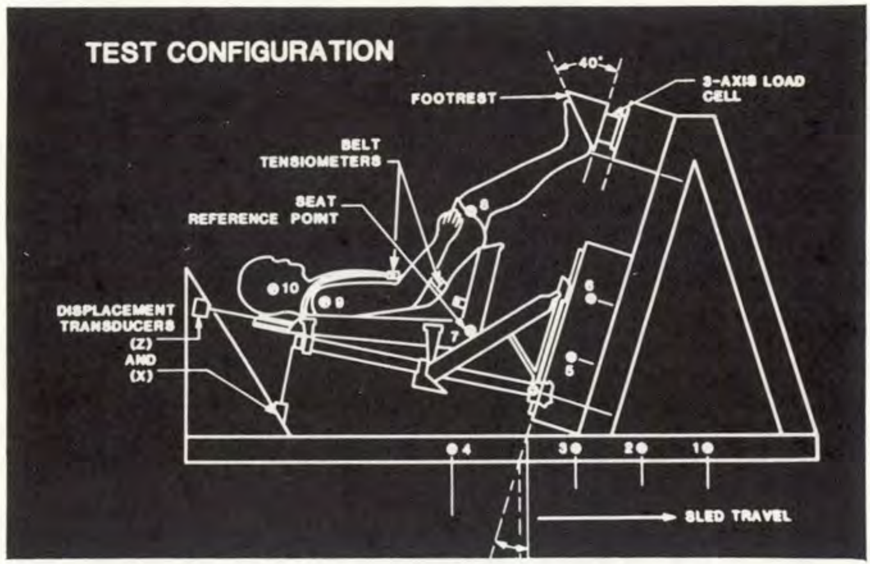


Figure 4

This is typically what happens when the harness is loose or the inertial reel fails to auto-lock. We are working hard to provide a positive lock through development of a new dual-acting (rate-of-extension G sensor) reel specification, but it goes without saying that the person seated in this figure would experience severe injuries at vertical G forces well below the 23-G peak design level.

Several of our Army friends are still collecting flight pay because they were riding in these seats when "everything hit the fan." There are many safety people whose battle trenches consist of examining the postcrash wreckage, pouring through reams of accelerometer traces, fastening harnesses to sled dummies, and suffering the slings and arrows of ill repute. Theirs is a lonely vigil, but they wish to see you continue to collect your flight pay. So keep your harness tight, and "Let's be careful out there." ■

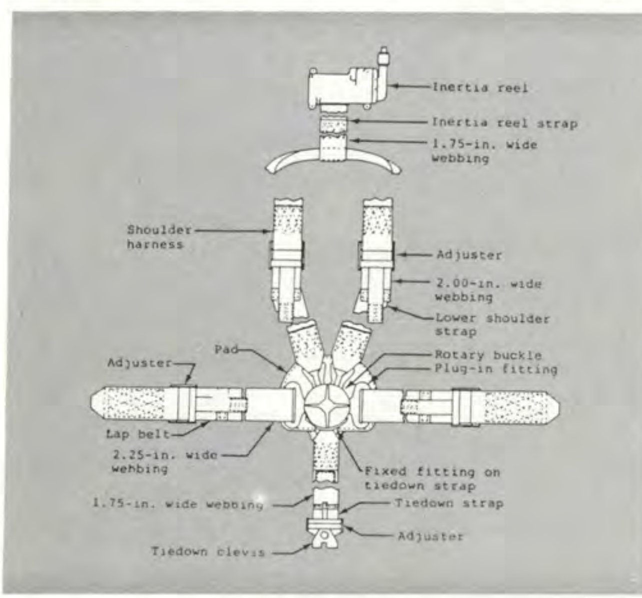


Figure 5

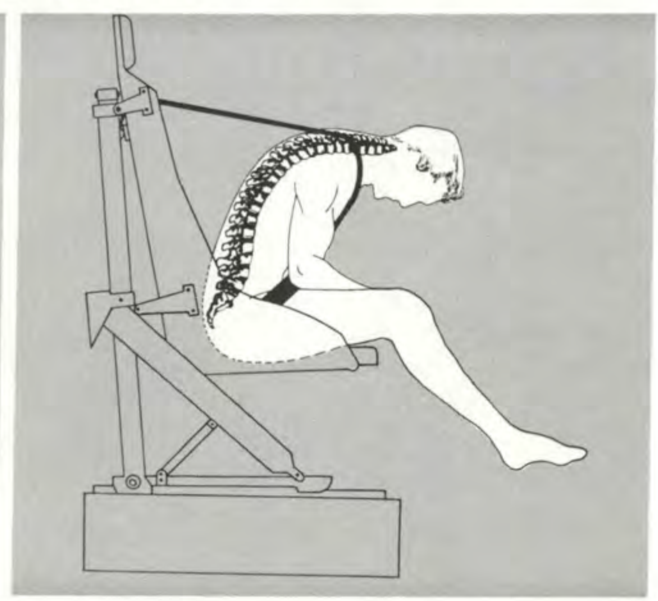


Figure 6

ARSA

Airport Radar Service Area

CAPTAIN JAMES ROBILOTTA
Chief, Air Traffic Control Operations
Norton AFB, CA

■ Heaven knows the aviation community has more than it's fair share of acronyms and buzz words. Well, a new acronym is born and will soon be in the vocabulary of all pilots, controllers, and the like. The new word is ARSA, pronounced are-sah. ARSA is the acronym for Airport Radar Service Area and is scheduled to replace Terminal Radar Service Area (TRSA) in the very near future. In fact, ARSAs are in place now and 66 more are being programmed for 1986.

Why the change? As a part of the National Airspace Review, a committee was formed specifically to evaluate the TRSA Program and recommend improvements to increase the efficiency and reduce the complexity of the ATC System. This committee was formed with members from organizations representing all of the major system users. The Department of Transportation, Department of Defense, Aircraft Owners & Pilots Association, Experimental Aircraft Association, and the Airline Pilots Association were a few of the groups represented.

This committee first identified five major flaws with the TRSA Program and then considered four types of airspace configurations to replace it. The consensus of the committee was to replace TRSA with the ''Model B'' airspace and service. The ''Model B'' title was later redesignated Airport Radar Service Area — ARSA.

The FAA tested this concept at two airports, the Robert Muellar Municipal Airport, Austin, Texas, and the Port of Columbus International Airport, Columbus, Ohio. These tests lasted for over one year and were very successful. The ARSAs were then put in place permanently at the test sites as well as the Baltimore/Washington International Airport. The FAA's overall plan is to install a total of 136 ARSAs while looking at implementing others where needed.

What were the problems indentified by the committee and how

continued

does the ARSA help? Let's look at the flaws in the current system and how the ARSA System helps. (See Figure 1 for a comparison review of TCA, TRSA, and ARSA.)

■ TRSA airspaces are very large in size. Many TRSA boundaries encompass most, if not all, of the approach control airspace. The feeling is the services are being offered in areas not really requiring them.

■ The ARSA is designed to be smaller and installed only in the area regarded as the space most needing the control, specifically near the primary airport.

■ TRSA airspaces are nonstandard in configuration, and the layouts are often very confusing. This was identified as a cause of why many pilots do not participate in stage service.

■ In contrast, the ARSAs will all be basically standard with minor changes to allow for local needs. The airspace will be divided into an inner and outer core. (See Figure 2.) The inner core will be 5 nautical miles (NMs) in diameter from the primary airport and extend from the surface up to an altitude of 4,000 feet above the airport's elevation. The outer core will be that airspace between 5 and 10 NMs from the airport from 1,200 feet AGL to 4,000 feet AGL. A big point to note here is the use of NMs vice statute miles. This is the first in a series of changes to standardize distances throughout our national airspace system. Beyond the 10-mile ring is a third zone called the outer limits. Within the outer area, any aircraft contacting the approach control will be given the same services advertised for the other cores. However, this is a voluntary call on the pilot's part.

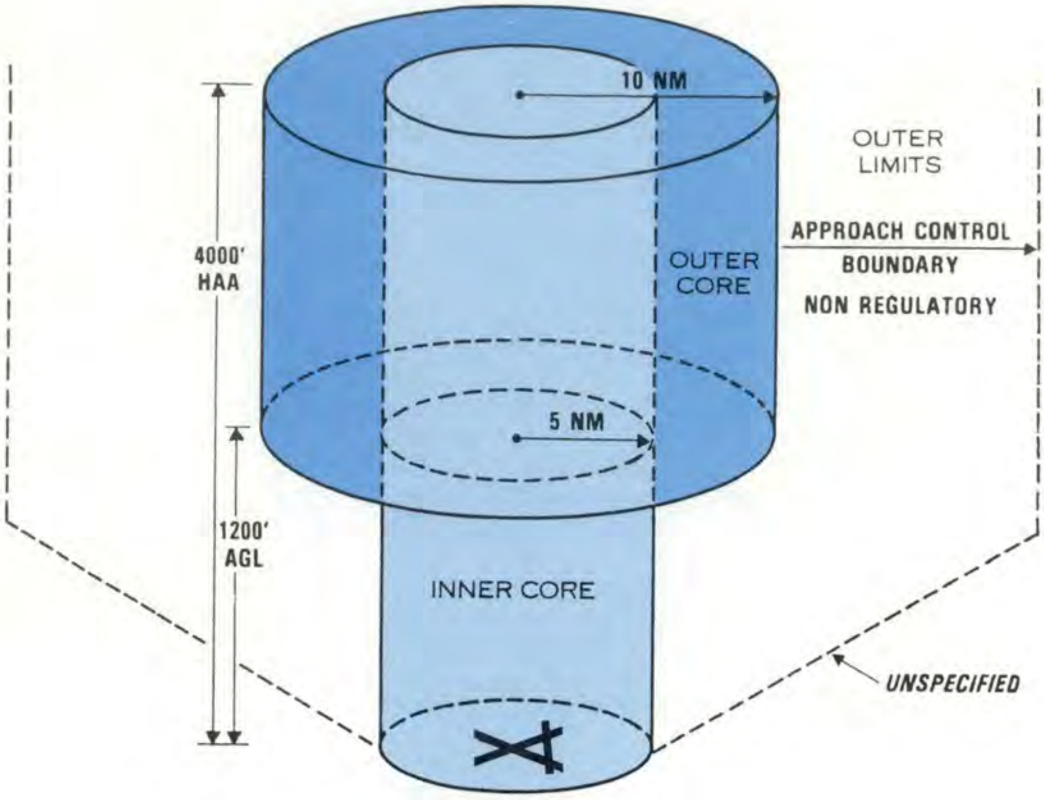
■ The TRSA Program is voluntary on the pilot's part but mandatory on the controller's part. This situation resulted in a much-less-than-desired participation by the users leaving many aircraft around airports *not* talking to ATC. Some TRSA statistics estimate as low as 30-percent participation rate among possible users. This inherently produces an increased midair collision potential.

■ Federal Air Regulations covering ARSAs require all pilots, prior to entering the ARSA airspace, to establish and maintain two-way radio communication with the controlling agency and to follow ATC instructions. The distinct advantage to this is the controller (and the pilots) will know where all of the airframes are around the airport. The midair potential is drastically reduced, and there should be no reports of the infamous small red-and-white, high wing aircraft going across the nose of aircraft on an instrument final. An additional "ben-

Figure 1
TCA/TRSA/ARSA Comparison

TCA	TRSA	ARSA
	AIRSPACE	
Regulatory Nonstandard Design	Nonregulatory Nonstandard Design	Regulatory Basic Standard Design Minor Site Specific Sensitivity
	EQUIPMENT REQUIREMENTS	
Mode C Transponder In Group 1 2-Way Radio VOR	2-Way Radio If Landing at Towered Airport Within TRSA	2-Way Radio Within Core
	PILOT REQUIREMENTS	
Group 1 Private Pilot or Better to Land at Primary Airport Group 2 Student Pilot Certificates	Student Pilots — OK	Student Pilots — OK
	PARTICIPATION	
Mandatory Within TCA	Voluntary	Mandatory Within Core
	SERVICE	
Stage 3 Separation Between All Fixed Wing A/C and Between Fixed Wing and Helicopters Sequencing	Stage 3 Between Participating Aircraft	Within Core: Sequencing of All Arriving A/C IFR Separation Between IFR A/C Traffic Advisories and Conflict Resolution (No Merging Targets at Same Altitude) Between IFR and VFR A/C Traffic Advisories Between VFR A/C Outside Core: Same as Above to All Participating A/C on 2-Way Radio and Radar Contact Within Approach Control Boundary

Figure 2



ARSA

nie'' of the system will be to eliminate the dreaded call of "Traffic 12 o'clock, one mile, opposite direction, type and altitude unknown!" With all aircraft participating, *all* will be known.

▪ Within the ARSA, the controller will provide the same services to pilots flying under similar rules. ATC service will continue the practice of first come, first served, and the controller cannot give preference to one type of user over another except for those special cases specified in the rules and regulations currently practiced.

▪ Controllers under the TRSA rules are using excessive separation standards. It is not uncommon for a radar controller to use IFR separation standards (3 miles and 1,000 feet) when controlling 2 VFR airplanes. This increased separation causes delays and irritates the VFR pilot.

▪ ARSA rules call for standard separation between two IFR flights, traffic advisories and conflict resolution if needed between an IFR and VFR pair, and finally, traffic advisories and, as appropriate, safety advisories for a set of VFR airplanes. Simply stated, conflict resolution means the radar returns of the aircraft will not touch. The distance between the aircraft will differ depending on several conditions (i.e., distance to the radar antenna) but will always be safe.

The ARSA System seems to answer the major problems the committee identified and looks to increase safety all around. As with all new systems, there are bound to be educational growing pains everyone must tolerate. The bottom line for pilots is to establish and maintain two-way radio communication and follow ATC directions. If you cannot meet the request, notify the controller and other arrangements will be made.

One final word — as with any ATC system servicing VFR pilots, ARSA does not eliminate the see and be seen/see and avoid concepts. In fact, the ARSA Program can be thought of as a radar-assisted, see and be seen environment which promises to help pilots get there and back safely, orderly, and expeditiously. ■

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Do You Have A Story To Tell?

■ One of the ways we learn about flying safety is through the experiences of others. This is the purpose of the There I Was Program. We ask you to tell us your experiences, those things which got your attention and taught you about flying.

A "There I Was" should be anonymous. We aren't interested in who you are. We are interested in what you have to say. We particularly want to hear those stories where the crew did (or didn't) do something that set the situation up. Maybe by telling the story we can keep someone else from making the same mistake.

One caution — There I Was is not a replacement for the hazard or mishap reporting systems or a way to air your complaints. We are trying to share flying experiences and help improve flying safety.

So if you have a story (and what pilot doesn't have at least one), take a minute and jot it down on the form on the next page, then cut that page out and send it to the address on the back. P.S. You don't need a form if one is not readily available. A plain sheet of paper will do. ■

THERE I WAS...

Fold

HQ AFISC/SE
NORTON AFB, CA 92409-7001

HQ AFISC/SE
"THERE I WAS"
NORTON AFB, CA 92409-7001

"EYES ONLY" for the DIRECTOR

Fold

OPS TOPICS

Flu? No Fly!

■ A recent incident suggests the need to reemphasize the importance of good health for flying duties. One morning while transiting one of the more exotic places MAC frequents, the copilot informed the aircraft commander he felt ill; *but not bad enough to see a flight surgeon.* What he didn't tell the AC was that he had been violently ill and nauseous most of the night. The copilot was operating in the "press-on" mode and wanted to continue the mission.

Upon reaching cruise altitude, the copilot's malady returned, and he became violently ill. So ill he was unable to perform his flight duties and had to get out of the seat. The AC was able to make an uneventful approach and landing, assisted by the scanner who moved to the copilot's seat.

A Matter of Priorities

An IP and student were flying a pilot upgrade sortie in an O-2A. During a touch-and-go landing, the student landed firmly, and the aircraft bounced. The aircraft settled back to the runway on the main landing gear, and when the nose was lowered to the runway, the gear warning horn and gear-in transit light came on. The IP decided to full stop the aircraft and took control from the student.

The gear warning horn went off and came back on again after a few seconds. The IP reached up to place the gear handle full down, but stopped to answer a radio call from Tower. Approximately 4 to 5 seconds after the warning horn sounded the second time, the nose gear collapsed, and the front propeller struck the runway. The aircraft slid to a stop on the runway, the IP shut down the engines, and both pilots egressed without injury.

Min Run Landing

An RF-4C returned from a low-level flight for an instrument approach and an overhead pattern to a full stop. Everything went fine until touchdown. The Phantom touched down first on the centerline external tank, then the two wing-mounted external tanks. It seems the crew missed one item in the before-landing checklist — the gear.

Boating Midair

Two C-141s were flying a VFR formation on an overwater flight at FL 410. Number Two was one-quarter to one-half mile in trail and slightly below lead when the lead aircraft lost its 20-man life raft and accessory kit from the right wing. The raft struck the Number Two aircraft causing minor damage to the Number Two engine pylon and wing leading edge. The pylon sustained a three-inch by five-inch cut while the leading edge received a one-inch by two-inch puncture. ■

UNITED STATES AIR FORCE

Well Done Award

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

FIRST LIEUTENANT

William R. Roberts

1st Tactical Fighter Wing
Langley Air Force Base, Virginia

■ On 29 January 1985, Lieutenant Roberts was part of a flight of two F-15s on a low altitude intercept mission. At the completion of the last planned intercept, as he climbed out of the low altitude structure, he heard a loud explosion followed by a left engine fire light, a left bleed air light, and an airframe mounted accessory drive overheat light. Noting his right engine was operating normally, he selected idle on the left engine, accomplished appropriate emergency procedures, and immediately diverted toward an airport approximately 25 miles away. The chase aircraft informed him that flames were coming from the top and bottom left side of his aircraft. Since the aircraft was on fire, Lieutenant Roberts shut off the engine master switch to ensure no fuel was being supplied to the fire. The flames appeared to subside, and the chase aircraft moved in to take a closer look at the left side. The pilot of the chase aircraft discovered numerous panels missing around the left wing root, the fuselage was scorched in various places around the engine, a panel on top of the aircraft had been burned away, and there were numerous holes on the side and bottom of the aircraft where the fire was still burning through the fuselage. Lieutenant Roberts spotted the airfield, contacted the tower on guard, and, due to the severity of the emergency, configured while turning a short base, and rolled out on a 3-mile final. He touched down on the first few feet of the short runway with no barriers or overruns, slowed his burning aircraft, and cleared the runway onto a high-speed taxiway where fire equipment was waiting to extinguish the fire. Lieutenant Roberts' quick decisive reactions and outstanding airmanship prevented possible injury or loss of life and the loss of a valuable aircraft. WELL DONE! ■

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MAJOR

Roger E. Taylor

57th Fighter Weapons Wing
Nellis Air Force Base, Nevada

■ On 10 January 1985, Major Taylor was flying as No. 2 in a two-ship formation of F-5Es returning to base for an overhead traffic pattern. The leader of the element was landing as Major Taylor rolled out on final approach. Major Taylor confirmed his landing gear indications as three green and full flaps, then shifted his concentration to the remaining portion of the landing approach and landed his aircraft on speed at 135 knots, 500 feet down the runway. At the moment of touchdown, two components in the landing gear system failed: A toggle switch used by ground personnel to open the gear doors and a hydraulic selector valve resulting in an uncommanded gear retraction. Major Taylor felt the aircraft touch down and maintained landing attitude. Moments later, he felt his aircraft settle as the gear began the uncommanded retraction. At that same instant, he noticed the three green landing gear indicator lights go out, a red light illuminate in the landing gear handle, and the gear warning horn sound in his headset. He immediately initiated a go-around selecting full afterburner power. The aircraft settled slightly, and the open main gear doors contacted the runway as well as the aft portion of the tail section. The engines were still accelerating from idle to full afterburner power. Major Taylor's aircraft was at landing speed which did not allow him much margin for holding his aircraft off the runway as the gear retracted. However, due to his skillful handling of the aircraft, he prevented it from settling totally onto the runway. Now with the aircraft only inches above the runway, the afterburners accelerated allowing him to gently fly the aircraft away from the runway back into the traffic pattern. Major Taylor accomplished an alternate gear extension and asked an F-4 chase aircraft to confirm all gear down and locked. He then flew a straight-in approach to landing and stopped the aircraft straight ahead so ground personnel could pin the landing gear. Major Taylor's presence of mind and airmanship probably averted injury to himself and saved a valuable aircraft. WELL DONE! ■

'Tis The SEASON

To Stay ALERT