flying

SAFETY

JANUARY 1991

Mishap Summaries

THE HEAVIES

THERE I WAS

■ Finally, it was checkride day in the old B-52G. Our crew's previous flight had been nearly flawless, and our hopes were very high for a repeat performance.

Our crew was fairly young with the exception of the radar navigator and myself . . . I was going through aircraft commander requal training.

The briefings, preflight, and engine start went smoothly. As we taxied out and received our clearance, the radar broke, and we had to get it fixed — a delayed takeoff, and we started to alter our flight plan. Finally, we got it fixed and took off about 10 minutes late. Not to worry. We cut our departure short and could still make our rendezvous with the tanker on time.

With a compressed flight plan, we rushed through each checklist in order to catch up. All this rushing had raised my body temperature a little, so I told my young copilot to turn down the air-conditioner. As we approached the tanker, I was getting even warmer, so I hounded the copilot to keep turning the temperature down. I told him to hold it in the manual cold position.

The air refueling track was cut short due to tanker malfunctions, so we continued on toward low level. Again we tried to reduce the cabin temperature, but to no avail. I now suspected the air-conditioner had gone to "full hot," so we reviewed the Dash-1 procedures and proceeded with our flight.

The closer to low level we got, the warmer the cockpit became. We decided to complete as much of the low level as we could with the air-conditioner in Ram to try and help cool our equipment. During low level, the radar set shut down several times due to overheating . . . but we continued.

As we exited the low-level route, the air-conditioner remained in Ram, so we had to put our oxygen masks on to complete the hour-and-a-half flight back to home base! Once there, we still had 90 more minutes in the traffic pattern to complete the checkride.

I remember stepping out of the aircraft after landing and remarked how "cool" it felt. The temperature was 110 degrees!

Lesson: Don't be so mission oriented you overlook good common sense and good airmanship. ■

UNITED STATES AIR FORCE

flying

SAFETY MAGAZINE

AIR FORCE SPECIAL PUBLICATION 127-2 | JANUARY 1991 | VOLUME 47, NUMBER 1

CONTRIBUTIONS

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

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SPECIAL FEATURES

REGULAR FEATURES

DEPARTMENT OF THE AIR FORCE • THE INSPECTOR GENERAL, OSAF

PURPOSE — *Flying Safety* (USPS 586-410) is published monthly by the USAF, Norton AFB CA 92409-7001, to promote aircraft mishap prevention. Use of funds for printing the publication has been approved by Headquarters, United States Air Force, Department of Defense, Washington, D.C. Facts, testimony, and conclusions of aircraft mishaps printed herein may not be construed as incriminating under Article 31 of the Uniform Code of Military Justice. All names used in mishap stories are fictitious. The contents of this magazine are non-directive and should not be construed as regulations, technical orders, or directives unless so stated. **SUBSCRIPTIONS** — For sale by the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402. Changes in subscription mailings should be sent to the above address. No back copies of the magazine can be furnished. **REPRINTS** — Air Force organizations may reprint articles from *Flying Safety* without further authorization. Non-Air Force organizations must advise the Editor of the intended use of the material prior to reprinting. Such action will ensure complete accuracy of material amended in light of most recent developments. **DISTRIBUTION** — One copy for each six aircrew members. One copy for each 12 aircrew support and maintenance personnel. Air Force units must contact their base PDO to establish or change requirements. AFSP 127-2 is entered as a publication at the Second-Class rate at San Bernardino Postal Service, 1900 W. Redlands Boulevard, Redlands, CA 92373 and additional entries. **POSTMASTER:** Send address changes to *Flying Safety.*

B-1B

MAJOR KELLY M. HAGGAR
Directorate of Aerospace Safety

■ In 1736, Benjamin Franklin lost his 4-year-old boy to the smallpox. He had this to say about it in his autobiography:

> I long regretted him bitterly and still regret that I had not given it to him by inoculation. This I mention for the sake of parents who omit that operation, on the supposition that they should never forgive themselves if a child died under it; my example showing that the regret may be the same either way and, therefore, that the safer should be chosen.

Some 250 years have passed, but our late ambassador to France is still exactly right. Resources are limited, demands are great, risks abound all about us, yet a path must still be chosen. Airplanes aren't made of "marvelinium" — only the Klingons know how to build "cloaking devices." The rest of us mere mortals have to fly, maintain, manage, and employ the B-1 according to what our admittedly imperfect knowledge can tell us about *which* path is both "effective" and "safe."

Class A Mishap

From that perspective, how did the B-1B do in 1990? The B-1B's ORI results should have silenced "effectiveness" critics of the aircraft. AFISC's area of primary interest is safety.

In FY90, the B-1B had one flight Class A mishap for an annual rate of 3.83 and a lifetime rate, through 7 years of service, of 4.78 overall. (Figure 1 continues last year's comparison with other bomber aircraft.)

The sole 1990 mishap involved a fire in an equipment bay for the Defensive Avionics System (DAS). Not only was the aircraft not destroyed, but it was EWO capable even after the fire and could have been rapidly turned and loaded for another sortie under wartime conditions. Moreover, the DAS did not start or sustain the fire. Its involvement was limited to being damaged by the fire. The source of the fire was found and corrected through a diligent investigation effort.

Class B Mishaps

Figure 2 gives the complete mishap picture for the B-1B over the last 4 years. By now, everyone must have seen film of one of the Class B mishaps on television. The 4 October 1989 nose gear-up landing on the lakebed at Edwards AFB was

FIGURE 1
MISHAP EXPERIENCE IN THE SEVENTH YEAR OF SERVICE

Aircraft	Year Seven	Class A	Destroyed	Rate
B-47	1959	24	22	3.8
B-52	1961	6	6	1.8
B-58	1966	1	1	3.2
B-1B	1990	1	0	3.8

broadcast live on several stations in California and picked up by a news network nationwide. The crew handled the emergency superbly, and the robust structure of the B-1B easily coped with the lakebed slide. The other Class B was an engine FOD incident.

Class C and HAP

As can be seen from Figure 3, which breaks out the Class C and HAP mishaps, FOD keeps four B-1B wing safety staffs busy churning out Class C reports and the jet shops occupied blending blades. While it's a high man-hour consumer, the FOD problem itself did not threaten the B-1B in flight in FY90. FOD has led to only one in-flight shutdown in the life of the aircraft. In nearly all cases, the crew is never even aware of a FOD. Closer attention to proper fastener length and aggressive airfield pavement maintenance seem to be the keys to FOD control in the B-1B.

By contrast, a B-1B crew knows when they've hit a bird! The B-1B had 28 bird strikes between 1 January 1987 and 30 September 1990. Twelve windows were hit in 11 incidents in that time. All of the window hits were during high-speed, low-level flight. (The double window hit occurred at night, but the crew easily recovered their stricken aircraft at home station.) While there have been some windows shatter during installation and two in flight, the windshield is a strong transparency success story. The USAF knew the aircraft would be in the low, fast environment with birds, wanted a stout window — and got it. Keep your visor down anyway, but experience shows a B-1B windshield can take a bird at 9 miles per minute and protect the crew.

Safety Improvements

Turning now to safety-related modifications, the largest effort on the aircraft is in the overwing fairing (OWF). Two Class IVA modifications are in work in the OWF — they are "Fire Protection" and "Fire Prevention."

The first mod installs a pair of additional fire detection loops in each OWF. These are the same type of loops currently used in the engine bays. One loop will go above the wing in the fixed area of the glove, and the other will go under the

continued

FIGURE 2
B-1B MISHAP EXPERIENCE, 1987-1990

Year	Annual Rate	Lifetime Rate	Class A	Class B	Class C	HAP
1990	3.83	4.78	1	2	45	11
1989	7.66	5.21	2	0	57	14
1988	0	3.18	0	1	41	9
1987*	11.96	8.49	1	2	16	3

*1 January 1987 to 30 September 1987

FIGURE 3
LEADING CLASS C AND HAP EVENTS

	1987*	1988	1989	1990	Total
FOD	10	27	30	30	97
Bird Strikes	4	6	9	8	27
Icing	2	3	9	4	18
Engine Shutdown	1	3	2	1	7

*1 January 1987 to 30 September 1987

wing's swept position. This lower loop will provide detection coverage above and between the engines. The fuel isolation valves currently installed in the 2-inch cooling loop and 4-inch main flex fuel lines will be reactivated as well.

The second OWF mod, "prevention," is a package of changes to the OWF. Dams and drains will be installed in the OWF and nacelle structure to prevent any leaking fuel from reaching an ignition source. More extensive insulation will be provided for the bleed air precooler. Finally, a fire suppression system using an additional pair of Halon bottles is planned.

Most of the scheduling issues on these two complex modifications have been resolved. The OWF refit will take priority over both normal training and alert growth rates and is SAC's top B-1B priority. Halon usage does raise some environmental issues, but there really isn't any substitute usable for it in the B-1B. If no funding snags develop, the last aircraft will be modified late in 1993.

There are a number of other modifications pending on the B-1B. The EMUX/sparkle problem will be fixed in conjunction with activation of the Stability Enhancement Function next summer. Both mods should be complete by June 1992. More than three-quarters of the fleet have been brought up to the "MOD 0" DAS configuration. Phase II of the Redball Program will update and standardize the DAS of another 19 aircraft.

Both the Tail Warning Function and the Radar Warning Receiver programs have recently encountered problems with funding and development. The ALR-56M, ALQ-153, or ALQ-156 may one day become part of the ECM suite on the aircraft.

Despite the DAS problems and the supportability troubles early in the program, the B-1B is an exceptionally safe and capable aircraft that will serve the USAF well in both SIOP and conventional missions for many more years. We should not let the ALQ-161 problems obscure the B-1B's superb ability to accurately deliver weapons if called upon by the nation. The aircraft has a fine mishap record considering its complexity, capabilities, and its relatively new status. The B-1B is on track and getting better, a testament to the crews and maintainers of the foremost strategic bomber in the USAF. ■

For Your Information

■ Those of a historical bent who would like a fuller review of one analysis on the "how and why" behind the B-1B's early teething troubles should contact the Logistics Management Institute (LMI), 6400 Goldsboro Road, Bethesda MD 20817-5886. Ask for their June 1990 monograph, "The Impact of Acquisition Strategy on B-1B Support." This LMI publication, while prepared under a DOD contract, is *not* an official DOD view of the B-1B program. However, it is interesting, thought-provoking, and ought to liven up meetings of the finance committee across SAC's alert pads. ■

B-52

MAJOR KELLY M. HAGGAR
Directorate of Aerospace Safety

■ It's times like these that focus a B-52 crewmember's attention on why there are B-52s. How many of you read this in the October 1989 issue of *Air Force Magazine?*

". . . there are lots of 'Balkans' all around the world where war could start. The Soviet influence tended to keep them under control. But they have their own dynamics, and they'll be more likely to create tensions as the superpower influence recedes.

"It may be difficult to explain this to the American people, but the threat to the US will nonetheless be at least as real as it is now. The potential threat to the United States at the height of the Cold War was probably greater in terms of nuclear exchange. But now the real threat, in terms of Americans really being put at risk and dying, could come at us from all angles and could be, in fact, much worse in a multipolar world."

James Canan interviewed Col Mike Hayden of the Strategy Division, Plans Directorate, HQ USAF Plans and Operations. (The complete article, "Global Power From American Shores," appears on pages 38 to 44.)

A Little History

The purpose of a bomber is not to be safe — rather it is to be ready and able to go into harm's way to safeguard the nation's interests. Among other things, the role of safety in that effort is to preserve assets in peacetime so the crews and planes will be available against the day that bombs, not tones, are dropped.

By that standard, FY90 was a super year for the B-52. There were no Class A mishaps — the sixth time in the B-52's service there have been no such mishaps. (The other years were 1955, 1976, 1985, 1986, and 1987.) The B-52 has had a very good

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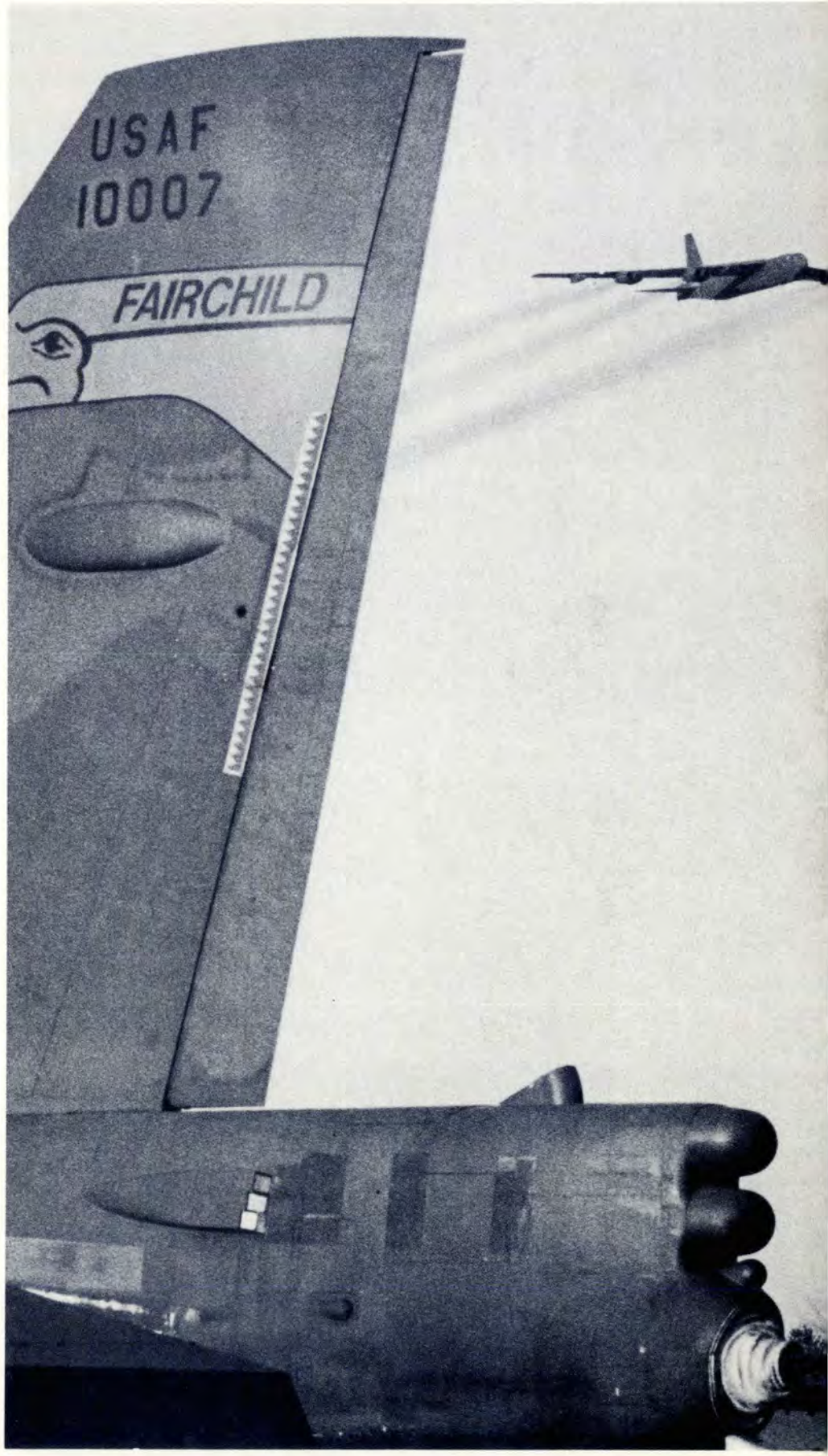

mishap rate, with a lifetime average (1955-1990) of 1.30 overall. In 13 of those 35 years, there was only one Class A mishap. (The worst year, 1969, saw nine Class A mishaps destroy eight aircraft.) Figure 1 depicts the most recent 4 years of mishap experience, while Figure 2 covers the main trends among Class C and HAP incidents.

Class Cs and HAPs

Most of the physiological mishaps will be depressingly familiar to flight surgeons: Crewmembers trying to fly with colds, a touch of flu, or a sinus condition. Anyone who has ever had a choice ear or sinus block knows why not to have a second one. Heed them, and go DNIF when you need to.

Most of the engine problems fall into low oil pressure, real or indicated, and fuel problems, usually manifolds or burner cans. About once a year, a TF-33 throws a second-stage fan blade. TCTO -973 (G) or -661(H) installs a flex-mounted fuel manifold with better joints. Until it's complete, we'll probably continue to see about one fire a year in the fleet. Engines aren't made of "marvelinium" either, and the manifold TCTO accomplishment rate is a good balance between cost, risk, man-hours, and competing mods.

The hatchlifter push rod problem has been rigorously explored by both SAC and AFLC. If you haven't seen the HQ SAC/IGF message 152230Z February 1990, "B-52 Ejection Hatch Pushrods," drop by your

FIGURE 1
B-52G/H MISHAP EXPERIENCE, 1987-1990

Year	Annual Rate	Lifetime Rate	Class A	Class B	Class C	HAP
1990	0	1.30	0	0	61	20
1989	.99	1.32	1	0	56	37
1988	2.04	1.33	2	0	54	27
1987	0	1.32	0	1	38	16

*1 January 1987 to 30 September 1987

FIGURE 2
LEADING CLASS C AND HAP EVENTS

	1987*	1988	1989	1990
Pressurization	8	7	6	7
Physiological	12	20	11	13
Engine Shutdown	13	8	13	14
Bird strikes	4	10	8	8
Extended takeoff roll	0	7	4	6
Failure to reach S-1	0	4	9	7
Hatchlifter pushrods	2	1	6	5
Antiskid/brakes	4	4	2	0

*1 January 1987 to 30 September 1987

DO or SE office and take a peek at it. While pushrod failure may be unsettling to the EW or gunner, it does not affect the reliability or capability of the ejection seat, nor will it lead to uncommanded hatch jettison. Replacement during the programmed depot maintenance (PDM) cycle is the best way to handle the pushrod failures and will be done by April 1992. (A tip of the hat to Minot AFB, North Dakota, safety office for suggesting reclaimed hatches from Davis-Monthan AFB, Arizona, be screened for old pushrods prior to issue.)

The S-1 failure or extended roll problem is proving harder to pin down. We've been through a cycle of this before, back in 1983-84. The airplane checks out fine after landing so often that no single cause has yet been found. However, since March 1988, every incident except one has been on a G model. (The sole H extended roll was traced to a loose brake cable.) Several efforts are under way to resolve these disturbing incidents.

The new rudder pedal (TCTO 2495) doesn't have a toe ridge, which ought to reduce inadvertent brake application during rudder inputs. The hydraulic filters are being changed more frequently (every 100 hours), and the fluid is getting a much better purge/flush filtration system. The new brake wear indicators and self-adjustors are being installed by field level TCTO-2492, to finish around November 1991. New and better brake linings are being tested, and an improved Mark III antiskid is a possibility for the B-52. Additionally, all trunnion swivel valves are now replaced at each PDM cycle at the depot.

We may find solving the B-52 brake and antiskid problems also cures the S-1 and extended roll HAPs. These could well be two halves of the same coin. Even if they ultimately prove to be unrelated, the brake and antiskid upgrades are worth while in their own right. The final B-52 project in this area is TCTO 2496, which will install failure lights for the current antiskid system on the right cockpit side panel. It will be complete around September 1991.

There are a number of other safety mods in work for the B-52:

- TCTO 2487 is complete. This changed the fuel pump caps to a new design that did not require a flame damper.
- TCTO 2479 is a new fuel pump purchase to replace all current body and external tank pumps. It will be complete by January 1992.
- TCTO 2478 provides the gunner and EW with an additional jettison handle to pop their hatches without having to rotate the seat levers or to risk arming their seats. Kit proofing on this field-level mod went well. All the kits have been delivered, but deployment will delay installation.
- The "47 section tie down" mod does not yet have an assigned TCTO number. This mod will enable some 2,000 pounds of fly away and mobility support gear to be safely carried in the 47 section, aft of the aft body fuel tank. H models will receive the mod as part of their common strategic rotary launcher refit. The Gs will get it as a field-level installation of a Boeing-produced kit. The last aircraft will be completed late in 1993.

Numerous other modifications are being planned or studied for additional B-52 capabilities. These range from the Global Positioning System to improved lighting that is more compatible with night vision goggles. These mods, coupled with continued strong performance by SAC's fliers and knuckle busters, will ensure the B-52 remains both "effective" and "safe." ■

A Suggestion for Further Reading

■ An old but still current document is the 1 October 1974 classified study, *B-52 Combat Damage Analysis*. This study covers every B-52 damaged or destroyed by enemy action in Vietnam and is still being published by the Joint Technical Coordinating Group for Munitions Effectiveness. The number is 61JTCG/ME-75-1. If your IN or DOX shops don't have it, contact OC-ALC/TISUD, Tinker AFB, Oklahoma, 73145-5990, DSN 336-5468. They'll have to open an account (if they don't already have one) to receive JTCG/ME publications, but this one is worth the trouble to get.

Anyone who doubts the strong, positive correlation between peacetime discipline and combat results needs to read *B-52 Combat Damage Analysis.* The long hours of study, seemingly endless emergency procedures tests, and recurring simulator rides in SAC paid off when it counted. There were some spectacular saves of very badly shot up B-52s that could only have been pulled off by sharp crews. (The story of Ash 1 in the August 1990 issue of *Flying Safety* was nearly another save.)

True, there were some B-52s more or less instantly destroyed by direct SAM hits. Yes, a single Sidewinder (GAR-8 then; AIM-9 now) did prove enough to knock down a B-52 in 1961. However, those weren't the usual outcomes. The B-52s got through the defenses, got their targets, and brought their crews back even when badly hit. ■

C-5/C-141

MAJOR DON LARSON
Directorate of Aerospace Safety

■ It is time once again to review the safety performance of the strategic airlift world in FY90. Last year provided some of the most demanding flying ever experienced in MAC. Operation Just Cause required a short notice, maximum effort from both our airland and our airdrop aircrews. Operation Desert Shield produced the highest sustained airlift in the history of MAC and was responsible for deterring further aggression in the Middle East.

Both operations stretched man and machine to their operational limits. MAC's capability to perform these missions effectively and safely throughout the year can be attributed to the skill and professionalism of the aircrews and the dedication and expertise of the men and women who maintain the aircraft.

Initially, I will comment on a couple of areas common to both the C-5 and the C-141. Later on, I'll address those areas of interest unique to each weapon system.

Reflecting on the safety accomplishments over the last year produces a "good news, bad news" routine (see figure 1). The good news is the combined total of all reportable mishaps in the C-5/C-141 world was a record low. The C-5 fleet had only two more than its all-time best (recorded 2 years ago). The C-141 community managed to improve on their record low last year by decreasing their mishaps by over 25 percent. For the third straight year, there were no reportable Class B mishaps in either weapon system.

The bad news is, for the second consecutive year, each weapon system was involved in a major mishap with loss of life or a severely damaged aircraft. In January, a C-141 flying no. 3 in a formation airdrop of personnel flew into the parachutes of three paratroopers from the no. 2 aircraft. One paratrooper was fatally injured when his reserve parachute failed to open. Although this was classified as a flight-related mishap, it does not minimize the tragic loss of life or the valuable lessons we can learn from it.

The C-5 Class A mishap occurred in August at a European base. The C-5, flying an exercise support mission, crashed shortly after takeoff, less than ½ mile from the departure end of the runway resulting in 13 fatalities and one destroyed aircraft.

While logistics-related mishaps continue to decrease, those involv-

Figure 1

C-5 Mishaps (FY 1988-1990)

CLASS	88	89	90
A	0	1	1
B	0	0	0
C	15	17	23
HAP	10	8	3
TOTAL	25	26	27

ing human factors are not. A recent analysis of Class A mishaps Air Force-wide showed as much as 85 percent of them were directly related to human factors. The strategic airlift world mirrors this trend.

Three of the last four major mishaps in the C-5/C-141 were directly attributable to human factors. Investigation on the fourth (the C-5 on takeoff leg) had not been completed when this article was written.

Dealing With Human Factors

Can we eliminate human factors-related mishaps? Probably not; at least not until we eliminate the human from the equation. Can we begin to reduce them? I think we can. I don't have a cure-all solution, but I would like to present a few not-so-new ideas for your review.

One of the most important steps to combatting human factor-related mishaps is a mental one. We, as crewmembers, have to recognize and be willing to admit to ourselves and our peers we can fail — we are capable of making a mistake. This admission of our own limitations provides us with the motivation to try and find ways to compensate for our "humanness." Using mishaps from this past year and 20/20 hindsight, I have tried to come up with a few practical suggestions to help guard against our human tendencies and minimize our mistakes.

Work As A Crew

We need to raise the practice and enforcement of the crew concept to a higher level. MAC has pioneered the idea of Aircrew Coordination Training (ACT) which trains us to work together when things aren't going too well. It should also include how to work as a crew when things are going smoothly, how to help each other out, and how to back each other up.

For example, the engineer can back up the pilots by bringing his altimeter into his cross-check more. Set the correct setting in every time it is called for in the checklist, and then be aware of what the critical altitudes are during a departure or on approach. If you are not sure, ask the pilot to brief them to you. The scanner or third pilot occupying the jumpseat should also have specific parameters he is monitoring. He should look for proper climb or descent rates, briefed airspeeds, critical altitudes, and have access to a terrain chart in IMC conditions during approach and departure. Several recent mishaps may have been averted had the engineer or jumpseat been watching for high sink rates and/or briefed altitude deviations when the pilots became distracted or channelized on other things.

Obviously, there are many more ways of working together and backing each other up. Be creative. Use the crew resources available to you in the most effective way possible.

Be Prepared

How many times have pilots whizzed through mission planning in base ops just so we could have a nice leisurely meal at the local grease bar prior to departure? More times than I care to admit. A MAC crew flying into a strange field at night in marginal weather landed short of the runway, causing extensive damage. The pilots admittedly were unfamiliar with the approach lighting configuration. If we leave base ops without carefully studying all of the appropriate pubs, reviewing possible approaches at the destination and alternate, and obtaining a terrain chart for departure and destination bases, we have shorted ourselves and our crew and have greatly increased our potential for a mishap.

Preparation and planning don't just take place on the ground. Another crew was flying an approach to a wet, short runway (7,200 feet) with a tailwind and a computed landing distance of 6,000 feet. After touchdown, the pilot had difficulty initially deploying the thrust reversers. This caused him to delay using

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the spoilers and maximum braking which resulted in his coming to a stop past the departure end of the runway. Preparing for the landing under those specific conditions might have allowed him to review his actions and change his normal touchdown habit pattern to come on the brakes sooner.

Fight Complacency

Let's face it — on the surface, a lot of what we do in MAC is boringly routine — clear weather, engine start, taxi, takeoff, cruise, and vectors to an ILS straight-in full stop on a long runway. But it is these seemingly ideal conditions where we can get ourselves into the most trouble. We have all read recently about the civilian aircrew who failed to set the flaps properly prior to takeoff and probably thought smugly to ourselves, "I would never allow that to happen." Think again!

An Air Force C-9 crew aborted a takeoff from an intermediate mission stop when the pilot was unable to rotate at rotation speed. Apparently, during the ground time, the instructor flight mechanic conducted some cockpit training and had engaged the autopilot which probably trimmed the horizontal stabilizer to full nose down. During the taxi checklist, the pilots were distracted momentarily and failed to verify the correct trim setting.

As the pilot advanced the throttles for takeoff, the takeoff warning horn sounded due to the incorrect trim setting. After verifying only the flaps, slats, and spoilers were correctly set, the crew elected to continue the takeoff, suspecting it to be a warning horn malfunction. **You say it couldn't happen to you? It can and it will if you are not paying attention.**

A C-5 was taxiing out for takeoff when two engines on the same side simultaneously flamed out for an undetermined reason. Only an extended taxi route kept the aircraft from being on takeoff roll or airborne when that happened. **Would you be ready to handle loss of two engines on takeoff?** A C-141 flamed out two engines while taxiing in from landing because the engineer used improper fuel transfer procedures. Was there a little complacency performing a routine procedure that had been accomplished many times in the past? Probably.

Complacency is dangerous during any phase of flight, but it is especially so during routine, but critical, phases of flight. We need to treat every takeoff, every approach and landing, and every checklist accomplished as a unique event requiring our undivided attention. Expect the unexpected.

I'll step off my soapbox now. As a direct result of the combined efforts of aircraft and systems engineers, maintenance personnel, and aircraft operators, strategic airlift aircraft continue to enjoy unprecedented levels of flight safety and a continuing reduction in reportable flight mishaps. We can begin to chisel away at the human factors problem by making sure we back each other up, are well prepared for the job we are trained to do, and we don't let our guard down, especially during critical phases of flight. Let me take a few minutes to highlight some weapon system-unique areas of interest.

C-5 Areas of Interest

There were several Class C mishaps worth mentioning. There were two reported instances of flight control malfunctions. One was a hard-over rudder, and the other was an uncommanded aileron input for unknown reasons. Both happened on final approach. One got to 45 degrees of bank before the pilot regained control. There were two cases of fuel savings advisory system (FSAS) auto-throttle failure which caused the overspeed or overtemp of all four engines. FSAS auto-throttle operation is prohibited until the problem can be isolated and fixed.

While taxi mishaps in MAC are way down, one C-5 managed to depart the runway momentarily during a 180-degree turn. While powering up to regain the runway, jet blast blew over one VASI light. The pilot tried to accomplish the turn inside the side stripes, which are normally 140 feet apart, instead of using the full hard-surface width of the runway.

Several modifications have already begun or should begin within the next year. Pending final allocation of funds, the new Malfunction Detection Analysis and Recording System (MADARS) II mod will begin to replace the older and unreliable MADARS I system and is the largest program for the weapon system since the wing mod.

The modification to the C-5A main landing gear involves replacing the landing gear and door actuation system with the less complex, better performing C-5B system, reducing the number of gear boxes from 40 to 8 per aircraft.

Replacement of the existing C-5A engine vibration monitoring system with the C-5B system will improve reliability, reduce the number of in-flight engine shutdowns due to er-

roneous indications, and provide better protection for the engine, airframe, and aircrew.

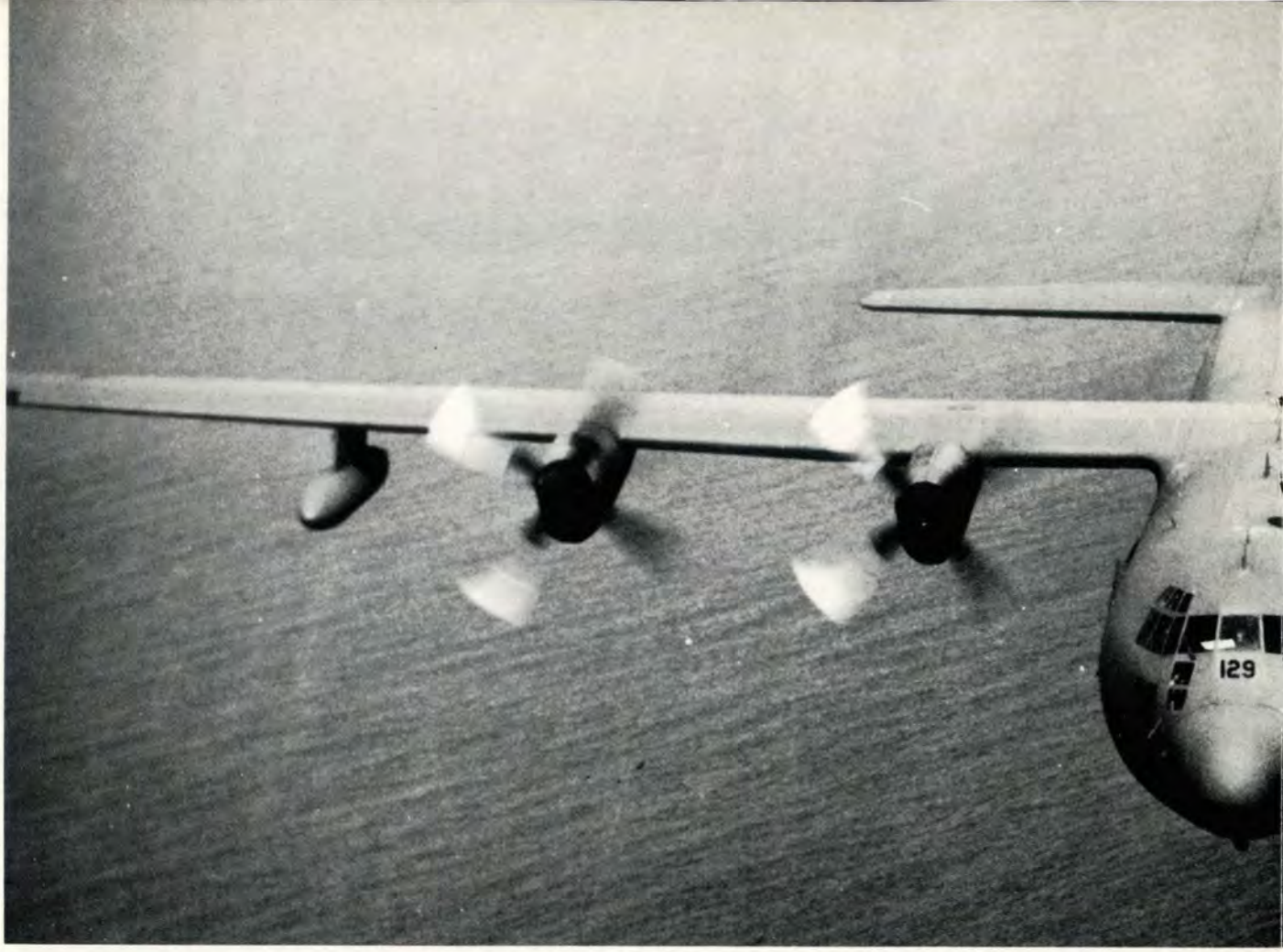
Pylon fire safety improvements include improved pylon fuel coupling, added pylon insulation and fire barrier relocated fire suppression system sensor into the pylon area, and a fire detector lockout kit.

C-141 Areas of Interest

The C-141 had another banner year, reporting no Class A or B flight mishaps and reducing the number of Class C and High Accident Potential (HAP) mishaps from their record low last year. Reported mishaps were spread across a wide range of categories, with no significant trends appearing. Cargo leaks continue to pose a hazard to airborne crews. One developed into a physiological incident when the loadmaster became affected by the fumes he was fighting. On four different occasions, crews were required to run the smoke and fume elimination checklist or the electrical fire checklist.

Structural defects continue to affect the operational capabilities of the C-141. Wing cracks discovered last year have placed operational restrictions on the entire C-141 fleet. The flight restrictions are designed to limit wing loads to below 74 percent of design load. Aircraft will be released from the restrictions following completion of TCTO 528. This TCTO involves a detailed inspection of the affected area and repair to known or suspected problem areas. Because this inspection is very time-consuming and can only be done at the depot or contractor facility, MAC is only projecting 76 airplanes will be unrestricted by October 1991.

Other structural modifications on the books include replacing the center wing box and repairing the pressure bulkhead at station 1398. Like other weapon systems, many mods for the C-141 are competing for funding coming out of a shrinking pool of money. For now, there is understandable hesitancy to commit funds until some basic questions on force structure, role, and C-17 issues are answered. ■



C-130

LT COL MARK E. S. MAYHEW
Directorate of Aerospace Safety

■ FY90 saw the old and new Herks involved in more combat-related actions than any time since the Vietnam era. You also ended the year having accomplished a mission not achieved since 1979 . . . no Class A flight mishaps. In the next few paragraphs, we'll review the year's mishaps, what's going on to improve the aircraft, and what we see on the horizon for the C-130.

Major Mishaps

The record books recorded FY90 as only the fourth year since 1955 that there were no Class A flight mishaps; other years being 1957, 1976, and 1979. Furthermore, there were no Class B flight mishaps. The only other time in its 36-year history neither Class A nor B mishaps occurred was back in 1957. When you consider the age of the airframes and the difficulty of the missions, this achievement takes on added significance.

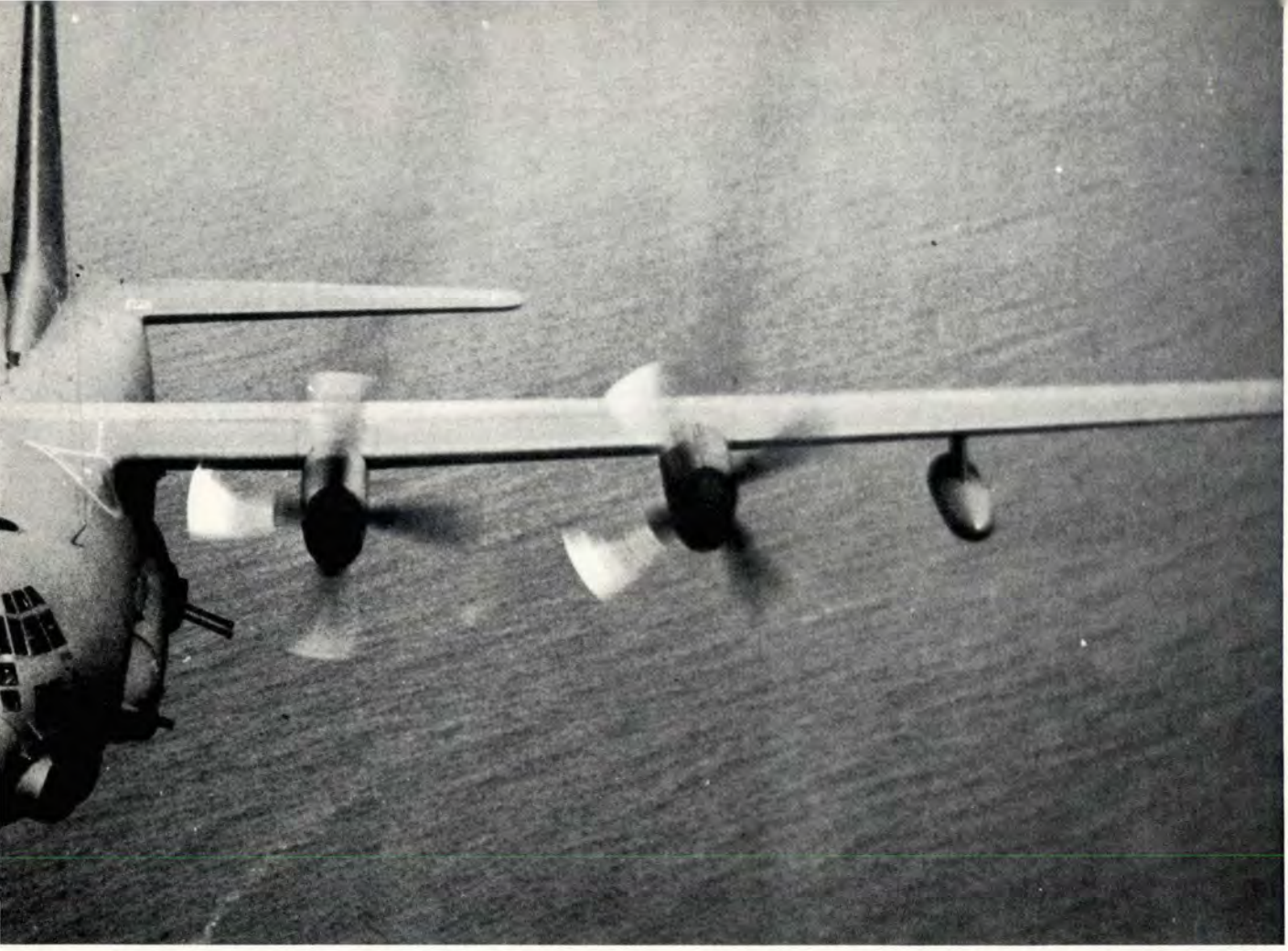
This year the Herk put in over 315,000 flying hours in all environments and in situations ranging from the mundane, to Just Cause, and to Desert Shield. By eliminating any Class A mishaps, not only do I get through this article without having the sad task of telling you about the loss of another of our friends in a mishap, but it also allows us to boast that our historic Class A rate is the lowest ever — 1.09. This is down considerably from the 186.00 we ended with in 1956.

No one feels this accomplishment was either a fluke or pure luck. The last few years have seen an increased emphasis on human factors consideration. Many training programs have sought to identify where human failure could occur and how impending failure could be avoided or at least recognized and minimized. We hope the lessons of desert operations currently under way will be captured and shared with all who fly any model C-130.

Class C and HAP Mishaps

Although at the time I wrote this article, mid-October, all of the data had not been entered into the computer, it still appeared we had fewer Class Cs and HAPs than we had in the recent past. This decrease does not seem to be due to changes in reporting criteria but to actually fewer occurrences. I'd like to take a look at some of the standouts in these categories. (See the table.)

Three/Four Engine Power Loss
As I had mentioned in last year's article, we had hoped we would at least see a turnaround in the number of these mishaps. The initiatives of the folks at Warner-Robins and Sacramento ALCs have greatly affected the number and severity of this problem. Not only has there been a 50 percent decrease in the



number of mishaps, but, as predicted, the torque drop in any one incident is way down. We understand they can never completely be eliminated even with the enhanced electrical system planned for the future, and we must stay prepared to take whatever action might be appropriate should these occur.

Uncommanded Liferaft Deployments This is another success story for the logistics folks. With the installation of the new adapters and filler valves, as well as a review and revision of rigging procedures, the reports have dropped back to where they were before the massive numbers of late 1988 and 1989 reports.

Foam Fires Because of actions taken by the SPM office and MAC, occurrences during refueling operations are all but eliminated. Once the replacement of blue or yellow foam with the charcoal foam is completed in conjunction with planned PDM, the other occurrences should cease. Total change-out of the foam is expected to take about 7 years.

Airdrop Malfunctions Our records show at least five times this year where human error or equipment malfunction combined to provide the opportunity for a load to depart the aircraft at an unplanned time. The stories on all of these events had happy endings, for the most part, in that these gifts from the sky didn't cause significant damage or injury. The folks at MAC are doing their best to come up with solutions.

Sometimes the gadget supposed to prevent the problem ends up assuring it will occur, as in the most recent malfunction. It seems the cover designed to prevent inadvertent actuation of the airdrop system works as desired unless the wrong type of switch is installed. In that case, installing a safety cover depressed the button, and when the door was open, the system functioned correctly, sending the load on its way. A check of that wing's aircraft revealed other such

continued

C-130 Mishaps

Category	FY87	FY88	FY89	FY90
Class C and HAP	127	148	152	128
Significant Areas				
Bird strikes	1	3	10	6
FOD	2	4	4	8
Physiological/injury	19	18	37	16
Lightning strikes	1	10	7	0
Foam fire	7	1	6	6
Two-engine shutdown	2	2	2	0
Flight control malfunction	5	3	2	1
Three- or four-engine power loss	13	18	13	6
Inadvertent liferaft dep	4	5	19	3

C-130 continued

"installations," but the problem should be corrected by the publication of this article.

The Future

In the budgetary environment of today, almost no program is sacred and, therefore, protected. Still, AFLC, ASD, and the operating MAJCOMs are doing their best to field the priority fixes and upgrades to carry the C-130 well into the 21st century and the post Cold War era. There will be significant improvements in our special operations C-130s to increase their avionics systems, their maintainability and reliability, and their combat survivability in the low-altitude night environments.

But from a realistic standpoint, one of the best modifications is in identifying and, if possible, changing those human factors which cause mishaps. Dealing with the personal side of the equations causes us problems for many reasons. First, quantifying and then building a predictive model of human behavior is extremely difficult. Second, I may not be willing, or able, to recognize my weaknesses or to identify them in another crewmember.

We can talk all day about key behaviors which may indicate an individual is not operating at 100 percent, but if we don't admit to ourselves it could happen to us or one of our cohorts, the training is for naught. The "we" who are reading this article are the ones who will be involved in the mishaps. We may not be the cause, but we may be included in the crew or may be able, through our actions, to prevent its occurrence.

We, in the commands with "heavies," may have or hear of one Class A mishap a year in our type aircraft. After hearing the safety brief, you walk away thinking, "how could the crew have done such a dumb thing?" It turns out, given the situation, what the crew did was a human thing, or a series of human things, which were not recognized as fatally wrong.

There are some key areas we have to concentrate on. Crew briefings must be the opportunity, not just to fill the square, but for the crew to review what it plans to do and how it will deal with normal contingencies. It allows the crew commander to assign tasks and receive input to the plan.

Crew attitude must be such that if you are not busy contributing to the progress of the mission, there's something wrong. "Not my job" is not an acceptable mind set. Extra sets of eyes checking specific parameters may be the key to preventing a mishap.

Recognizing a "setup" is another tough one to handle. Examples are: Rushing for an on-time takeoff, diverting into a strange field, an approach to minimums without expecting to do the missed approach, a distraction during an otherwise mundane phase of flight, significant personal problems, or a last-minute schedule change putting you on the flight.

These are just a few, but I think you get the idea. No matter how you fit into the human puzzle that makes the mission happen, aircraft commander or crew chief, your recognition and announcement of these potentially dangerous signs may help the rest of those involved avert a mishap.

Once again, congratulations to the fliers, maintainers, and modifiers of the C-130. Good luck in 1991. ■

Once Again, Thanks For Your Support!

AND THE WINNER
FOR THE AUGUST 1990
DUMB CAPTION CONTEST IS . . .

Jim Burt
Training Department
NAS Corpus Christi, Texas

As in most other things, the Air Force undoubtedly has the greatest in humorists. You've demonstrated your fantastic sense of humor once again and have badly beaten the best offerings of the Dumb Caption Writers of America. We extend our congratulations to Jim Burt as the world's greatest dumb caption entry for the August contest. Your CHEAP LITTLE PRIZE will be in the mail to you as soon as we can get the contest coordinators to stop laughing. But you can begin bragging immediately, Jim.

And it doesn't stop there. The 10 honorable mention entries are so close it's almost impossible to judge. (Many of them received top selections by some of our judges.) Each of you have bragging rights, too.

Honorable Mentions

Gentleman 1=left facing, gentleman 2=center facing, gentleman 3=right facing

1. **(2) What do you mean you traded our plane for some magic seeds?!**
   SSgt Henry R. Harlow, 907 CAMS/MAAA, Rickenbacker ANGB, Ohio

2. **(Far left facing) These new Stealth airplanes are great! Flaps? (2) I'll say. I can't see a thing! (3) Flaps, check.**
   SrA Kevin Martin, 4911 Kahiltna, Apt D, Eielson AFB, Alaska

3. **(2) You gotta believe me, fellas, the maintenance guys said they were just going to cannibalize a FEW parts!!**
   Mr. Norman L. Moore, Jr., 437 MAW/MAM, Charleston AFB, South Carolina

4. **(2) According to this manual, this *RUG* should fly when I say "Upsa Daisy Sezza me."**
   TSgt Rick Maier, 71 FTW/SE, Vance AFB, Oklahoma

5. **(2) Men, I can't tell you what our final destination is because it's classified. And yes, we ARE sitting on a Flying Carpet . . .**
   TSgt Rick Maier, 71 FTW/SE, Vance AFB, Oklahoma

6. **(From L to R — all thinking except #4) (1) Wish I could remember where I left my comb. (2) Lord, if you'll just get me off this crew, I'll never ask you for another thing! (3) Where do we get these guys? (4) No kiddin'! I couldn't have been a fighter pilot. I just like flying Hercs! (5) I wonder if he realizes he's sitting in a puddle of JP-4?**
   Chuck "Guess Who" Woodside, San Antonio ALC/LAKD, Kelly AFB, Texas

7. **(2) I don't know about you guys, but this is not what I envisioned as crew rest.**
   CMSgt Robert D. Martin, 1923 CCSG/LG, Kelly AFB, Texas

8. **(2) Men, we know now that Stealth aircraft can both elude the enemy and those who are taxiing it for takeoff . . . (3) I still can't figure it. How did it just disappear out from around us?!!**
   Lt Col Douglas Jessmer, CAP, West Virginia Wing, Marietta College — Box 657, Campus Mail, Marietta, Ohio

9. **(Far left thinking) Umm — let's see . . . I need to pick up milk, bread, eggs, extra-strength Excedrin® . (This guy's giving me a headache!) (1 thinking) Yak, yak, yak! I wish Joe would hurry up! I gotta go to the John! (3 thinking) Joe *must* be a spy. No way could he afford a ring like that on his salary!**
   Wanda S. Trudell, WRDC/FIM, Wright-Patterson AFB, Ohio

10. **(2) Make up your minds, OK? First it was McDonald's® , then Wendy's® , then Burger King® . Next trip it's a box lunch or nothing.**
    Major Dennis W. Kotkoski, 127 CAM/MAM, Bldg 34, Selfridge ANGB, Maine

C/KC-135

MAJOR JAMES L. WALL
Directorate of Aerospace Safety

■ By the time you read this article, the oldest C-135 will be 34 years old (see sidebar). During FY90, the C-135 fleet flew over 270,000 hours. These hours added to the previous 33 years gives the C/KC-135 fleet a grand total of 9,671,901 since aircraft 3127 became operational. This article will discuss FY90's Class A mishap, Class C and High Accident Potential (HAP) mishaps, and highlight some of the ongoing and proposed -135 modifications.

Class A Mishap

The C/KC-135 experienced only one Class A mishap in FY90. This mishap resulted in the death of all four crewmembers and brings the total fatalities in C/KC-135 mishaps to 625 individuals. During its many years of flying, the C/KC-135 has been involved in 73 Class A mishaps which resulted in the destruction of 62 aircraft.

Class C and HAP Mishaps

FY90 data are shown in the figure, along with the preceding 3 years of comparable mishaps. As can be readily seen, engine mishaps, which include FOD, have increased dramatically. One SAC base skewed the FY90 data when it discovered its runway was being ingested by the engines. Conversely, physiological mishaps have had a steady decline over the past several years.

Safety Concerns

Of particular interest and concern to anyone flying a -135 equipped with a Fuel Savings Advisory Cockpit Avionics System (FSACAS) have been the results of several mishaps. We now believe a FSACAS malfunction is capable of turning on the air refueling pumps with those pump switches in the off position and the respective circuit breakers pulled. If this happens when the aft or forward fuel gauges are blank or "dashed," the crewmember will not have a means to adequately monitor this situation.

It is highly recommended crewmembers follow Dash-1 and command guidance when accepting an aircraft, or continuing flight, when fuel gauge readings are not available. Corrective actions for this problem may be many years away!

AFR 60-18

Sometime in your career you may be tasked to participate in an airshow. Pilots should remember there is specific guidance concerning airshow activities located in command directives and AFR 60-18, *Air Force Participation in Aerial Events*. First and foremost, if you fly *in front of a crowd*, even for a flyover, i.e., change of command ceremony, or pub-

A Comparison of Mishap Categories

Category	FY87*	FY88	FY89	FY90
Air refueling	16	13	12	16
Bird strike	11	10	13	12
Engines	7	23	19	35
Physiological	26	16	18	9

*1 January 1987 to 30 September 1987

lished low approach, you are still governed by AFR 60-18.

Two rules to remember: First, the weather must be 2,500 and 5 miles visibility (special VFR does not apply); and the second, your height must be 1,000 feet AGL with an airspeed of stall plus 30 percent (remember to add for bank angles).

Retread Tires

A recent change to the manufacturing of C-135 tires results in a rash of blown tires. The system is still correcting the problem (going back to the old tire design) by replacing these new tires. Pilots can determine, during their walkaround, if they have a potential problem tire by looking for the lettering QTR 85-01 along the side of the tire.

Autopilot

Many of the aircraft have been equipped with the new Digital Automatic Flight Control System; however, the use of this autopilot is currently restricted. The corrective action will be a software change to the autopilot's main computer. Crews should be able to resume full use of the autopilot shortly after the beginning of the year (if the cause of the problems has really been identified and corrected).

Air Refueling Pumps

An automatic shutoff feature is being designed to shut the air refueling pumps off when they run dry. Additionally, a light on the fuel panel will tell the pilots the pumps have automatically shut off. Estimated TCTO start date will be the second half of 1991, with completion scheduled for 1 year later.

Ground Collision Avoidance System (GCAS)

Recently, all of the open Class A recommendations concerning the installation of a GCAS were closed. The C/KC-135 community has had almost 20 controlled-flight-into-terrain (CFIT) and 11 stall mishaps. These 31 Class A mishaps cost 376 lives. Some of these mishaps might have been prevented had a GCAS been installed. The C-130 and C-141 fleets are currently in contract discussions on upgrading the C-141 GCAS and installing a state-of-the-art GCAS in the C-130.

GCAS, for the C-135, is still a proposed modification encompassed in the Avionics Modernization Proposal and does not currently contain a stall warning provision. However, the proposal is not scheduled for several more years. During the wait, the C-135 will probably experience between one and two, possibly preventable, CFIT or stall mishaps.

Strobe Lights

On a happier note, many years ago I participated in a C-135 Class A mishap board which recommended the C-135 be modified with strobe lights. Over the ensuing years, I have followed this open recommendation and, to my delight, found a contract had recently been awarded to equip the C-135 with strobes. Modification should begin in the first half of 1991 and be completed within 2 to 4 years.

A great help in making this modification a reality was the fact a Class IVA mod for strobe lights had been approved for the C-141 and C-130 fleets. (Seems like those aircraft are always in the forefront for safety modifications.)

The Future

There are still many modifications planned, or in the works, on the C/KC-135 fleet. Being in the safety business, I tend to concentrate on these few. Some have been previously mentioned: GCAS, strobe lights, and FSACAS, but maybe the most important change is the new Crew Resource Management (CRM) program being taught.

When we looked at how many mishaps had been caused by human error, we arrived at a staggering number — 85 percent. The civilian world had a little better rate — 70 percent. In the C/KC-135 community, at least 60 percent of our Class A mishaps were either directly or indirectly caused by human factor errors. Clearly, this is an area where added attention can result in positive results.

Some may find CRM training not to their liking, but results speak for themselves. The Navy and Marine rotorcraft mishap rate, caused by human error, has dropped 60 percent since CRM was introduced into their training. CRM may be the most important training you receive for it may one day save your life. ■

Some Interesting Info

■ For the C/KC-135 history students, I have dug back into the dark dungeons at HQ AFISC — my bottom right-hand desk drawer — and pulled some informative figures and dates concerning the C/KC-135 aircraft.

The first KC-135 to be placed in operational service with SAC was 55-3129 and was assigned to the 93d Bombardment Wing at Castle AFB, California, on 18 June 1957. The oldest C/KC-135, now an NKC-135A, serial number 55-3127, was delivered to the Air Force on 31 January 1957 and is currently assigned to AFSC at Wright-Patterson AFB, Ohio. The -135 with the highest number of flight hours is an RC-135W, serial number 62-4134, stationed at Offutt AFB, Nebraska, which has flown a total of 37,161.5 hours as of 1 November 1990. The first KC-135 built, serial number 55-3118, christened the "City of Renton" on 18 July 1956, is now an EC-135K assigned to TAC and stationed at Tinker AFB, Oklahoma. Of the 808 -135 aircraft built for the Air Force, 734 are still in the active inventory. Seventy-four aircraft have been attrited: 62 in flight mishaps, 8 during ground mishaps, 4 for tests or displays in museums. One aircraft (still in the active inventory), a GNC-135A assigned to ATC, serves as a ground trainer at Chanute AFB, Illinois. ■

KC-10

MAJOR JAMES L. WALL
Directorate of Aerospace Safety

■ FY90 was another outstanding year for the KC-10 fleet. The 59 aircraft flew a total of 51,302 Class A mishap-free hours. Throughout its history, the KC-10 has flown 270,088 Class A mishap-free hours. No Class B mishaps were reported during the previous year, and Class C and HAP mishaps were much lower (with the exception of air refueling mishaps). The figure gives a comparison of FY90 mishaps in four common categories with the previous 4 years.

System Safety Items

During the most recent KC-10 system safety group meeting, 25 October 1990, discussions covered several engine safety issues. The exact counting of engine cycles, other than a start and shutdown, is still undecided. Currently, low approaches and throttle changes during air refueling are not counted as cycles but touch-and-go's are. Two engines will be taken off aircraft and torn down to determine exact wear and tear. Then, the system program manager's office will determine if procedures to count additional cycles need to be changed.

Most of the engine-driven fuel pumps have been changed, with those remaining pumps scheduled to be changed out when they reach 3,500 hours. Crews should find any old pumps are installed only on engine no. 2. All engines should have new pumps within 2 years.

After a recent mishap, it was discovered escape slides were not being inspected as thoroughly as deemed necessary. Maintenance cards have now been changed to ensure appropriate left and right slides are placed in the proper position. Additional information clarifying how many escape slides are necessary should be out shortly.

A Mishap Comparison

	CY 86	FY 87*	FY 88	FY 89	FY 90
Air refueling	7	2	4	6	9
Bird strike	1	1	1	2	1
Cargo	0	2	2	1	0
Engine	0	1	3	5	0
Physiological	0	0	3	0	2

*1 January 1987 to 30 September 1987

There will be several improvements in the centerline hose and drogue refueling system. First, the guillotine system is being improved so when you need to get rid of the hose, it should work. Secondly, the sensitivity of the hose takeup system is being changed to help prevent sine wave drogue losses due to receiver contacts. Several of this previous year's air refueling class C/HAP mishaps were a result of this problem.

Recently, we have seen instances of delimitation of the thrust reversers. It was originally believed these were flight-time change-out items. The civilian DC-10 fleet usually changed out at 10,000 cycles or about every 5 years. We now know 5 years is the limiting factor, and replacement schedules have now been changed.

Of particular importance is the variety of locations that you, as a KC-10 crewmember, may find yourself. Not all airfields were designed to specifically accommodate KC-10s, especially taxiways. Crewmembers need to use some extra caution and even scanners when they are faced with taxiing in an unfamiliar location or on a narrow taxiway.

Again, congratulations for another Class A mishap-free year. ■

WRITE A DUMB CAPTION CONTEST THING

The UODCWA (United Organization of Dumb Caption Writers of America), led by Byron Q. Lackluster, President and International Director, have put up a fuss for months now about how our writers have been made to appear foolish by you, our brilliant and very humorous readers, for topping their captions in the Dumb Caption Contest Thing each month. Their precious little egos have been hurt, and they now want to put the shoe on the other foot.

They've gotten one of the regular members of the staff to come up with this month's photo and put a caption on it. They seem to think this will make it easier for them to win. Well, we don't think they've got a chance against you folks but we're going to let them try. Maybe that will stop them from sniveling all the time.

Write your captions on a slip of paper and tape it on a photo copy of this page. DO NOT SEND US THE MAGAZINE PAGE. Use "balloon" captions for each person in the photo or use a caption under the entire page. Entries will be judged by a panel of experts on humor in March 1991. All decisions are open to bribes in excess of $100,000. In fact, make it big enough and we'll go back and make you the winner of previous contests.

Send your entries to **"Dumb Caption Contest Thing"** • *Flying Safety* Magazine • HQ AFISC/SEPP • Norton AFB, CA 92409-7001

HELICOPTERS

MAJOR JOSEPH J. POUNDER III
Directorate of Aerospace Safety

■ Another record was set for USAF helicopters in 1990. For the first time in history, there were *no* Class A or B helicopter mishaps. This is a remarkable accomplishment considering the increasingly demanding missions we are required to fly and the age of most of our aircraft.

I've flown a lot of diverse operations. The common denominator I saw among all units was professionalism. It was most evident in your day-to-day operations, briefings, and crew coordination. Everyone associated with helicopters — maintenance, operations, and administration — should be commended.

There are no Class A or Class B mishaps to discuss. The bulk of this article will talk to major modification programs and open mishap recommendations in each of the weapon systems. But first, a brief review of what did not go right for us in 1990.

There were a total of 45 Class C and High Accident Potential (HAP) mishaps reported. This is up 82 percent from 1989. The figure breaks these down by system. Most involved some sort of material failure, with engines leading the way. However, there is no trend with regards to these engine malfunctions. It is most pleasing to see aircrew errors are down significantly.

H-1

Not a whole lot of new information to pass along. The inventory has remained unchanged for the past few years, with "N" models outnumbering "H" models two to one. The major modification program remains the upgraded fuel system. When it's complete, we should see a remarkable improvement in accuracy and reliability. Included in the mod are new, easily readable gauges.

For the skeptics among us who thought Huey drivers were expendable, we have a new crashworthy seat available. The seat is manufactured by Simula, who produce the crashworthy seats for the H-3, H-53, and H-60. The seat has been tested and approved.

H-3

The inventory continues to dwindle, and, at last count, the HHs outnumbered the CHs seven to one. There are a few modifications ongoing, most being avionic upgrades. The flight engineer's seat is being redesigned, but it won't be crashworthy. New crashworthy seats, for the pilot and copilot, have been installed in all HH models, closing out the last mod.

There are still some open recommendations from past mishaps concerning the H-3. The first calls for the development of periodic unit-level inspection criteria for main rotor blade tips. WR-ALC is developing the inspection criteria, and you should see it in the near future.

The next recommendation would establish procedures which will ensure substandard, safety critical screw-threaded components (SCSTC) are identified and removed from service. Depot procedures have already been established to identify substandard SCSTC in H-3 sleeve and spindle assemblies during depot overhaul. Changes to de-

pot procedures for the remaining H-3 SCSTC are under way. Estimated completion date for all H-3 depot repair procedures is FY94.

The last four recommendations all dealt with underwater egress. The first one accelerates acquisition of helicopter emergency egress devices for those rotary wing units which are required to fly overwater missions on a routine basis. I would like to think all affected units have the bottles and have trained with them by now.

The next recommendation calls for installation of activated cyalume lightsticks (chemlights) adjacent to emergency exits for all unaided night overwater missions. Another recommendation would develop aircraft-specific underwater egress procedures to be incorporated into flight manuals. Lastly, one recommendation will modify all rotary wing aircraft with a water-activated helicopter emergency egress lighting system.

H-53

Except for some TH-53As and a couple of NCH models, the remainder of the 53 inventory are "J" models. Since the Pave-Low modification is complete, the Service Life Extension Program (SLEP) has begun. It would take volumes to discuss all the modifications being done during the SLEP, so I'll list only the major ones. The aircraft will get a completely redesigned electrical system and a new hydraulic system. Then they will stick on a new elastomeric main rotor head and swash plate.

Along with the new main rotor head will come improved gear boxes and an improved automatic flight control system. The intercom system is being improved so you can hear yourself over the noise of the new -100 engines. These new engines, along with the gear boxes, are being fitted with fuzz-burning chip detectors. Various airframe components are being beefed up and self-retaining bolts installed in the flight controls. If all this wasn't enough, they are redesigning the avionics shelf to accommodate the many new systems being added and the old ones being improved.

The last two programs are by no means the least. They are developing a blade and tail pylon fold kit to be used for shipboard ops, and they are working on increasing the gross weight to 50,000 pounds. Quite an impressive list of improvements!

There are two major open recommendations for the 53. The first calls for procuring a self-storing fold-down seat for use by scanners during missions of long duration. A complete engineering study has not been satisfactorily accomplished.

The second is a recommendation by HQ USAF/IGD. We suggested HQ AFLC conduct an analysis on the crashworthiness of the entire H-53 fuel system and implement crashworthy modifications. After numerous false starts, a crashworthy fuel cell for an H-53E model was tested for fit in the H-53A/B/C models. Results revealed modifications are required on both the fuel cell and the airframe to accomplish the installation. An engineering study was conducted to integrate a common crashworthy fuel cell into all USAF H-53 models. The modification was approved, and the next milestone is the contract award.

H-60

We're at the halfway point in converting the UHs to MHs. It appears the average will remain about four conversions per month. Other than this program, there are only two modification programs ongoing at this time. The SOF aircraft are updating their engines to the GE -701C. All models prior to 1989 are receiving an upgraded Global Positioning System when they go back to depot.

All in all, 1990 was a very good year. Hard work on the part of operators, maintainers, and supervisors was greatly responsible, plus a probable dose of good luck. However, if we hope to continue this record into 1991, greater efforts are required by all. Don't let your guard down!! ■

Mishap Breakdown

	H-1	H-3	H-53	H-60
Engines	5	6	3	2
Fuel	0	0	0	0
Rotor	0	0	0	0
Drive	6	1	6	0
Flt Cont	0	0	0	1
FOD	0	0	3	1
Aircrew	1	3	0	0
Misc	2	2	3	0
Total	14	12	15	4

BEST PILOT IN THE SQUADRON?

MAJOR MICHAEL T. FAGAN
Directorate of Aerospace Safety

He knew the Dash-1 down to the publisher's initials and was an authority on all the "non-bold face bold face" published by the MAJCOM on down.

■ Not long ago, as an unproductive happy hour wound to a close, several of my flying colleagues and I were gathered around the dregs of the last pitcher, which was rapidly approaching being too flat to drink. As is often the case when aircrew members "stand to their glasses," the conversation drifted from war stories through "where is ol' so-'n'-so," to memories of those no longer with us.

Some had been recruited by the airlines and some had gone to rated sup, but the talk centered on one of our number who had met an untimely end on a desert gunnery range. If there is a special eulogy for pilots, it is not delivered by a chaplain from a pulpit — it is spoken by his messmates in the bar as the happy hour crowd thins out and the beer gets warm.

No congregation could be more sad-faced. No higher praise could be given. The ceremony is as predictable as any formal funeral. Sometimes there are even hymns of a sort, and green Nomex is a kind of vestment. It was an unfortunately familiar scene to most of us who had been around for a few years. Inevitably, someone said, "Yeah, he was the best pilot in the squadron." All who knew him nodded their heads in silent accord.

A Memorable Figure

He certainly had been a memorable figure. He had been assigned to standboard as a lieutenant. An academy graduate, his bearing and conduct were exemplary. He knew the Dash-1 down to the publisher's initials and was an authority on all the "non-boldface boldface" pub-

lished by the MAJCOM on down. Though he got to SEA too late for the hot part of the conflict, he extended until the very end and played a highly decorated part in the evacuations and the Mayaguez affair.

He was always chosen to lead the tough missions and earned the total respect of his superiors at all levels. His exploits were legendary. He was the one who went to the development conferences and flew the test program. His physical appearance was striking. He was well ahead in his PME. He was always available when the schedule changed at the last minute, and he more than pulled his weight in the additional duty department. Besides that, he was a nice guy. No one was surprised when he was selected for major below the zone.

He was the best pilot in the squadron.

It does not pay to speak ill of the dead, but wait a minute! If he was so good, why is he dead? At the risk of asking a sacrilegious question, how about those other well-remembered colleagues who have been honored with the posthumous title of "best pilot in the squadron"? Is there something about being the best which is fatal? What good is being the best if it kills you? What good is having the best in the squadron end up in a box when he is needed in the cockpit? Let's take another look at this paragon of pilot virtues.

A Second Look

He was aggressive, ambitious, and confident. These are admirable qualities — in fact, they are requirements for the job. There is, however, an important distinction between confidence and overconfidence, aggressiveness and overaggressiveness, and even achievement may be overdone, or done too fast.

He had required a little command assistance to transition into a new weapons system when he did, and no one was surprised when he got it. That he was killed on a range *was* a surprise. He had a lot of low-level experience. He liked being down in the weeds, and he was good at it.

The investigators found nothing wrong with the aircraft. It appears he simply flew into the ground after pulling off the target. He either didn't hear the knock-it-off call or it came too late. In any case, he got low enough to prompt a call and apparently did not react to it prior to impact.

Could there have been a malfunction? He had previously demonstrated exceptional ability to bring the aircraft home when another pilot might have landed at an intermediate point, even though maintenance would have been inconvenient and the squadron would have bought a bunch more down time. He was good enough (and mission oriented enough) to take a bird with minor discrepancies, work around them, and get the job done. He was a mission hacker. "Ya gotta be tough . . ." he had said more than once. It probably wasn't a malfunction. He could have handled any malfunction small enough to be missed by the investigators.

His exploits were legendary. He was the one who went to the development conferences and flew the test program. He was the best pilot in the squadron.

The flight was a late afternoon launch, but there is no reason to believe he had been fatigued. He was not a heavy drinking man, and he had had no duties which would have conflicted with crew rest. Besides, during the Mayaguez mission, he had demonstrated he could perform when tired. He had flown sortie after sortie, on his own adamant insistence, even though there were more rested pilots available. He kept getting an airplane despite fatigue. After all, he was the best pilot in the squadron, and that was one tough mission. A little fatigue wouldn't have bothered him.

He bought the farm on a checkride, but stress couldn't have been a factor — he always did well on checkrides. In fact, stress may actually have improved his performance. At Kho Tang Island, he earned a medal for going in on the hottest objectives. In one case, he went in a third time after being shot off twice. Now, that's stress! No, he was not a pilot who choked under pressure.

It Takes Only Once

In the final analysis, the report concluded the cause of the mishap was "pilot distraction" or "disorientation" — in other words, what used to be called pilot error. But errors are not something one would expect from the best pilot in the squadron. On the other hand, if he had not "gotten caught," no one would have ever suspected he had been disoriented or distracted. He had exhibited no such tendencies, or at least none had been recognized.

But it takes only once, and it's hard to make a habit out of having fatal mishaps. The diagnosis has to come before the fact to do any good, and it's no easy task.

The distinction between the spirit of attack and dangerous lack of caution is not always readily apparent. What passes for aggressiveness may be found to be (or at least labeled) recklessness after a mishap. Spirit, however, is a prerequisite, and an excess of caution can definitely be self-defeating.

What It Takes

A force of timid pilots, reluctant to take any risks, is not acceptable. Neither is a corps with the disdain for death of kamikazes (especially if

continued

Best Pilot in the Squadron? continued

training flights are required). What is required are pilots with the will to accomplish the task at hand, but the sense to recognize a given result is not worth the loss of an aircraft and crew. This is especially true in a training environment.

During the early seventies, when Vietnamese aviation cadets were receiving primary training in the United States, one Vietnamese training officer would address each arriving class with the following safety philosophy: Each student must become the best possible pilot. That requires both nerve and skill.

Since the mission doesn't end with a single sortie, a good pilot must be available to fight tomorrow. Good pilots bring both themselves and their airplanes home. Dead pilots are bad pilots. The loss of an airplane in training is as detrimental to the war effort as a direct hit from an SA-7. Sometimes it takes nerve to refuse an aircraft or abort a mission. That's part of what it takes to be a good pilot — nerve.

So what does this have to do with the pilot who is the subject of this tale? Little or nothing. Flying safety lectures will do him no good now, and, apparently, they didn't do him enough good when he was alive. All those monthly meetings, special briefings, and bulletin boards weren't enough to keep him alive. Neither were his skilled, highly trained hands and feet, vast knowledge of regulations and procedures, or extensive experience.

He destroyed a valuable aircraft and killed its pilot. At the very best, he did not prevent the loss, and he was the last person who could have done so.

For all his education, ability, and desirable attributes, his final professional act was costly and wasteful. He destroyed a valuable aircraft and killed its pilot. At the very best, he did not prevent the loss, and he was the last person who could have done so.

The Best Pilot

The best pilot in the squadron? He's still *in* the squadron. He, too, knows the books, has the skills of a brain surgeon, and reeks of moxie. But he comes home with his airplane intact. Maybe it's that little bit of extra for Mom and the safety officer. Who knows?

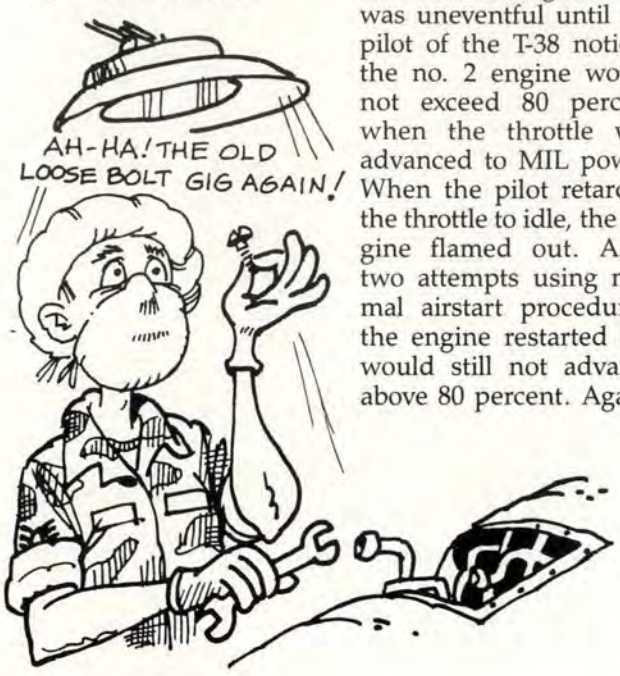
One thing is for certain, though — the best pilot in the squadron will get the job done without unnecessary losses. While he's there to fly and fight, he knows broken birds stay on the ground and dead pilots don't defeat anybody.

The pilot's epitaph, unfortunately, will occasionally be intoned in the bar while the ice melts and the happy hour crowd drifts out the door with the smoke. It's a traditional way to honor our dead. But in the meantime, let's be honest. Here's to the real best pilot in the squadron — the one who's still with us. ■

Adapted from *Flying Safety*, June 1980.

MAINTENANCE MATTERS

Throttle Troubles



■ The training mission was uneventful until the pilot of the T-38 noticed the no. 2 engine would not exceed 80 percent when the throttle was advanced to MIL power. When the pilot retarded the throttle to idle, the engine flamed out. After two attempts using normal airstart procedures, the engine restarted but would still not advance above 80 percent. Again, as the throttle was retarded, the motor quit, the pilot declared an emergency, and he made an uneventful straight-in landing.

A team of maintainers quickly found the cause of the throttle anomaly was a loose bolt on the throttle control which allowed the throttle cable to shift enough to cause erroneous inputs to the main fuel control. A review of the records revealed the mishap flight was the second since the engine was installed during a phase inspection. It seems the bolt was not properly secured in spite of the fact the TO contained a CAUTION which specifically states, "If the control lock bolt is not properly tightened, loss of engine control may occur."

The word "CAUTION," as it pertains to aircraft maintenance, is used to emphasize procedures or practices which, if not strictly observed, will result in damage to, or destruction of, equipment. A CAUTION will always precede the step or procedure to which it applies. Unfortunately, in spite of the emphasis that CAUTIONs impart, they are frequently ignored or overlooked by maintainers — often with disastrous results. ■

FSO'S CORNER

DEPLOYMENT SAFETY MANAGEMENT BOOK

CAPTAIN DALE T. PIERCE
919th Special Operations Group
Duke Field, Florida

■ I recently received a package from the 1st Special Operations Wing (1 SOW) safety office at Hurlburt Field, Florida. Enclosed in the package was their Deployment Safety Management Book in hard copy and on a 5.25-inch floppy disk (WORDSTAR).

As I scanned the material, I was struck by the hours of thought and effort that obviously went into developing the document. I'm sure it serves the 1 SOW as a useful management tool in support of predeployment training and serves the additional duty deployment safety officer (DSO) as a ready reference.

Most of the things an additional duty DSO needs to know are included. For the things which might have been overlooked, there are suggestions for gaining information locally as well as DSN numbers for Hurlburt Field safety personnel. The document addresses the following subjects:

- Commander's safety policy
- Predeployment duties
- Arrival duties
- Mishap notification procedures
- Mishap reporting
- Inspections
- Hazard reports
- Hazardous air traffic reports
- Ground safety
- Explosives safety
- Applicable forms and regulations
- Medical testing rules
- Bird strikes
- Off drop zone impact
- Dropped objects
- Classified problems

The list of subjects addressed is quite impressive. Having reviewed the document and started the adaptation for adoption process myself, it seems to me, with a few hours' time, any safety officer could modify the document to meet specific unit requirements.

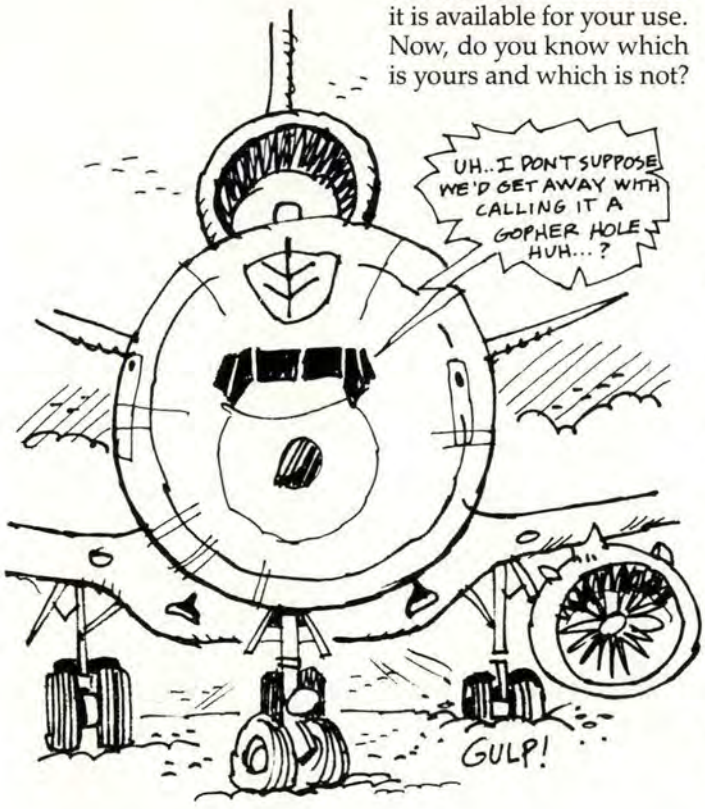
If you'd like a copy of the 1 SOW document, call me at the DSN number shown below.

What are you doing in your program that could help other FSOs if they knew about it? If you know of something, call me (Dale Pierce) at DSN 872-4858 (USAFTAWC) or send a short note to 919 SOG/SEF, Duke Field, Florida 32542-6005. ■

OPS TOPICS

A Taxiway It Ain't!

■ The good news is you've got a nice long strip of runway out there. The bad news is not all of it is available for your use. Now, do you know which is yours and which is not?



Recently, a large, 3-engine aircraft was taxiing down the runway after a full stop landing. The crew reached the end of the runway and prepared to do a 180-degree turn. They decided it would be okay to use the asphalt painted with yellow chevrons to complete the turn.

Somewhere in the middle of their turn, chunks of asphalt began to fly. After stopping to check it out, the big jet's left gear slowly sank through the 2-inch pavement and settled nearly a foot into soft earth.

To give the crew some credit, over 40 years of collective flying knowledge went into their decision. The overruns they had used in the past were stressed for big jets. But that didn't change the airport manager's reasons for putting big yellow chevrons on this one. A little basic review of AFR 51-37, *Instrument Flying*, figure 14-7, would have thrown serious doubts into their plan.

In fact, a more thorough job during their mission planning with FLIP AP/1 would have shown them a 180-degree turn *anywhere* on this runway by a big jet was not authorized. Additionally, the overrun was so porous it could be damaged by jet blast from aircraft in the takeoff position using maximum thrust closer than 100 feet to the threshold.

If you are one of those pilots who are not so sure of the difference between a displaced threshold, an overrun, or a stopway, then perhaps it's time to start looking at AFR 51-37 and FLIP General Planning. Some of the pavement may look like a good taxiway, but don't bet on it. ■

A Good Plan is Better Than Good Intentions

■ Time after time, pilots go over the emergency procedures which may be needed on the upcoming flight. Usually, they are never needed, but every once in a while, the briefing pays off.

Prior to a recent helicopter mission, the crew briefed as usual, to include the possibility of jettisoning the external fuel tanks in an emergency. Arriving over the pickup site, they calculated all the performance factors for hovering 25 feet above the rocky creek bottom.

They stabilized at 50 feet and then began to descend to 25 feet. When they attempted to level off, the helicopter lacked power, and the crew began a go-around toward the canyon wall. As briefed, the tanks were dropped, and the helicopter flew out of the canyon without any further problems.

Now, aircraft needing to drop the external stores to improve performance during an emergency situation are not limited to the rotor wings. However routine the mission briefing for emergency procedures may become, it still provides a good plan *before* you need a good idea. ■

OPS TOPICS

Give 'em a Break!

■ Okay, admit it. All you pilots out there have been a little "testy" now and then over the apparent curtness of the air traffic control folks.

Well, they're human, too, and might have a pretty good reason for their frustrations.

Following the eighth operational error at a coastal TRACON, the FAA conducted an on-site review. That review, and the NTSB's own study, showed the controllers were doing well to show only their frustrations.

There are 10 radar displays in a working space 15 by 20 feet. These displays must handle a Marine Corps air station, a Marine Corps helicopter base, an Army airfield, an international airport, and three civilian fields. They also are required to handle six radar sectors from the ARTCC and try to help pilots enter the nearby TCA. All this, *before* they can help the VFR traffic flying up and down the coast.

Oh, this cramped facility is located on the Marine Corps air station near runways, taxiways, and parking ramps. Noise from the military jets is a constant problem, and the old-fashioned, *rotary* telephones frequently don't work.

It sort of puts your extra turn in the holding pattern in perspective, doesn't it? The next time things aren't going as smooth as you would like, give the Air Traffic Control folks a break. They're really trying to give you the best service they can. ■

It Gets Worse Before It Gets Better

■ When faced with a 200-mile trip to the in-laws for Thanksgiving dinner, the optimist will say, "Once we get there, I'll feel better." The pessimist sees it differently, "I feel 'okay' now, but things can only get worse." Not too long ago, an optimistic pilot climbed on board a B-52 for a routine 8-hour mission.

The pilot didn't feel really great, but still felt whatever was ailing him didn't warrant removal from the flight schedule. Eight hours of typical B-52 training sortie passed before the pilot was forced to admit to the aircraft commander things were getting worse. The pilot felt awful and had a fever. The aircraft commander mercifully terminated the mission 1½ hours early and sent the pilot to the flight surgeon.

The viral flu had sufficient time to "simmer" during the flight, and the pilot was, indeed, sick. He spent the next 4 days in the hospital trying to get rid of the virus. Even after release from the hospital, the pilot was ordered to stay at home for another week before being pronounced fit to fly.

When it comes to fighting off the effects of a flu, only an optimist would think the cockpit is a good place to be. ■

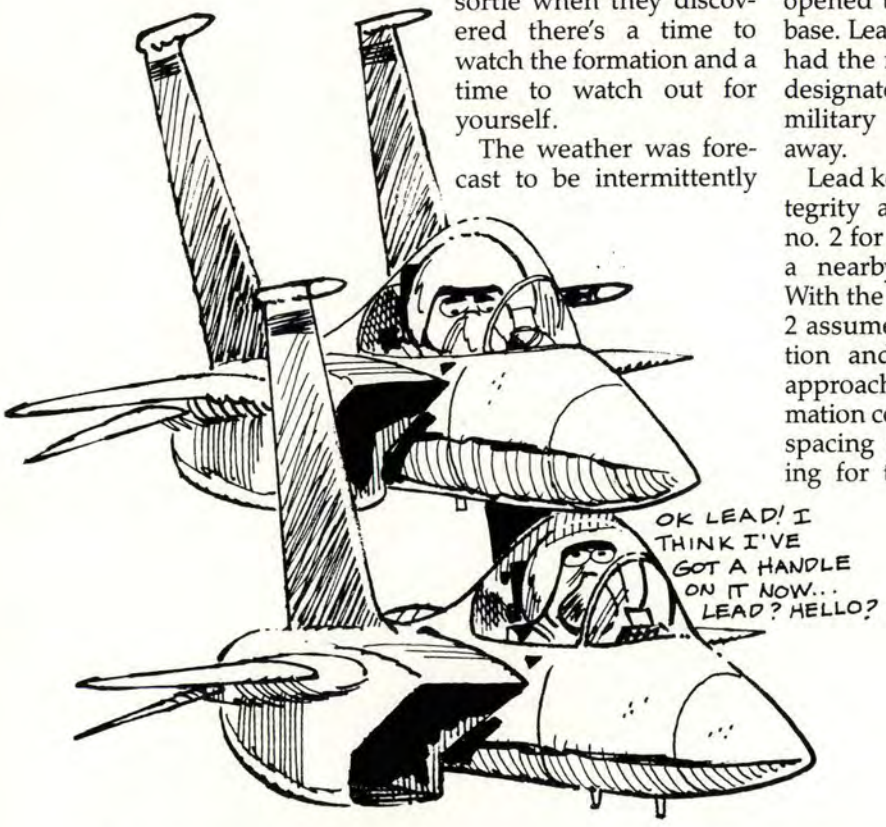
OPS TOPICS

You Fly Yours and I'll Fly Mine

■ Formation integrity is a wonderful concept. But it is possible to carry it just a little bit too far. A three-ship of Eagles was returning home from a training sortie when they discovered there's a time to watch the formation and a time to watch out for yourself.

The weather was forecast to be intermittently 1,500 broken, 3 miles visibility, with thunderstorms in the vicinity. Sure enough, about the time they reached a 4-mile final, the thunderstorm opened up on top of the base. Lead sent no. 3 (who had the most fuel) to the designated alternate — a military base 40 miles away.

Lead kept formation integrity and stayed with no. 2 for the short hop to a nearby civilian field. With the field in sight, no. 2 assumed the lead position and continued the approach while the formation commander flew a spacing maneuver, waiting for the wingman to land. After getting set up on short final, attention was again diverted to watching the wingman complete the landing.



Somewhere in the midst of this concern for the other aircraft, the formation commander realized the landing picture was not right and added power to keep from getting any lower. After landing, a couple of good-sized gashes were found on the bottom of the horizontal tail. The gashes matched neatly with some damaged approach light towers. These approach lights are 4 feet above the runway elevation and 400 feet short of the runway!

There's probably not a whole lot of help lead is going to be able to give wing during a landing roll, especially when no. 2 lands 3 minutes before lead. At times like this, the best formation integrity is to be sure to fly your own aircraft. ■

How to Build a Gut Bomb

■ Step one: Skip breakfast to make the takeoff of a weekend cross-country mission.

Step two: Do your flight planning at the stopover base *before* you get anything to eat so you have only 10 minutes to eat before the crew bus arrives.

Step three: Order the following from the flight line snackbar — a bacon-cheeseburger with mayo, nachos with jalapenos, and a jumbo-size soda.

Step four: Climb back into your unpressurized Tweet (not as fun as a rapid decompression in the other birds, but just as interesting) and initiate climb to FL 230.

By this time, the gut bomb should have detonated and the other crewmember will have to carry you to the nearest flight surgeon. ■

☆U.S. GOVERNMENT PRINTING OFFICE: 1990-779-017/40001

UNITED STATES AIR FORCE

Well Done Award

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

CAPTAIN
David H. Shiver

MAJOR
Stephen G. Schramm

117th Tactical Reconnaissance Wing
Birmingham ANGB, Alabama

■ Capt David H. Shiver, Pilot, and Maj Stephen G. Schramm, Weapons System Officer, were on a redeployment sortie in an RF-4C. Following initial takeoff while passing approximately 5,000 feet, the right engine fire light and voice warning came on followed immediately by right engine overheat and left engine fire lights. While retarding the throttle from afterburner, the crew experienced a loud bang and aircraft yaw to the left, followed immediately by a left engine overheat light. Excess fuel had entered the left engine bay through the aux air door area causing the left engine fire/overheat lights.

Coming out of afterburner, the right engine throttle stuck at 98 percent. The left engine fire/overheat lights went out at idle, and the right engine fire/overheat lights remained on. Capt Shiver immediately began a left descending turn, shut down the right engine, and declared an emergency. Capt Shiver's rapid shutdown of the right engine with the master switch prevented additional fuel from entering the engine bay and the fire from spreading.

Capt Shiver elected not to jettison the centerline tank because of the numerous houses in the area. Maj Schramm and Capt Shiver successfully accomplished a heavyweight, single-engine, approach end arrestment. Tower advised they saw no fire during the cable engagement.

Capt Shiver and Maj Schramm made a rapid, but normal ground egress. While checking the aircraft prior to the arrival of the fire and rescue vehicles, Capt Shiver observed smoke coming from the exhaust area of the right engine which soon self-extinguished.

During the 4 minutes of their flight, Capt Shiver and Maj Schramm's thorough knowledge of aircraft systems and prompt execution of emergency procedures minimized the damage and allowed the recovery of a valuable aircraft.

WELL DONE! ■

AIRLIFT
Makes It Happen!