

The Combat Edge December 1993

THE COMBAT EDGE

DECEMBER 1993





THE COMBAT EDGE

Air Combat Command
Safety Magazine

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Gen John M. Loh
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Happy Holidays



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A HOLIDAY MESSAGE

As we approach this holiday season, we eagerly anticipate spending time at home enjoying family and friends, and the spirit of good will. It also affords us the opportunity to reflect on the past year and to look forward with anticipation to the year ahead.

Once again we conclude another exciting year of resizing and reshaping the Air Force. For the men and women of Air Combat Command, too, it has been a challenging year, full of accomplishment and change.

Our capabilities have served our nation well this year in trouble spots around the globe. During this past year, ACC sent nearly 5,000 people to support operations in Iraq, Saudi Arabia, Bosnia, Central and South America, and Somalia, sacrificing our own comfort and enduring danger and family separation to bring hope, relief, and security to others. This is part of our heritage and a part of our new ACC culture. As we continue to strive toward our goal of building the world's most respected air and space force, devotion and service to others remain our hallmark.

During 1993, we welcomed several new members into the Air Combat Command family including more than 8,000 members of the Air Rescue Service and the C-130 community. We also said farewell to several old friends in the fighter training and ICBM communities who have been instrumental in build-

ing Air Combat Command. We welcome our new partners and wish those who have departed the best of luck in their future endeavors.

As we look to the future, these kinds of changes will continue to provide us with a host of new opportunities and challenges. By their very nature these challenges bring uncertainty -- uncertainty that can significantly impact morale and, ultimately, combat capability. Because of your hard work and professional approach these changes have brought neither. Through your efforts we have improved our working climate and are continuing to build a solid "quality" foundation in ACC.

As we reflect on the joys and blessings of this holiday season, we have much to celebrate. We just completed a record year in flight safety. Our Class A composite flight mishap rate for FY 93 was at an all-time low of 1.8 accidents per 100,000 flying hours. We also had a 25 percent reduction in our off-duty Class A and B ground mishaps. Overall, we saw a 12 percent reduction in our "on" and "off-duty" ground mishaps compared to 1992. Your professionalism and attention to detail is what allowed us to achieve these improvements. Despite drawdowns and frequent deployments -- things which could have been major distractions -- you never let your guard down. You accomplished the mission and got the job done safely.

In our quality culture, we will always strive for a

zero mishap rate. This past year narrows the gap significantly, but we still have some room for improvement. I've already set the goal for next year -- to improve on this year. I have every confidence we can do this! Our training is better now than it has ever been, our equipment continues to improve as we apply new technologies, and quality has become an integral part of our command culture. However, improving our overall safety performance will require our constant attention.

This is important because each mishap degrades our combat capability and reduces our ability to accomplish our mission. Replacements are harder and harder to get -- we need to stress safety in everything we do as a key part of preserving the capabilities we have. If even one mishap results in loss of life or serious injury, it is one too many.

As I look ahead to 1994 I see many challenges on the horizon. But one thing is certain, the same ideals of quality, professionalism, dedication, and compassion that made 1993 an outstanding year will help us through the challenges that lie ahead.

This holiday season is a time for family, friends, and celebration. I sincerely hope that you will take full advantage of this season and that you will celebrate it safely. Each and every member of the ACC team is important, and we must all take responsibility to make sure the holidays are not marred by injury, loss, or tragedy. Leadership and personal involvement are the keys to taking care of our people and getting better in our business. This is the cornerstone of our command and our culture. To all of you and your families -- have a safe and happy holiday. ■



*General John M. Loh
Commander*

As I look ahead to 1994 I see many challenges on the horizon. But one thing is certain, the same ideals of quality, professionalism, dedication, and compassion that made 1993 an outstanding year will help us through the challenges that lie ahead.

BREAKING THE CHAIN

*Lt Col Armando V. Villagran
8 AF/SED
Barksdale AFB LA*

Low level B-52D missions around Guam were never really something to get excited about. They were normally flown at 1,000 feet above the water and the routine just never seemed to change; the targets were some overwater imaginary points located just short of Guam's northern cliffline, right over the bottomless Marianas Trench. Missions at night were really unexciting. The only visual cues were the distant lights from the base, lights from the Russian trawler that just happened to be in the local target area, or lights from the moon and stars overhead and their reflection off the water. However, "unexciting" took on a whole new and different meaning one night many years ago.

We showed up at the squadron approximately 2 1/2 hours prior to takeoff for our night mission; the copilot, a brand new daddy,

was complaining about not getting much sleep or crew rest due to his newest family addition. (Link # 1 Preparation.)

We were scheduled for a pure crew sortie with no extra bodies on board, single-ship, EWO type mission; the kind you could just sit back and not have to worry about number 2. With the exception of the old-head gunner, we were all pretty new in our respective positions. Our mission that night consisted of air refueling, a navigation leg for the Nav, bombing practice for the upcoming local Bomb Nav competition, and a lot of traffic patterns for the copilot.

After about 3 hours of maintenance delays, the old D model lumbered off the runway well after most of the island had already hit the sack for the night. Our tanker had managed to wait for us, so we hooked up and took on a token 5,000 pounds of fuel. We didn't want to take on our full

scheduled load since that would mean a much, much later land time. After a little timing loop to get back on schedule, we finally entered the low level at 0200L. Since we were the only aircraft in the route that night, we managed to squeeze in a few extra runs, just for practice sake. Our nav team figured the more time we spend up here, the less time we spend in the pattern. Racetrack after racetrack, we kept bombing the heck out of those imaginary targets; but they wouldn't go away! It had gotten to the point where we had all just about memorized each other's checklists. We were beginning to respond to checklist items without even being prompted. (Link # 2 Complacency.)

We were finally setting up for our last run, when I turned to the copilot and noticed he had started dozing off; the caffeine in the coffee no longer keeping him awake. As we came up on our

turn point, I turned the aircraft to bomb run heading, crosschecked our fuel cross-cockpit and did a few mental calculations to make sure the fuel was in its proper sequence. I then disengaged our autopilot and started a slow descent to our final bomb run altitude, cleared off center frequency, did a quick scan of all our systems and took one last look at the copilot, who was still busy sawing logs. As I chuckled at the sight, I felt a little bit cocky. Here we were, in the middle of the night, it's pitch dark outside, my copilot's dozing in his seat and I'm flying this bomb run by myself!! Not an unusual feat, mind you, but I felt pretty good about handling everything upstairs on my own. I felt like I was flying solo. (Link # 3 Over Confidence.)

Rolling out on heading, I checked our airspeed and rehacked my watch on the radar nav's call. "Timing looks good!" I echoed. "Roger, pilot," he replied and yawned as he continued with his litany of bomb run checklists with the nav. I did a quick rudder check to make sure the gunner in the tail was still with us, and he let out his normal groan to confirm it. As I reached down to reengage the autopilot, I heard the radar call for 3 degrees left. I immediately reached to pull my

oxygen mask up and acknowledged "Roger, 3 left." (Link # 4 Psychological.) I then returned my hand to the throttles to keep that airspeed wired. But a very important step had just been missed, and it would come back to haunt us later. As the seconds ticked off, I maneuvered the aircraft to the radar's headings --

For some reason, the lights from the base which sat on the northern cliffline seemed to have started disappearing; again, it never entered my mind what was happening to us. It was pitch dark outside! "Pilot," the radar called, "airspeed please!" Again, I noted that the airspeed had crept up; but it never occurred to me why.

always striving for that elusive "shack" score. "Heading and airspeed." I kept telling myself. I checked our airspeed again and noted that it was slowly increasing, so I dragged the throttles back a bit and took a quick glance outside; but the overcast deck and moonless night hid any light sources from above. I then

tweaked the red lights down in the cockpit to see if I could pick out any features on the island, but no luck. Even the Russian trawler had gone home for the evening! For some reason, the lights from the base which sat on the northern cliffline seemed to have started disappearing; again, it never entered my mind what was happening to us. It was pitch dark outside! "Pilot," the radar called, "airspeed please!" Again, I noted that the airspeed had crept up; but it never occurred to me why. (Link # 5 Perception.)

"We must have started to pickup some tailwind!" I thought. I glanced at the copilot, but he was out. If he hadn't done a couple of quick head nods, I would've thought he was dead. "Oh well," I thought, "he needs his sleep, besides, I've got this bomb run well in hand and he'll need to be rested for all his pattern work." (Link # 6 Accepted-Risk.)

As the clock ticked down to 20 seconds to release, I called for the tone, and the bomb doors came open. I cross checked our heading and airspeed; and they were well within shack tolerances, although I was having to continually pull back on the power even with the doors open. "Boy, those winds must really be picking up!" As the BOMB DOORS OPEN light illuminated, my at-

As the bomb scoring tone blared over the interphone, time seemed to stop as I yanked back on the yoke and slammed in the power. But it was too late as the nose of the aircraft hit the water.

illuminated, my attention was drawn to the altimeter, which was reading 200 feet and decreasing. "But," I thought to myself, "we're supposed to be at 1,000 feet!" I crosschecked the copilot's altimeter -- it read the same. "Why hadn't the radar altimeter caution light illuminated as we descended below 1,000 feet? No wonder my airspeed kept increasing, we were slowly descending; it wasn't a tailwind after all!" As the bomb scoring tone blared over the interphone, time seemed to stop as I yanked back on the yoke and slammed in the power. But it was too late as the nose of the aircraft hit the water.

Well, this mishap really never happened ... almost! I did finally manage to break the chain of events, but not before I scared the hell out of myself and the crew. The recovery wasn't as dramatic as I pictured above, but I did manage to get the crew's attention to our altitude being at 300 feet (Link # 7 Broken), slowly decreasing, and no one on board saying a thing. The RBS site had already shut down for the night, and our last few runs were camera scored; so nobody was monitoring our altitude! For some unknown reason, the radar altimeter had failed, and no one had noticed. Besides being dead tired, I and the guys downstairs were wired on heading and airspeed; no one watched the altitude! I guess one can say altitude doesn't affect your score unless you just happen to run into the ground before you get to the target; then it matters! Of course, ballistics, arming parameters and safe escape

tactics dictate otherwise.

We learned a valuable lesson that "unexciting" night. We were all young, inexperienced and trying to do the best job we could which was almost our last. Crew rest is vital, especially when you are flying during a period when the body thinks it should be doing otherwise. Trying to do too much on your own can result in task saturation and only invites distractions from outside sources and resultant missed checklist items or procedures. Lack of situation awareness can cause you to perceive that things are going well when, in fact, they may not be. Doing something, even though you know that there might be problems in doing it, only compounds the risks inherent in doing that certain act. And finally, complacency in your job is a mishap waiting to happen; and I and my crew had let ourselves fall into that trap. The guys downstairs had put their complete trust in us upstairs. But, lest we forget, this was a "crew" mission; and somebody on the crew should have noted the discrepancy! During the post mission critique, we all pointed the finger at each other for letting such a thing happen; but after a couple of cold beers, we were all best of friends again. This little incident made us all a better crew. We were fortunate that we survived to tell about it and to learn a valuable lesson. And yes, the copilot did finally manage to wake up, but only after I smacked him on the side of his helmet with his own checklist! FLY SAFE!! ■

SAFETY FORCE REDUCTIONS AND YOU!

*SSgt Eric Prince
7 WG/SE
Dyess AFB TX*

With more Department of Defense cuts looming ahead and many of us facing an uncertain future, our jobs and accomplishing "THE MISSION" at all costs have become many people's primary focus. However, during this time safety is being ignored by a few and overlooked by many. Oh, you hear a lot of people saying nice sounding phrases like "safety is paramount" or "safety first." I'm sure the people saying those things really mean well; but in actuality, safety tends to be forgotten during stressful times.

If you look at this sensibly, you will realize that it is possible to accomplish the mission and be safe at the same time. In fact, it is mandatory for efficient and effective operations. We are more productive when actively paying attention to safety rather than paying lip service to it.

The Air Force we live and work in today requires that we work smarter and safer than ever before. With all of the personnel reductions, fewer people are doing the same work once done by a larger force. When you add in the people missing work due to injuries or other mishaps, the requirement to accomplish a task falls on an already overburdened force.

Here is an example. Amn John Doe is a B-1B crew chief. For several months now he has been developing the bad habit of not following his tech data while performing aircraft maintenance. This habit developed due to his supervisors pushing him to complete as many tasks as possible in as little time as possible. Now add some additional factors: he rarely gets a break during the day and any break he does get is spent under the wing of his aircraft in 100 degree weather. In addition, he has marital problems because his weekends are spent on the flightline instead of with his wife. Amn Doe is in the process of becoming a high mishap potential individual. In an effort to get ahead, and having often seen it done before, Amn Doe realizes that by cutting corners he can get more accomplished and get his supervisors off his back. Do

you see a pattern developing here? Nobody says anything because Amn Doe continually manages to get work done when others can't complete the task. This pattern continues for several months until the day that Amn Doe, while accomplishing a task without using tech data, manages to electrocute himself. Amn Doe dies as a result of his injuries and causes \$25,000 dollars worth of damage to a B-1B. During the mishap investigation it is discovered that Amn Doe worked 10-12 hours a day with almost no breaks. His supervisor noticed he was not using his tech data; but as long as the job was accomplished, he was happy.

Of course, this situation didn't happen and Amn Doe is a fictional character; but, I suspect that activity like that described goes on every day in the Air Force, whether we like to admit it or not. You have a responsibility to stop ANY unsafe or unhealthy activity. Failure to do so makes you just as liable as the person performing the unsafe task. If your co-worker is performing his tasks in an unsafe manner, who do you think will have to fill in for him when he is injured or dead. You will! What about the family who will be forced to go without their loved one? Would you like to be the one who had the opportunity to say or do something that could have prevented a death, but kept your mouth shut so as not to be labeled a trouble maker?

This may sound harsh, but it's time people stopped getting hurt unnecessarily. The problem, as stated earlier in this article, is people paying lip service to safety and then just doing what they please, so long as the job gets done. We need to have the mindset that our people and safety are what allow us to accomplish the mission. When we start accomplishing the mission while paying attention to safety and personnel, then life as we know it will only get better.

As more reductions occur and the pressure mounts, think of what you read here today and what you can do to make a difference. Let's all perform safely for a successful Air Force. ■

ACCOLADES

QUESTIONS OR COMMENTS CONCERNING DATA ON THIS PAGE SHOULD BE ADDRESSED TO HQ ACC/SEA, DSN: 574-3814

	TOTAL			ACC			ANG			AFR		
	OCT	THRU OCT		OCT	THRU OCT		OCT	THRU OCT		OCT	THRU OCT	
		FY94	FY93		FY94	FY93		FY94	FY93		FY94	FY93
CLASS A MISHAPS	0	0	1	0	0	1	0	0	0	0	0	0
AIRCREW FATALITIES	0	0	0	0	0	0	0	0	0	0	0	0
* IN THE ENVELOPE EJECTIONS	0	0	1/0	0	0	1/0	0	0	0	0	0	0
* OUT OF ENVELOPE EJECTIONS	0	0	0	0	0	0	0	0	0	0	0	0

* (SUCCESSFUL/UNSUCCESSFUL)

CLASS A MISHAP COMPARISON RATE

(CUMULATIVE RATE BASED ON ACCIDENTS PER 100,000 HOURS FLYING)

		MONTH											
		OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
ACC	FY 93	2.0	3.1	2.2	1.6	1.7	2.1	1.7	1.7	1.7	1.6	1.6	1.8
	FY 94	0											
1 AF	FY 93	0	0	0	0	0	8.0	6.5	5.5	4.6	4.3	4.1	3.9
	FY 94	0											
2 AF	FY 93	0	0	0	0	0	0	0	0	0	0	0	0
	FY 94	0											
8 AF	FY 93	0	5.2	3.7	2.7	2.1	1.6	1.4	1.2	1.0	0.9	0.8	2.3
	FY 94	0											
9 AF	FY 93	6.7	6.5	4.4	3.3	3.9	3.1	2.7	2.3	2.7	2.4	2.2	2.0
	FY 94	0											
12 AF	FY 93	0	0	0	0	0	0	0	0	0	0	0	0
	FY 94	0											
ANG	FY 93	0	2.2	2.9	2.1	3.5	2.9	3.1	2.7	3.4	3.0	3.2	3.3
	FY 94	0											
AFR	FY 93	0	0	8.0	5.9	4.8	4.0	3.4	3.0	2.7	2.4	2.2	4.0
	FY 94	0											
TOTAL	FY 93	1.3	2.7	2.7	2.0	2.4	2.4	2.2	2.1	2.3	2.1	2.1	2.4
	FY 94	0											

* (HOURS NOT AVAILABLE)

I WANT



This is **YOUR** magazine! You determine its quality through **YOUR** articles, inputs, and feedback. If you aren't seeing a particular type of article or the coverage of a particular discipline isn't to your liking -- it's because **YOU** haven't sent us anything. **YOU** are our authors! Commanders, if you have something you want to put forward for command-wide exposure/consideration, send it to us in the form of an article. Tout the mishap efforts of your organization and people. Give everyone in the command the benefit of your thoughts, ideas, and experiences. Supervisors and workers -- **YOU** need to do the same! Everyone can benefit from your thoughts and experiences, but only if **YOU** write an article.

We are committed to giving you the best product possible, but we can't do it alone -- we need **YOUR** ideas and articles!

Send **YOUR** articles to:

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Sgt James Lewis
22 ARS
Mountain Home AFB ID



Recently, during an evening towing of one of our unit's KC-135R aircraft, our 3-man tow team encountered a little problem. Using a borrowed tug from Crash Recovery, we were towing the aircraft from the wash rack to the parking area with the supervisor riding in the tug. Suddenly we noticed smoke coming out of the engine compartment! The tow was stopped immediately. SSgt Mark Vera, the tow supervisor, ordered the brake rider to apply brakes and then installed the aircraft chocks. SSgt Vera then disconnected the tow bar and directed me to drive the tug away from the KC-135. I moved the tug about 200 feet away and brought it to a full stop and shut off the ignition. I opened the engine compartment to determine the location of the fire. The fire appeared to be coming from the exhaust manifold area. I then pulled one of the fire bottles from the tug and put out the fire by pointing the extinguishing agent toward the base of the fire as I had been trained.

In the meantime, SSgt Vera was busy calling the line chief on the radio and ensuring that the aircraft was safe. He then assisted me with suppressing the fire. We let the tug stand for about 10 minutes to make sure there was no chance of the fire restarting. Since the fire was located near the exhaust manifold, we centered our attention there. We were able to determine that the starter wire had pressed against the exhaust manifold, which, in turn, melted the wire and caused the fire. We called vehicle maintenance, and they completed a field repair on the starter cable allowing us to complete the tow and remove our aircraft from the taxiway.

This incident just highlights the fact that an emergency can happen at any time and any place. SSgt Vera and I are glad our training and experience allowed us to recognize and respond quickly to this situation. Our primary concern was to protect our KC-135 from damage so the Gunfighters could maintain full combat capability. ■

KEEPING SAFETY STRONG

*MSgt Gary R. Reniker
442 FW/SEW
Richards-Gebaur AFB MO*

Consistently effective safety performance requires continuous attention. The challenges are constant. New technologies and increased workloads can strain a safety program if you let them. You have to be constantly educating the work force to meet and master these challenges.

To be effective, a safety program has to be vital as well as sustained. The message has to be revised and new initiatives have to be tried. Otherwise, apathy sets in.

One area that holds tremendous promise for improving safety in the Air Force is Total Quality Management. I think we are now

realizing that you can't have successful quality without safety. The two aren't mutually exclusive. They go hand in hand. Without success in safety, other quality factors don't measure up and will be negated.

Nobody can achieve a safety record overnight -- it takes time and effort. But, if the will to improve safety is evident, if upper management is sincere, and if the "troops" play a part in helping to achieve safety, everyone will share in the pride of accomplishment. And pride is something you cannot put a price tag on. ■

SAFETY SUPERVISOR

*MSgt James K. Kivell
HQ ACC/SEG
Langley AFB VA*

Few occupations in the civilian world expose the civilian worker to as much inherent risk as the military does. For this reason, supervisors at all levels must ensure safety is integrated into all aspects of activities on and off duty. Initially this may sound like a difficult tasking, but let me assure you it isn't.

Including safety in activities is nothing more than using common sense. It's easy, doesn't require an expenditure of much time, and the results can be a much safer operation for everyone. Just think about what is being done: Does it make sense to shave 30 seconds off a

task and risk damage to equipment or injury to coworkers? Usually not.

Some tasks will include a degree of risk which can not be avoided. In these instances, personnel performing the task must be fully trained and qualified to minimize the risk. In addition, supervisors must ensure that personal protective equipment is adequate, serviceable, and properly used by the workers. Remember, to overlook a simple safety violation is to compromise your entire attitude towards the value of another person's life. Make each activity a safe one. ■

Capt Thomas P. Azar
97 AMW/HC
Altus AFB OK

SAFE SEPARATIONS



Franks and Jane are both Air Force officers who met and married in Germany. They lived in the fast lane traveling and having a good time seeing Europe. Jane and Frank both wanted to have children but were unable to do so for several years. Jane's respect for her husband and country began to sour after DESERT STORM. She began to complain quite a bit. Frank listened and tried to support her as best he could, but to no avail. Jane asked for time to go home to visit some old friends. Frank agreed to whatever she wanted. Finally she told him that she was going to

live with someone else.

Frank was devastated. His anger was so uncontrollable that he developed a self-destructive and unsafe attitude which affected his performance on the flight line. His 35-10 compliance and military bearing were sloppy. He became negative and resentful to members in his squadron. He didn't eat well or exercise regularly as he had done before. He became extremely critical of others, especially women.

It is hard to face separation, but the denial and non-acceptance of feelings and the grief process prevents growth and a restart on life. Frank's helplessness led to a non-acceptance of the divorce and had an immediate negative impact on the safety of his fellow maintainers and flight crews.

Why does love turn sour and cause attitudes and behavior that are totally opposite from the way lovers felt toward each other in the beginning of their relationship? Do each of the involved parties realize the impact of divorce on their work performance? Without good counseling, individuals cannot begin to understand the complicated conscious and unconscious network of attitudes, behavior, desires, hopes and ideals that merge in a marriage and, unfortunately, turn sour or break down.

In marriage, unselfish and unchanging love is the premium ingredient. If two individuals are serious about establishing a relationship for life, their preawareness and motive for marriage must be verbalized and actualized for the union to last. Marriage involves two complex individuals who are surrounded by a pluralistic society with a swerving set of values and a poor track record for long lasting marriages.

What are some causes that lead to separation? In Jane's case, there was frustration with her career, a breakdown in communication with Frank and a lack of trust. All of these problems did not begin when she married her spouse. They were formed over the years of her early life. They increased and resurfaced in other areas of her life: detachment and avoidance in communication with her spouse, critical remarks about her commander and troops and a general dislike for Air Force policy.

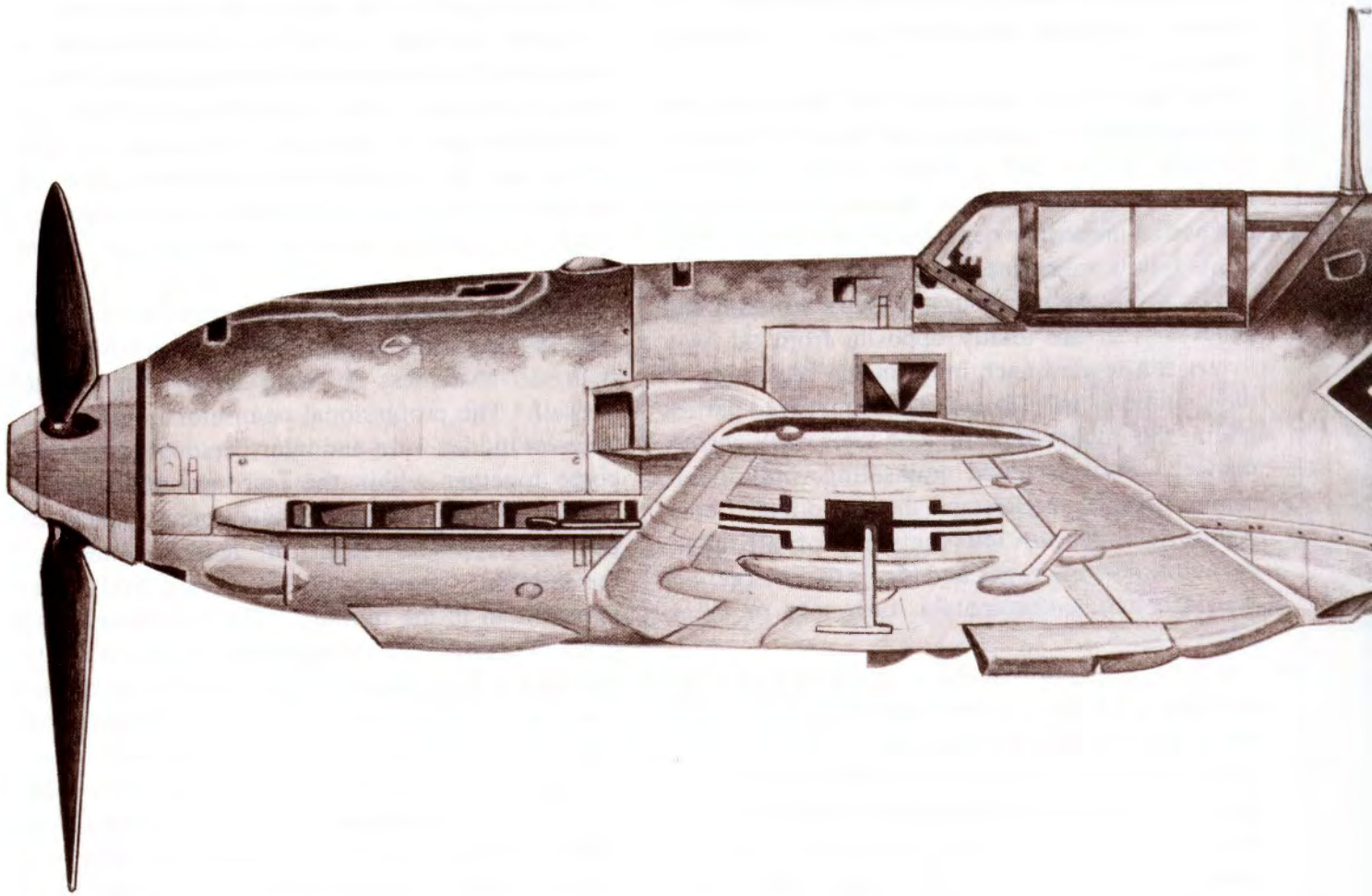
The impact of separation and the underlying causes of the divorce had a direct affect on the personality and job performance of both Frank and Jane.

Changes take place daily within home and work relationships. In marriage, feelings and thoughts buried from the past surface and swell. If disproportionate and unresolved, they influence the marriage and, consequently, the job in a destructive way.

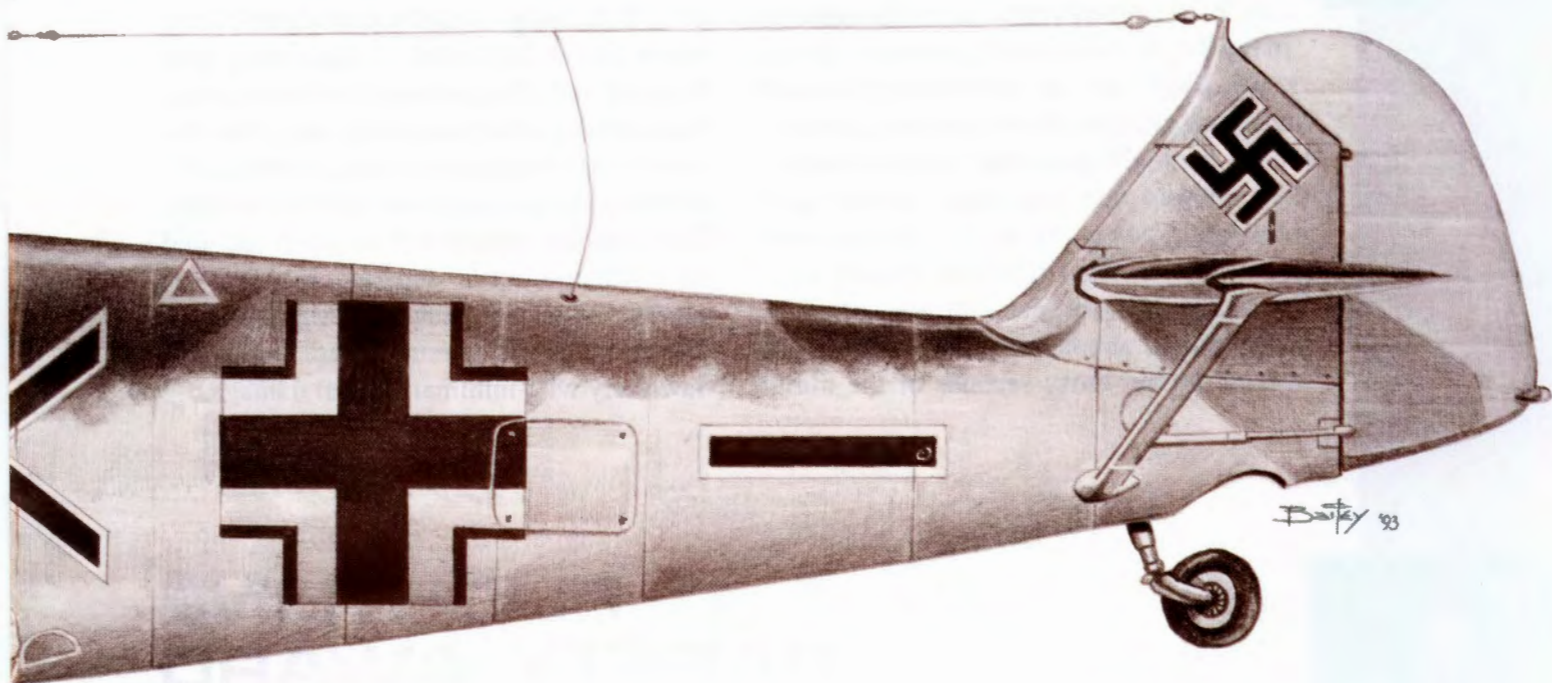
A good marriage is one that allows spouses to know and share their respective strengths and weakness and help each other work toward fulfilling the needs of the spouse. A healthy relationship depends on the daily give and take with each other, centered on their original standards and motivations for marriage. Counseling serves as a tune-up for longer life.

Counseling helps a couple understand their differences so they can love more deeply. Growth begins with self-awareness or being happily married to oneself. The professional counselor is trained to uncover hidden intra-and inter-personal issues that come together within the marriage relationship. The counselor realizes the interconnectedness of personal happiness and the safe accomplishment of the mission. Nowhere is this more gravely connected than in the military. The Air Force takes pride in caring for its own, especially as it seeks to maintain a high quality organization with a profound military posture worldwide. When marital health weakens, job performance buckles.

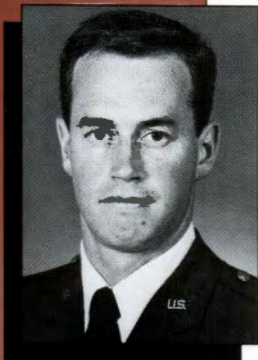
Frank and Jane could have built a safer marital foundation by engaging in premarital counseling. This would have given them greater awareness of their similarities and differences and several tools to work out their differences. They could have obtained counseling when they first sensed the early warning signs that lead to separation. Frank finally agreed to several counseling sessions that helped him work through his grief and deal with his anger and loneliness. If these issues are not confronted, they have a direct impact on the safety of the mission. When a couple is facing a divorce, no one is a winner. Knowing what professional resources are available will help them unpack their pain safely, so they can begin to find their new opportunities. Even if it is not broke, we need to fix it! ■



MESSERSCHMIDT



MITT Bf 109E



PILOT SAFETY AWARD OF DISTINCTION

1Lt Gerald Q. Brown, 307 FS, 347 FW, Moody AFB GA

As the wingman on a two-ship F-16 surface attack tactics mission, First Lieutenant Brown experienced major fluctuations in the B-system hydraulic pressure. After a "knock-it-off" call, he immediately lowered his landing gear handle and continued to monitor the hydraulic pressure. Cockpit indications showed that both main landing gear were safely down and locked, but the nose gear was not. His flight lead visually confirmed that the nose gear door was still completely closed although the landing gear was lowered within thirty seconds of the initial

hydraulic pressure problem. Thirty seconds later, the B-system hydraulic pressure went to zero. Following checklist procedures, Lieutenant Brown attempted an emergency gear lowering using the pneumatic backup system. Approaching emergency fuel, and after discussion with his flight lead and the wing SOF, he elected to execute a nose gear-up landing. This complex emergency situation required the completion of 27 separate steps encompassing 4 phases of aircraft systems failure. Lieutenant Brown executed these procedures flawlessly with minimal aircraft damage.



FLIGHTLINE SAFETY AWARD OF DISTINCTION

TSgt Gerald Laney, 363 LG, 363 FW, Shaw AFB SC

While performing a 36-month quality assurance follow-up inspection on an F-16 aircraft ACES II ejection seat, Technical Sergeant Laney found the seat/catapult elbow fitting clogged. This deficiency had been missed by the previous seven-level inspector. Knowing the seriousness of this clogged elbow, Sergeant Laney began an investigation isolating why it was clogged. He found that all the elbows in bench stock and in the local supply were also clogged. He immediately contacted the item manager, and together they concluded the elbow's manufacturer had used

some kind of anti-corrosive compound that when dry, clogged the elbow. TSgt Laney initiated a maintenance crosstell alerting all ACES II users of the defective elbows. His attention to detail identified a critical problem, and his prompt action may well have saved a pilot's life. If the defective elbow was placed on an aircraft ejection seat, it would prevent the pilot's separation from the seat, and kill the pilot. Sergeant Laney's efforts to identify and prevent the defective elbows from being used through-out the DOD, potentially saved an undetermined number of lives.

AIRCREW SAFETY AWARD OF DISTINCTION

*Col Gary N. Schneider, Capt Gregory E. Davis,
Capt David T. White, Capt Donald L. Loomis
42 OSS, 42 BW, Loring AFB ME*



Captains White and Davis were completing a normal touch and go when, at approximately 30 feet of altitude, their B-52G shuddered. Immediately, they surveyed the engine instruments, hydraulics, and gear indications but everything appeared normal. The aircraft felt as if it was handling normally as they climbed to pattern altitude. However, the radio crackled to life as both the Runway Supervisory Officer and Tower relayed that the right aft landing gear fell off the aircraft and bounced on the runway. The rest of the crew immediately began referencing the T.O. and coordinating for an emergency recovery. In addition to the loss of a landing gear, the

aircraft was the only B-52G in the inventory with the tail gun assembly removed. The center of gravity (CG) was already well forward due to the removed guns and now the absence of the rear landing gear further shifted the CG to an out of limit condition. In conference with maintenance and Boeing, it was determined that some fuel could safely be moved to shift the CG aft to an acceptable landing condition. After a final low approach to determine the remaining gear were down, and no additional damage to the aircraft, Captain White softly set the crippled B-52 on the runway.

CREW CHIEF EXCELLENCE AWARD

Sgt Michael J. Hill, 34 FS, 388 FW, Hill AFB UT



Sergeant Hill was performing a thru-flight inspection on an F-16 aircraft when he noticed hydraulic fluid coming out of the leading edge flap (LEF) power drive unit (PDU) drain. After removing the PDU access panel to investigate the cause of the leak, Sergeant Hill noticed that the mechanical linkage connecting the command servo to the PDU was not connected. Further investigation revealed that one of the mechanical linkage bearings had seized to the command servo causing the linkage to fail. The aircraft had landed code one with no maintenance fault listings or

flight control related problems. However, had this condition gone uncorrected, the aircraft on its next sortie could have experienced serious flight control anomalies resulting in loss of controlled flight and possible injury to the aircrew. After removing the defective parts and ensuring no damage had occurred to either the command servo or PDU, Sergeant Hill performed the required operational check of the leading edge flaps ensuring system integrity and returning the aircraft to fully mission capable status.



TEAM SALUTES

The HQ ACC **TEAM SALUTE** recognizes a person, group of people or unit for notable displays of quality performance in the area of mishap prevention. **TEAM SALUTE** recipients are selected by the ACC Safety Awards Board from the monthly nominees for ACC safety awards. Periodically, **TEAM SALUTE** recipients will be featured in *The Combat Edge* magazine. Our congratulations to these recipients of the **TEAM SALUTE**.

TSgt Kelly J. Branscom
49 MS, 49 FW
Holloman AFB NM

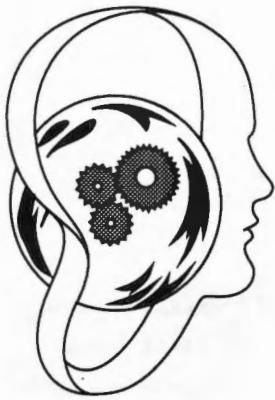
As I was performing a cockpit inspection on an F-117, prior to an ACES II ejection seat installation, I noticed an excessive gap between the canopy unlatch arm casing and the torque drive tube linkage. A verification inspection was done, and the gap was found to have far exceeded the limitation stated in the applicable technical order. Had this discrepancy gone unnoticed and a pilot ejection attempted, the canopy would have possibly failed to fully unlatch, preventing it from being released from the aircraft. The end result could have been the loss of a pilot's life. After the condition was identified, a one-time inspection of all fleet aircraft assigned was accomplished and six other aircraft were found to have the same discrepancy. In

addition to this situation, I have supervised a Time Compliance Technical Order modification to all ACES II seats in the F-117A aircraft which improves the reliability of the seat during ejections. These accomplishments have greatly improved the safety of valued flight crewmembers.

SrA Wayne Dombroski
347 OSS, 347 FW
Moody AFB GA

A C-172 was en route from Tennessee to Ft. Lauderdale when the pilot realized he would be unable to land at the intended airport due to weather. He decided to divert to Valdosta knowing that fuel was a problem and he would have to land immediately. SrA Dombroski vectored him to a final approach for an ILS into Valdosta, but the pilot had to go missed approach. The

pilot then requested an ASR approach and advised SrA Dombroski of his low fuel status. SrA Dombroski vectored him in close to the outer marker and gave the pilot the ASR approach. SrA Dombroski also advised the pilot to turn on the pilot controlled lighting since Valdosta tower was not open. The pilot wrote a letter concerning this incident and he said that if SrA Dombroski had not reminded him about the pilot controlled lighting he would have forgotten because he was concentrating on the approach and his low fuel status. He broke out of the clouds and was perfectly aligned with the runway which enabled him to make a safe landing. His letter stated that "without the experience of the controller at Moody AFB, Wayne Dombroski, our circumstance could have developed into a life-threatening situation."



WHAT YOU TOLD US!

In our August and September issues, we asked you to participate in a survey so we could measure how well we're meeting your needs as a customer. We need your inputs to improve **The Combat Edge** and better serve you. From the 54,062 surveys available, we received 74 responses for a return of 0.13 percent. (Survey response is obviously an area where we need to get better.) To all the people who took the time to send us their opinions, **THANK YOU**. We enjoyed reading your thoughts (yes, we read every survey) and appreciate your honesty. To everyone who didn't send us a survey, we can only assume that we're satisfying your needs; otherwise, you would have told us.

Applicable portions of the survey have been reprinted along with your responses. For questions 1-6 and 42-43, the numerical entries are percentages, i.e., 55 percent of our survey respondents read the magazine very often, 25 percent - often, etc. The responses listed for questions 8-41 are numerical averages and reflect how well we rated on the scales included in the survey. This data is depicted graphically in Figs 1 and 2. Remember, for questions 8-22 low numbers are good. We will continue to analyze the data and use the results in planning future issues of **The Combat Edge**.

Overall, we interpreted the data to indicate that **The Combat Edge** has been fairly successful in fulfilling its charter. Our goal is to prevent mishaps by providing accurate and useful information concerning flight, ground and weapons safety. The magazine staff is committed to improving our product for you -- the customer. We intend on doing just that, based on your responses.

Again, thanks to everyone who filled out a survey and now... how about an article? You can help make us better and correct the shortfalls you identified by sharing your experiences and expertise with your fellow readers. We are completely dependent on **YOUR** articles. **HAPPY HOLIDAYS!**

The Staff of
The Combat Edge

- | | | | |
|---|----|--|----|
| 1. How often do you read this magazine? | | 4. How many other people read/share the copy of this magazine you receive? | |
| a. Very often (every issue) | 55 | a. None | 8 |
| b. Often (most issues) | 25 | b. 1-3 | 26 |
| c. Sometimes (some issues) | 11 | c. 4-6 | 15 |
| d. Seldom (very few issues) | 9 | d. 7-9 | 16 |
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| b. GPO subscription/direct mail | 3 | 5. After reading this periodical, what do you do with it? | |
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| d. Co-worker, associate, friend | 5 | b. Discard it | 7 |
| e. Other | 4 | c. Pass it on | 49 |
| 3. How much of each issue of this magazine do you read? | | 6. How soon do you see a copy of this magazine after it is published? | |
| a. All | 18 | a. One week or less | 16 |
| b. Most | 41 | b. One to three weeks | 58 |
| c. About half | 22 | c. Three weeks to a month | 16 |
| d. Some | 11 | d. A month or more | 10 |
| e. A little | 4 | 7. What magazines or newspapers do you regularly read? | |
| f. Look at but seldom read | 4 | | |
| g. None | 0 | | |

DAILY PAPER, AIR FORCE, AIRMAN

We are interested in your assessment of *The Combat Edge* magazine. When choosing an answer, write in the number corresponding to the extent you agree or disagree with each statement.

Strongly Agree

Agree

No Opinion

Disagree

Strongly Disagree

1

2

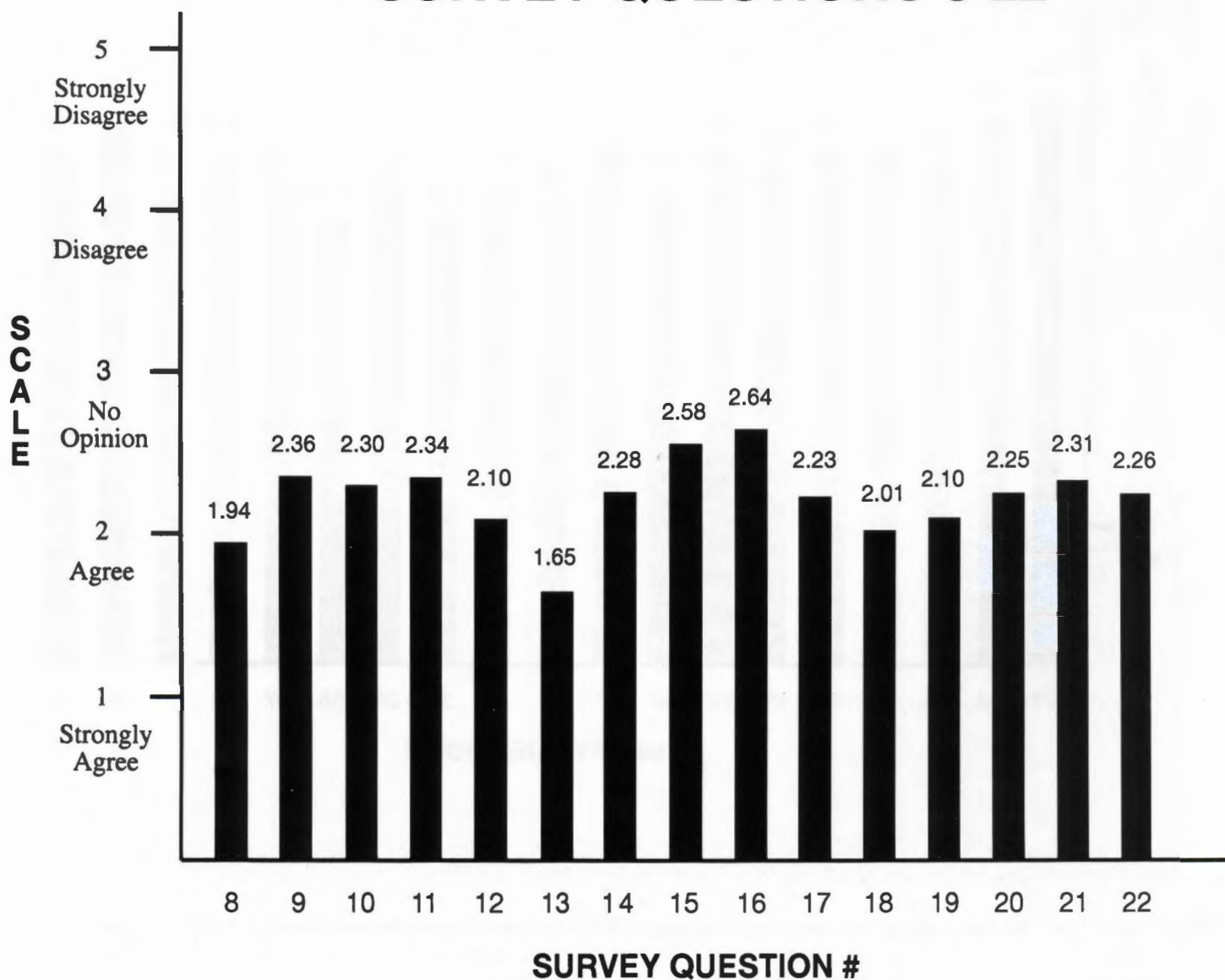
3

4

5

- | | |
|---|--|
| <p>8. The Combat Edge satisfactorily presents safety information.</p> <p>9. The Combat Edge is as interesting as other publications I read.</p> <p>10. The Combat Edge is as informative as other publications I read.</p> <p>11. The level of reading in The Combat Edge should not be higher.</p> <p>12. The articles in The Combat Edge are technically accurate.</p> <p>13. Overall, the appearance of The Combat Edge is good.</p> | <p>14. Coverage of flight safety issues is adequate.</p> <p>15. Coverage of ground safety issues is adequate.</p> <p>16. Coverage of weapons safety issues is adequate.</p> <p>17. The number of photos, illustrations and charts in The Combat Edge is sufficient.</p> <p>18. The Combat Edge articles are informative.</p> <p>19. The Combat Edge articles are interesting.</p> <p>20. The Combat Edge magazine is useful to me personally.</p> <p>21. Article topics are in tune with important trends.</p> <p>22. The Combat Edge is an effective mishap prevention tool.</p> |
|---|--|

SURVEY QUESTIONS 8-22



For the areas listed below, please rate each using the following scale:

Poor
1

Fair
2

Satisfactory
3

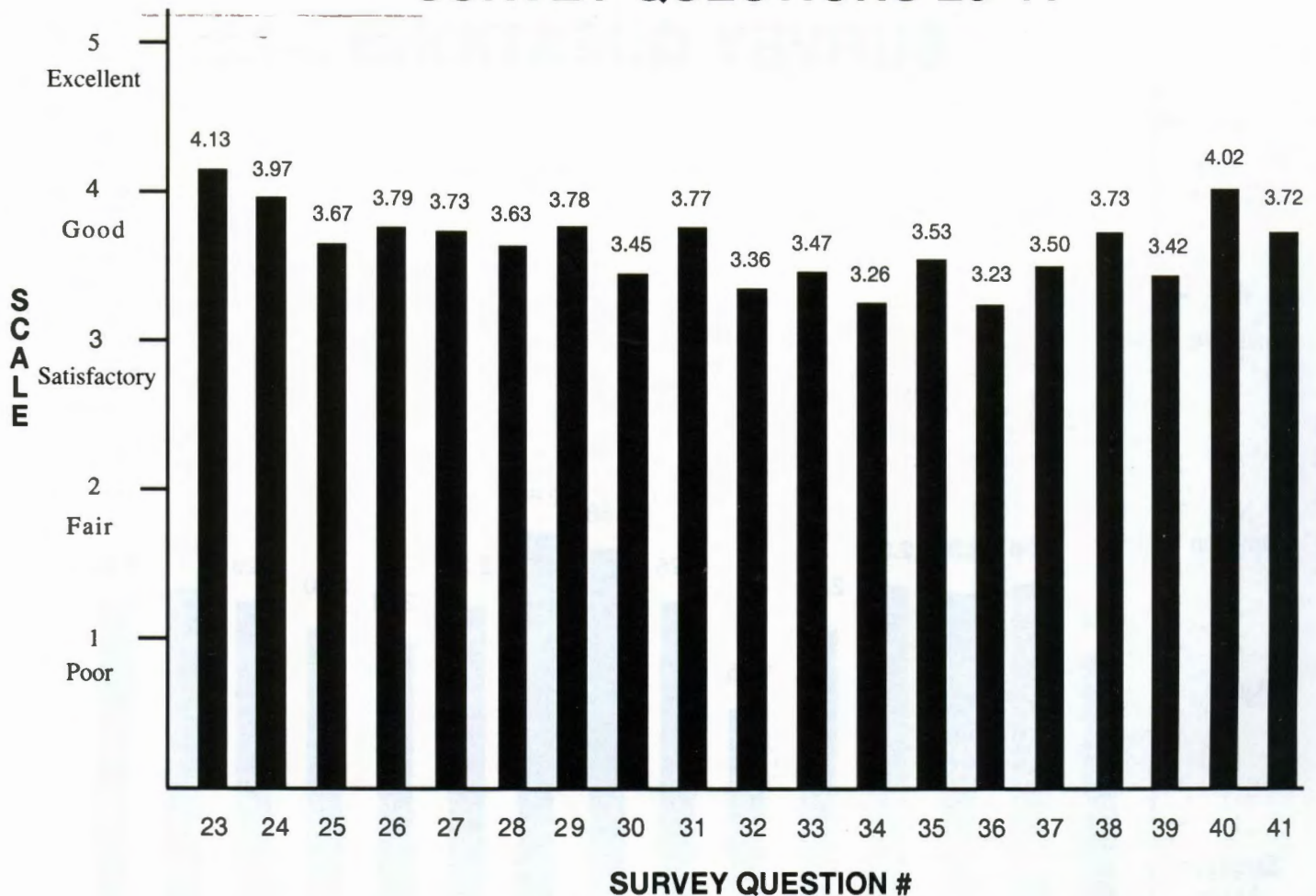
Good
4

Excellent
5

- 23. Covers
- 24. Layout (professional appearance)
- 25. Article quality
- 26. Photographs
- 27. Illustrations
- 28. Information value
- 29. Use of color
- 30. Thought provoking nature
- 31. Type (size and style)
- 32. General interest/entertainment value

- 33. Article thoroughness
- 34. Article variety
- 35. Awards coverage
- 36. Usefulness in my job
- 37. Timeliness of articles/issues
- 38. Accuracy
- 39. Usefulness in increasing professional expertise
- 40. Attractiveness
- 41. Overall value

SURVEY QUESTIONS 23-41



42. Has a **Combat Edge** article ever saved your life or kept you from doing something dangerous? YES -- 16

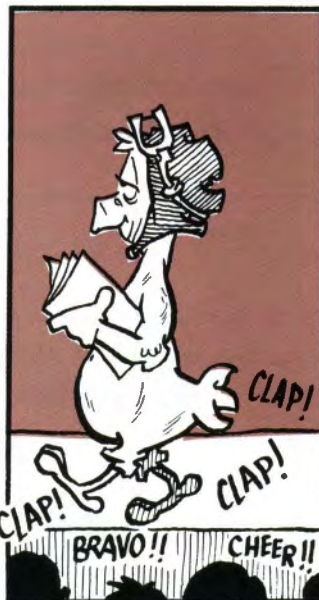
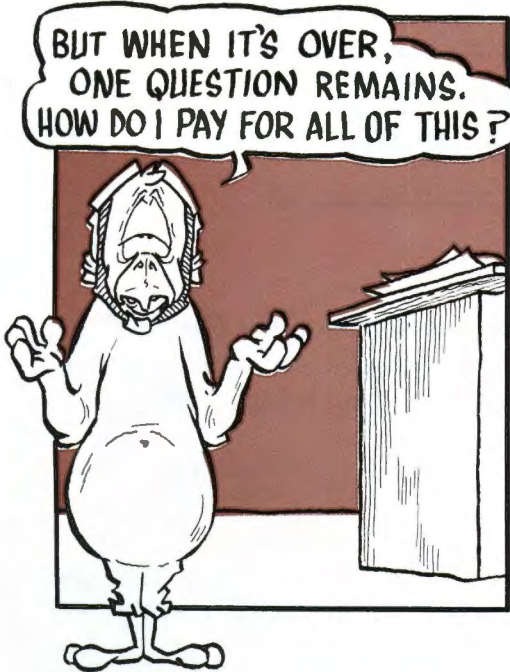
43. How would you rate this magazine in comparison with other publications dealing with the same or similar subject matter?

- | | | | | | |
|---------------------|----|--------------------|----|---------------|---|
| a. The best | 11 | c. Average | 19 | e. The worst | 5 |
| b. Better than most | 55 | d. Worse than most | 5 | f. Don't know | 5 |

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Ed.





F-15 EAGLE

Lateral Asymmetry

LIMITATIONS

Monte Cooper and Del Linge
Aircrew Training Instructors
McDonnell Douglas Training Systems Inc.
Tyndall AFB FL

Since the early years of aviation, lateral asymmetry has been one of the leading causes of departures from controlled flight; the F-15 Eagle is no different when operating above 30 cockpit units angle of attack (AOA). Glen Larson, an Eagle Driver for the 110th Fighter Squadron (Air National Guard), St. Louis, Missouri, and McDonnell Aircraft Company program development manager, addressed this subject in the *Digest*, Vol. 31, No. 3, 1984, "Stalls, Spins and Autorolls." Because of the number of departures the F-15 fleet continues to experience, we feel it is time to revisit this subject.

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After discussing departure from controlled flight occurrences with several F-15 operational pilots, we found that the examples and restrictions in TO 1F-15()-1 (flight manual) occasionally are being misinterpreted. In some instances, pilots have been flying in the susceptible departure region of the flight envelope without realizing it.

The F-15 is -- as are most attack and fighter aircraft -- out of balance laterally to some degree; therefore, limits have been established because the flight characteristics can change dramatically as a function of asymmetry. With this in mind, let's review what effect lateral asymmetry has on an Eagle in a high-angle-of-attack situation.

Lateral Asymmetry (foot-pounds)	Departure (All Loadings)	Spin	
		Without Centerline Tank	With Centerline Tank Only
0 to 5,000	Resistant	Extremely Resistant	Resistant
Greater Than 5,000 (Less Than 7,000)	Susceptible	Resistant	Resistant
7,000 to 10,000	Extremely Susceptible	Resistant	Susceptible
Definitions			
Extremely Susceptible to Departure	Departure from controlled flight will generally occur with the normal application of pitch control alone or with small roll and yaw control inputs. This can occur almost instantly.		
Susceptible to Departure	Departure from controlled flight will generally occur with the application or brief (about 1 second) misapplication of pitch, roll or yaw controls that may be anticipated in operational use.		
Resistant to Departure	Departure from controlled flight will only occur with a large and reasonably sustained (more than 3 seconds) misapplication of pitch, roll or yaw controls.		
Extremely Resistant to Departure	Departure from controlled flight can only occur after an abrupt and inordinately sustained (over 15 seconds) application of gross, abnormal, pro-departure controls.		
Notes: • This table applies to altitudes above approximately 20,000 feet. • Departure resistance is increased considerably at lower altitudes. • The aircraft can become directionally unstable at high AOA (approximately 40 to 44 units) with sideslip (yaw angle) present.			

Figure 1. Departure/Spin Susceptibility Summary

Departure and Spin Susceptibility

The flight manual provides a description of the Eagle's departure and spin susceptibilities based on lateral-asymmetry loadings (Figure 1). They are:

- * As long as the F-15 is operated at or below 5,000 foot-pounds of lateral asymmetry, the aircraft will remain resistant to departure;
- * between 5,000 and 7,000 foot-pounds lateral asymmetry, the F-15 becomes susceptible to departure; and
- * above 7,000 foot-pounds, the F-15 is extremely susceptible to departure.

What does this mean? The flight manual defines departure as an uncommanded flight path change such as a nose slice, roll away from a lateral input or excessive yaw rates. The F-15's greatest resistance to departure occurs below 30 units AOA. Provided the control inputs are smooth, the airplane can be flown all the way to 30 units with as much as

one full external wing tank of asymmetry.

As AOA increases beyond 30 units, the airplane will tend to yaw and roll away from the heavy wing. The resulting sideslip angle requires lateral stick toward the heavy wing to stop the roll. Rudder pedal toward the heavy wing also will be needed to stop the yaw rate. This tendency to yaw away from the heavy wing will eventually overpower the control surfaces during abrupt or high AOA maneuvering and the airplane will depart. Just in case the astute Eagle driver still has not received the message, the yaw warning tone will most likely sound off indicating a yaw rate exceeding 30 degrees per second - definitely not the place to fly the Eagle, especially with lateral-stick displacement.

So what does TO 1F-15()-1 section on "Departure/Spin Susceptibility Summary" (Figure 1) say? Basically that the aircraft is departure-resistant (0-5,000 foot-pounds), which means it will depart only with large and sustained (longer than 3 seconds) misapplication of pitch, roll or yaw. Conversely, an

aircraft operating in the susceptible region (5,000-7,000 foot-pounds) would necessitate only a brief (about 1 second) misapplication of pitch, roll or yaw controls to cause the jet to depart. When flown in the extremely susceptible region (7,000-10,000 foot-pounds), just the normal application of pitch inputs coupled with any sideslip will depart the aircraft almost instantly. We need to also point out that in the region of reduced stability (40-44 units AOA), departure susceptibilities are further exaggerated. During maneuvering, pilots should use 37-44 units AOA to define this region due to the lag in the AOA indicator.

Asymmetry Calculations

The above considered, the pilot obviously needs to ensure that the F-15 is loaded and operated within the resistant to departure region (i.e., less than 5,000 foot-pounds lateral asymmetry). The computation of the correct value is sometimes misunderstood, and has resulted in pilots operating their aircraft in the susceptible to extremely susceptible regions when, in fact, they thought they were in the resistant zone.

A basic aircraft possesses a right-side asymmetry of 1,700 or 1,850 foot-pounds (A-D model and E model, respectively) to start with because of the gun, its associated support equipment and avionics line replacement units (LRUs). Therefore, any right-side asymmetry is more critical because that basic asymmetry value is added to the asymmetry as opposed to being subtracted from the asymmetry when computing left-side values. The flight manual states: "Fuel asymmetry is the summation of any combination of imbalance between the internal wing tanks and/or the conformal fuel tanks, when installed." For example, if the right CFT has 400 pounds more than the left CFT, and the left internal wing tank has 200 pounds more than the right internal wing tank, the net asymmetry is 200 pounds -- but that's not the whole story.

Using the above example, the aircraft would have a 200-pound net imbalance; however, that imbalance would result in a 740 foot-pound right wing heavy fuel asymmetry (400 pound right CFT imbalance

$\times 5.6 = 2,240$ lateral asymmetry right side heavy) minus (200 pound left internal wing imbalance $\times 7.5 = 1,500$ lateral asymmetry left heavy) = 740 pounds right side heavy total fuel asymmetry. To complete the computation, the right side basic asymmetry of 1,700 or 1,850 foot-pounds must be added to the value. For example:

- * The F-15A model total asymmetry would be 2,440 foot-pounds, right side heavy (740 pounds fuel asymmetry + 1,700 right side basic asymmetry = 2,440 foot pounds); whereas,
- * The F-15E model would have a 2,590 foot pounds asymmetry, right side heavy (740 pound fuel asymmetry + 1,850 right-side basic asymmetry = 2,590 foot-pounds).

Back to the flight manual discussion of asymmetry. According to the manual: "Asymmetric missile load is the summation of any combination of missile loadings. For example, four missiles (any type) on one side and one missile on the other side result in an asymmetric missile load of three missiles." Once again, one would need to take into account the specifics about the type of missile and its location in order to determine the resulting total missile asymmetry. The appropriate fuel asymmetry (if any) and right side basic asymmetry values would then be applied to complete the total asymmetry computation.

After you reference Figure 2, it becomes apparent that the weight limit section found in TO 1F-15A-1, Chapter 6, bears careful consideration. To compute total lateral asymmetry, one needs to look at the lateral asymmetry resulting from fuel and/or missile asymmetry and either add 1,700 (A-D models) or 1,850 (E model) foot-pounds basic aircraft asymmetry to right-side loadings or subtract those values for left-side loadings. The resultant value equates to total lateral asymmetry and is the number used to determine whether the aircraft is resistant, susceptible or extremely susceptible to departure as defined in Figure 1. Keep in mind that even the slightest fuel imbalance combined with missile asymmetries can result in unacceptable departure susceptibilities when flying at more than 30 units AOA. This is

even more acute for F-15E or MSIP-equipped Eagles that can carry mixed air-to-air loads to include AIM-120As on wing stations.

Unquestionably, the Eagle continues to be one of the world's pre-eminent fighters. Operated within its envelope, it has proven to be an honest, easy-to-fly aircraft that enables the pilot to spend time

focusing on weapons employment rather than worrying about what the jet may do. Flown outside its envelope, the pilot may get a ride he does not expect. Since lateral asymmetry is one of the most frequent causes of that ride, it is imperative that pilots understand and adhere to limitations that will enable them to fly the jet as opposed to riding it.

The true asymmetry picture can only be obtained by summing individual asymmetry contributions. Depending on mission needs, you may be able to lower the asymmetry by cleverly loading the external stores.

Weapon/Stores	Store Station	Weight (pounds)	Buttline (inches)	Lateral Asymmetry (foot-pounds)
Wing Pylon F-15A-D F-15E	2 or 8 2 or 8	345 371	115.3 115.3	3,313 3,570
Outboard Launchers* LAU-114 (With Adapter) LAU-128/A (With Adapter)	2A or 8B 2A or 8B	52 (79) 82 (106)	125.0 125.0	542 (823) 854 (1104)
Inboard Launchers* LAU-114 (With Adapter) LAU-128/A (With Adapter)	2B or 8A 2B or 8A	52 (79) 82 (106)	105.5 105.5	458 (695) 721 (933)
AIM-120A	2A or 8B 2B or 8A 3 or 7 4 or 6 CFT Stations	338	130.8 99.6 58.8 55.2 75.6	3,684 2,805 1,656 1,555 2,130
AIM-7F/M	3 or 7 4 or 6 CFT Stations	510	58.8 55.2 75.6	2,499 2,346 3,213
AIM-9L/M	2B or 8A 2A or 8B	195	99.6 130.8	1,619 2,126
ACMI Pod	2B or 8A 2A or 8B	160	99.6 130.8	1,328 1,744
Internal Wing Fuel			90.0	7.5 × Fuel Imbalance
External Wing Fuel			115.2	9.6 × Fuel Imbalance
- 3 CFTs (F-15C/D) - 4 CFTs/-5 CFTs (F-15E)			67.2	5.6 × Fuel Imbalance
LANTIRN Targeting Pod		621	46.4	2,401
LANTIRN Navigation Pod		520	46.4	2,010
Basic Asymmetry** F-15A-D F-15E				1,700 Right Side Heavy 1,850 Right Side Heavy

* The basic launcher weights are computed without the adapter units. The weights in parenthesis represent the launchers with the adapter units installed

** Gun, support equipment and line replaceable units

Figure 2. Lateral Asymmetry Contributions

Hopefully, this article has clarified the lateral-asymmetry puzzle and removed any question about how that asymmetry is computed. The true asymmetry picture can only be obtained by summing individual asymmetry contributions. Depending on mission needs, you may be able to lower the asymmetry by cleverly loading the external stores. Be sure to take into account the normal release sequence and its possible effect on the asymmetry of intermediate configurations.

The more you lower the asymmetry, the more honestly your jet will fly. However, given fuel gauge tolerances, here are some base rules-of-thumb for use in the air-to-air heat of battle that should keep the aircraft within the resistant to departure region. For the sake of simplicity, the most restrictive asymmetry inflight value serves as the limitation. Examples are:

Training Loads

1. A fuel imbalance not to exceed 400 pounds with:
 - * clean or symmetrically loaded aircraft.
 - * any combination of AIM-9s and/or ACMI pods loaded asymmetrically on the left wing.
2. Fuel imbalance not to exceed 200 pounds with one AIM-9 loaded on the right inboard station or ACMI pod loaded asymmetrically on the right wing.
3. A zero fuel imbalance with a single AIM-9 loaded on the right outboard.
4. Any combination of two AIM-9s and/or ACMI pods loaded asymmetrically on the right wing exceeds 5,000 foot-pounds.

Operational Loads (AIM-7s and AIM-9s; Normal Firing Sequence Assuming Symmetrical Pre-launch Load)

1. A fuel imbalance not to exceed 400 pounds with:
 - * clean or symmetrically loaded aircraft.
 - * any one missile asymmetry except one AIM-9 missile asymmetry on the right wing.

2. A fuel imbalance not to exceed 200 pounds with:
 - * one AIM-9 missile asymmetry on the right inboard.
 - * any two-missile asymmetry except two AIM-9s on the right wing with no AIM-9s remaining on the left wing or two CFT-mounted AIM-7s loaded on the same side.
3. A zero fuel imbalance with two CFT-mounted AIM-7s loaded on the left side.
4. The following configurations exceed 5,000 foot pounds of asymmetry:
 - * any three missiles or greater asymmetry.
 - * two AIM-9s on the right wing with no AIM-9 remaining on the left wing.
5. Specialized or poorly conceived pre-launch load plans or non-standard firing sequence caused by any combination of hung missiles, AIM-9 seeker head blanking or SRM stepping by the pilot can result in load asymmetries exceeding 5,000 foot pounds (i.e., susceptible to departure).

Operational MSIP or E-Model Loads (AIM-7s, AIM-9s, and AIM-120As)

With these aircraft, be especially alert for asymmetry involving AIM-120 missiles loaded on the CFTs and/or wing pylons. Load planning should always take firing sequence by missile type into account. Since firing order may be altered by pilot selection, pilots must be aware of remaining missile types and locations. For example, a single AIM-120A asymmetry on the right outboard station exceeds 5,000 foot-pounds.

New look at an old problem? You bet! Hopefully this article has shed some light on the asymmetry issue. Flight manual changes are in the works. Adherence to the preceding revised departure guidelines should keep the Eagle's lateral asymmetry within acceptable limits and the pilot in the employment versus the ride mode. ■

