A special Issue of
Mech Approach
2006

AVIATION 3750

your partner in the aircraft and on the flight line

The Naval Aviation Safety Program Handbook

A Special Supplement to *Mech* and *Approach* – October 2006

Mishaps waste our time and resources. They take our Sailors, Marines and civilian employees away from their units and workplaces and put them in hospitals, wheelchairs and coffins. Mishaps ruin equipment and weapons. They diminish our readiness. This magazine's goal is to help make sure that personnel can devote their time and energy to the mission, and that any losses are due to enemy action, not to our own errors, shortcuts or failure to manage risk. We believe there is only one way to do any task: the way that follows the rules and takes precautions against hazards. Combat is hazardous enough; the time to learn to do a job right is before combat starts.

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what's inside...

Admiral's Corner

From Commander, Naval Safety Center

Aviation3750—A Tool for the Challenge

If you were a naval aviator in 1956, you would have experienced the full dose of what it means to deal with risk. That was the year naval aviation had 406 fatalities and lost 574 aircraft. Flash forward 50 years to 2006, and, although we're doing much better, we've got to raise the bar on our performance if we're to prevent all mishaps. This special issue is designed to provide information and resources to help you succeed and to help us reach that goal.

With advances in technology and the improvements in our aircraft over the years, the focus on mishap prevention is on human factors; over 80 percent of mishaps have a human-causal factor. While the introduction of such major initiatives as the angled deck, NATOPS, the Fresnel lens, and field arresting gear significantly drove down the mishap rates years ago, we now are faced with finding ways to reduce a relatively low mishap rate dominated by human error—this is our challenge.

This special issue provides information on many programs and resources to help aviation units reduce and prevent mishaps. Programs such as operational-risk management (ORM), safety surveys, culture workshops (CWs), crew-resource management (CRM), command safety assessments (CSAs), the web-enabled safety system (WESS), and bird animal strike hazard (BASH) have been developed to improve the way we do business. This guide also provides current and past mishap statistics, examples of best practices, and a review of trends in our aviation communities. Points of contact, reference material, and website addresses give you access to the information you need.

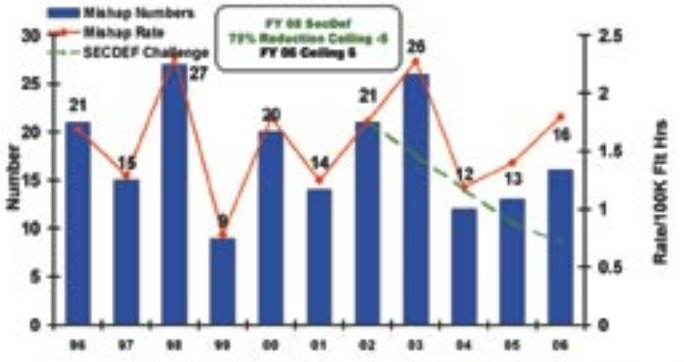
When we have a mishap because of crew-rest violations, lack of NATOPS knowledge, or poor decisions, we know it was preventable. Every mishap wastes our time and resources, and it diminishes our ability to carry out the mission. Our position is that we can meet the challenges of naval aviation—today and in the future.

Use the information in this special issue as a resource to help you manage risks and create an environment in which you accept no unnecessary risk.

Years ago, we computed mishap rates as mishaps per 10,000 flight hours, and now we compute them per 100,000 hours. We want future aviators to look at our current mishap rates, just as we view those of 50 years ago, and say, "We've come a long way."

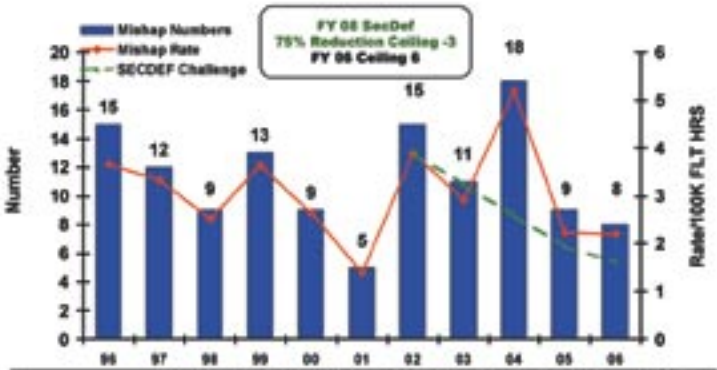
RADM George Mayer

Navy — Class A Flight Mishaps

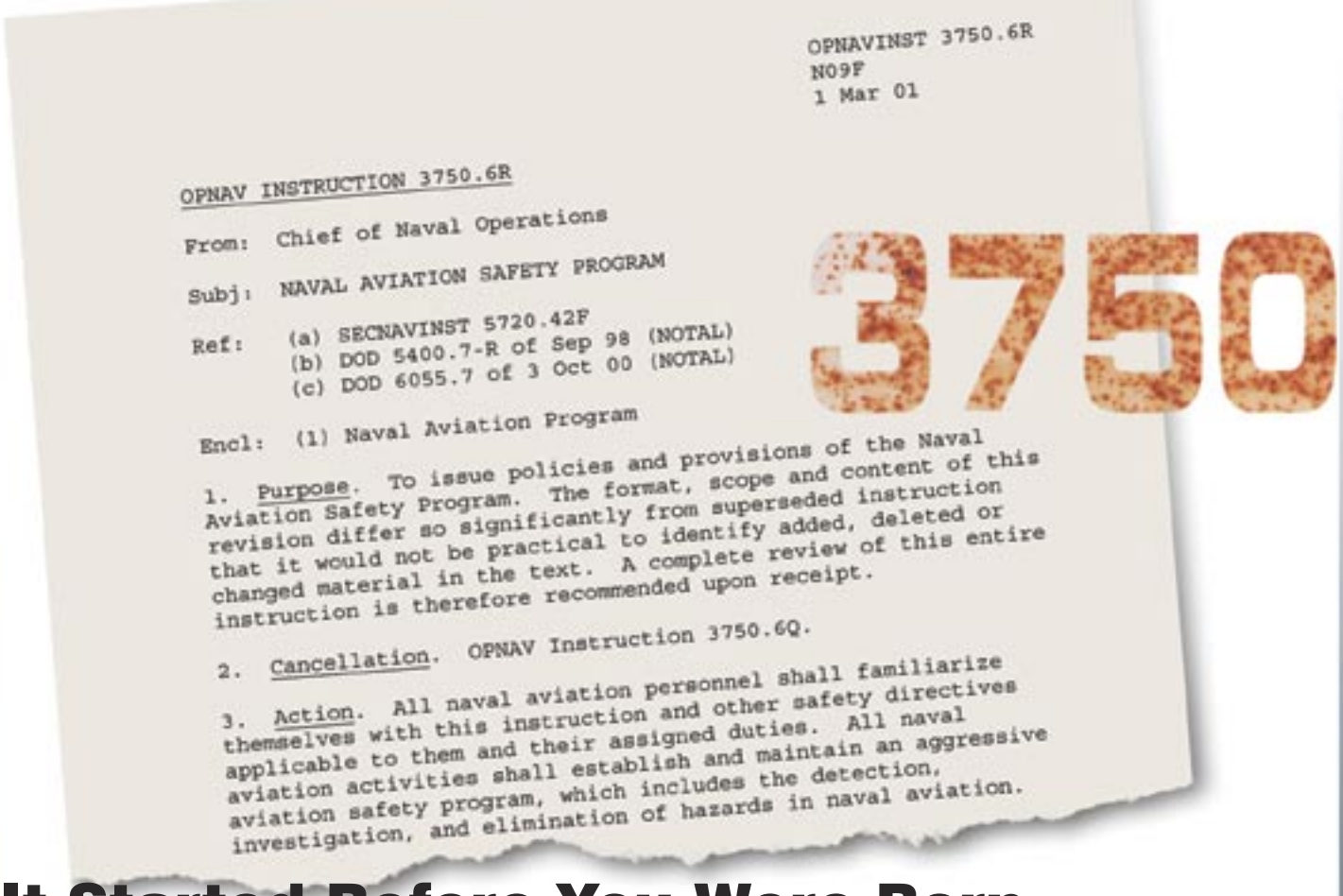


	Mishaps	Mishap Rate	Fatalities	Fatality Rate	Dollars
FY06 thru 15 Sep	16	1.80	13	1.46	$324.9M
FY01-05	99	1.84	60	1.11	$2.1B
Since 1980	939	2.57	752	2.06	$10.6B

USMC — Class A Flight Mishaps



	Mishaps	Mishap Rate	Fatalities	Fatality Rate	Dollars
FY06 thru 15 Sep	8	2.21	12	3.31	$162.7M
FY01-05	61	3.26	96	5.13	$1.4B
Since 1980	443	4.26	613	5.89	$5.5B



It Started Before You Were Born

By Kimball Thompson

The earliest edition of OPNAVINST 3750.6 that we can find at the Naval Safety Center is the "B" version, dated 20 May 1956. When Capt. James Flatley (who would rise to the rank of vice admiral) was the OinC of the Naval Aviation Safety Activity, he referred to the 3750.6 (no A or B) in his September 1953 report to the CNO about the naval aviation accident-prevention program. I therefore can assume we've had the 3750 from the early 1950s. Originally, the 3750.6 was called the Navy Aircraft Accident, Incident, and Forced Landing Reporting Procedure. It now is called the Naval Aviation Safety Program.

So what changed? The 3750 was about 64 pages in the 1950s. Now it is about 1.62 megabytes in Adobe Acrobat; there are 318 pages (with changes 1 and 2 incorporated). We now investigate mishaps, which are humanly preventable, as opposed to accidents, which can imply an act of God or nature. It now contains hard-won pearls of wisdom about running your unit safety programs where the earlier 3750s are mostly about investigating, reporting and collecting data to prevent mishaps.

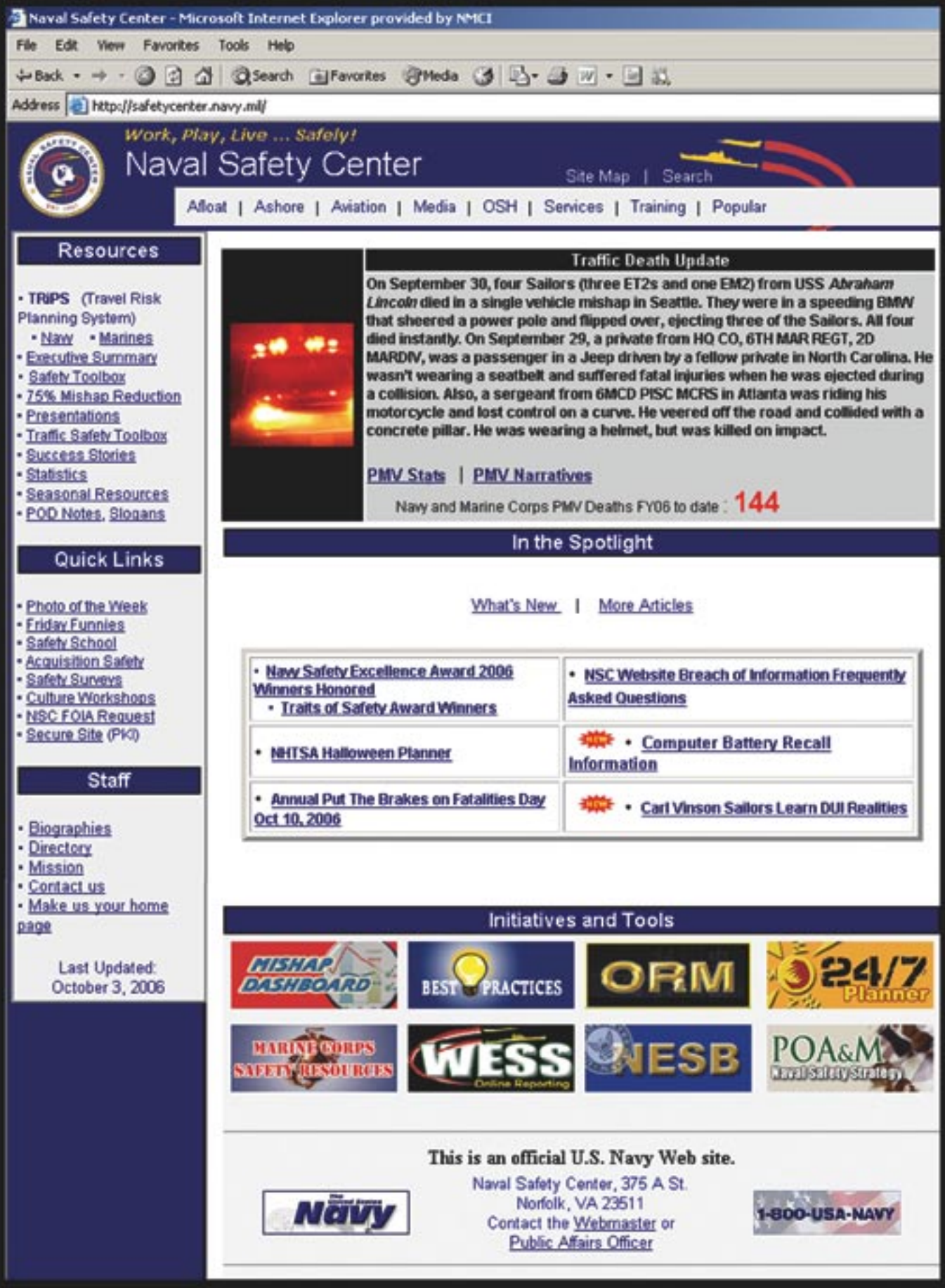
Reports back then were typewritten and mailed. The Forced Landing, Incident, Ground Accident Report (referred to by the great acronym FLIGA) was two pages. The accident report was four pages. You could add various one-to-two-page reports, such as the flight-surgeon, ditch-and-bailout or safety-equipment reports. And you could include enclosures, such as statements from pilots, witness, engineers and LSOs, as well as photos. Now we devote entire chapters to MDRs, Hazreps and Mishap Reports and, of course, multiple enclosures. Pilots' names used to be included in the reports; there was no concept of privilege. However, like today, there were clear statements that safety reports were not used for disciplinary action and were not shared with legal investigations.

Much like today, accident investigations examined material factors, human factors, records, and support facilities. The accident board had to determine all causal factors of the accident that could be used as the basis for corrective action. Unlike today, a primary causal factor was selected.

Damage classifications were A, strike (or lost); B, substantial damage (major overhaul); C, substantial damage (major overhaul not required); and D, minor damage and injury classifications A through M. The current A, B and C mishaps are tied directly to all mishap costs and/or level of injury. We were flying more than 200 type/model/series aircraft in 1956. The most expensive one was the A3D-1 at $4,050,000. Most aircraft cost less than $1 million. Your car probably costs more than the least expensive 1956 aircraft. We now fly about 75 variants; the most expensive is the E-6B at $130.313 million. The least expensive is the TH-57B/C at $.763 million.

Perhaps in 2056, someone will look back at the 3750.6R to 3750.6S transition and notice the shift from message traffic to online reporting. They'll be flying 25 T/M/S at about $4 billion a copy. Presumably, the 3750 won't be 30,000 pages long, but who knows?

—Kimball Thompson flew SH-3Hs and is now executive assistant for Aviation Safety Programs at the Naval Safety Center.



safetycenter.navy.mil

Your Online Guide for Aviation Safety Programs

PROGRAMS

AVIATION SAFETY PROGRAMS

- CW
- CRM
- WESS
- CSA/MCAS
- ORM
- Maintenance Toolbox
- Investigations
- BASH
- Aeromedical
- Safety Surveys

Culture Workshops

The culture workshop (CW) provides a proactive tool that lets a commanding officer identify human-factor issues and problems before a mishap. The workshops also can make organizations more effective. They are step one of the ORM process, with the workshop being set up and debriefed in an ORM format. The CW provides a forum to address underlying culture foundations, giving an early warning of organizational challenges. The CW does not solve a command's problems or usurp or infringe upon command authority.

The CO must request a CW. To complete a request, go to www.safetycenter.navy.mil/culture/request.htm.

A list of units requesting a CW is sent to the facilitators every seven to 10 days. A CW facilitator who is available on the command's requested dates will contact the command, confirm dates for the CW, and provide the updated schedule information to the CW scheduler at the Naval Safety Center.

The facilitator team consists of one trained CW facilitator (per 300 members of the command) and two assistants from a "sister command," to include one O-2 or O-3 aviator and one E-7 or E-8 maintainer. The CW starts with an in-brief with the CO and key players. The two days for the CW consist of individual discussions with command members, seminars, debriefs, and a final wrap-up debrief with the CO.

As the effectiveness of the CWs becomes more widespread, the requests for them have increased. In FY01, the Naval Safety Center did 56 workshops; this number has increased to 104 in FY05, and the goal for FY06 is 140.

The feedback from these sessions has been positive. Here are a few examples:

"This is an absolute must for any CO. We have no other vehicle to accurately gauge the climate and culture in our squadrons."

Another skipper said, "Great tool… could save an aircrew and airplane."

The benefits are many, the cost limited, and return on investment great. Ask for a CW today, and see what you can do to improve your squadron or command.

Tools and Resources:

Visit the culture-workshop website at www.safetycenter.navy.mil/culture/. The following references apply to the program: COMNAVAIRFOR msg DTG 071000Z JAN 03 and ACMC msg DTG 121432Z MAY 04.

Points of Contact:

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Practicing Crew Resource Management

By Cdr. Bob Hahn

A seasoned fleet aviator who recently came through our CRM instructor course as a student commented, "This is the answer waiting to happen!" After finishing the course, he was excited about the mission that lay before him: to do everything in his power to reinvigorate the local CRM program in his aircraft-model community.

That's our mission at the schoolhouse, too, and we believe we have something that will benefit naval aviation. How do we bring down that mishap rate even farther? How do we effectively accomplish the complex tasks involved in our missions? How do we optimize risks inherent in our business while, at the same time, minimizing errors and coordinating with other aircrew, wingmen, or controllers? We have the answer before us: We just need to look to our local CRM programs and practice effective crew-resource management in our flight operations.

In recent years, the study and practice of CRM has improved vastly. This is significant because, as aircraft become more technologically advanced and reliable, the human being remains the same. Human error causes most mishaps and inefficiencies in mission accomplishment. On the academic front, research buttresses the seven critical skills. Command of these skills allows us to do the things we do in the aircraft competently. These items remain the foundation of a good CRM program.

However, studies into why we make mistakes—and how we can recognize, avoid, manage, and mitigate our errors—advance CRM discussion beyond the seven skills. Similarly, advanced discussion on workload management contributes to superior airmanship skills by helping us recognize when it begins to fail and helping us develop strategies to optimize it.

Remarkable developments have occurred in commercial airlines' CRM efforts that can contribute to fleet programs. Despite the tragic recent ComAir mishap, major commercial carriers in the U.S. give a good deal of credit to their CRM programs for their recent safety record—only two Class A mishaps in more than four and a half years.

As aircraft, missions, and the battlespace become more complex, our approach to airmanship must rise to the level of these machines and operations. Strategies and skills to meet these modern demands on airmanship is what a good CRM program should offer your squadron. The schoolhouse tries to capture these develop-

ments in CRM and push them out to the fleet.

Current CRM initiatives include the MV-22 Osprey training program, which has embraced a CRM model that uniquely aids its aviators in their approach to airmanship. The KC-130J community has thoroughly integrated CRM in their flight training. Some communities have integrated CRM into their NATOPS manuals.

CRM has become a part of the School of Aviation Safety. Our schoolhouse takes the instructor course on the road to fleet centers four times a year. We are working on updating the OPNAV CRM instruction. CNAF invited us to help out on some outstanding post-flight, lessons-learned reporting programs. We continue to work on updating naval CRM academics by observing fleet and industry best practices, and we're keeping abreast of the research in academia.

For all these initiatives to make an impact on naval aviation, each community and each aviator must accept or buy into CRM. For ground training, use case studies related to what your squadron is doing today to make your CRM program relevant to your aircraft and operations. In flight, practice CRM—it's the skill set that ties together all the things learned in flight school and tactics training. It's the answer waiting to happen.

Tools and Resources:

OPNAVINST 1542.7C
OPNAVINST 3710.7S
Naval Aviation Schools Command's CRM website
https://wwwnt.cnet.navy.mil/crm/

Points of Contact:

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Naval Aviation Schools Command
(850) 452-2088/5127 (DSN 922)
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LCdr. Deborah White
Naval Safety Center
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CRM Instructional Model Manager
NASC Pensacola, Fla.
(850) 452-2088 (DSN 922)
wwwnt.cnet.navy.mil/crm/ ■

CRM

Crew-Resource Management

CRM improves mission effectiveness by minimizing the number of errors that a crew can commit, maximizing crew coordination, and optimizing risk management. The program incorporates specific behavioral skills into all Navy and Marine Corps aviation operations. Weaknesses in any of the seven common behavioral skills listed below have caused aviation mishaps.

1. Decision-making - The ability to use logical and sound judgment to make decisions based on available information.

2. Assertiveness - The willingness to actively participate, state and maintain a position, until convinced by the facts that other options are better.

3. Mission analysis - The ability to develop short-term, long-term, and contingency plans—as well as to coordinate, allocate and monitor crew and aircraft resources.

4. Communication - The clear and accurate sending and receiving of information, instructions, or commands, and providing useful feedback.

5. Leadership - The ability to direct and coordinate the activities of the other crew members or wingmen, and to encourage the crew to work together as a team.

6. Adaptability and flexibility - The ability to alter a course of action when new information becomes available.

7. Situational awareness - The degree of accuracy by which one's perception of the current environment mirrors reality.

Training in and practicing these CRM skills will improve mission effectiveness and serve to prevent mishaps that result from poor crew coordination.

What's Up with WESS?

By Katherine Escobar

The Web-Enabled Safety System (WESS) is the primary method for reporting aviation hazards and, in the future, will be the method for reporting aviation mishaps. It is an evolving program with many features to improve the reporting process.

It is built on a Turbo Tax-like logic, asking questions that pertain only to the type of event you are reporting. For example, if you are reporting a bird strike, the application will not ask you about physiological-episode-related data. WESS allows you to route reports for approval, notify other commands, submit to the Safety Center, and endorse a report—all electronically.

Feedback and suggestions from the aviation community have helped us to improve WESS and the flow of information. Here are some questions we've received about WESS:

Can you use the Enterprise Safety Applications Management System (ESAMS) to report an aviation hazard?

No. ESAMS is a management system to report minor OSH-related events. If there is a "defined naval aircraft involved," you must use WESS to report your event. Also, ESAMS is not designed to route, notify or endorse a report, and does not collect the level of detail required to obtain a full OPNAVINST 3750.6R report.

Is there training for WESS?

Yes, we have several available sources for training. You can walk through the PowerPoint tutorials on the Safety Center website at: www.safetycenter.navy.mil/wess/. Another option is to contact the aviation department at the Safety Center and request a mobile-training-team visit to your command.

How do I get help?

There are two primary ways. First, submit a feedback form. The link to the feedback form is available under the activities link on the left of every WESS page. Second, for immediate assistance, call our help desk where you will talk with a representative: (757) 444-3520 (DSN 564) Ext. 7048.

What will happen after the December 2006 deadline for PKI or Soft Cert requirement is implemented?

The Safety Center must follow these NavCert requirements. If you don't have a PKI card or Soft Cert on your machine, you no longer will be able to access WESS. Information on how to obtain your credentials is available at www.doncio.navy.mil/pkipkeresourcecenter/.

Changes and enhancements coming for WESS:

- Ability to manage reports by chain of command (Spring 2007).
- WESS Disconnected (WESS-DS) version (Spring 2007).
- Long-term training solution included in formal safety-officer training classes (Summer 2007).
- Continued interim deployments with changes from your feedback.

Tools and resources:

For information on how to provide feedback, set up an account, WESS Barrier Removal Team, user's guides, training, FAQs, contact information, and links to online systems, visit our website at www.safetycenter.navy.mil/wess/. The best way to make WESS work for you is to continue sending us your constructive feedback.

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Command Safety Assessments

FOR 50 YEARS, HUMAN ERROR HAS CAUSED ABOUT 80 PERCENT OF ALL MISHAPS

Naval aviation's flight-mishap rate has declined substantially during the past 50 years, from 33.48 mishaps per 100,000 flight hours in 1956 to 1.83 so far this year. However, the proportion of mishaps due to human error has stayed relatively constant at 80 percent.

For several years, naval aviation's Human Factors Quality Management Board (HFQMB), which no longer is active, had analyzed and recommended improvements to processes, programs and systems that affect human performance. One outgrowth of the HFQMB was the development of two organizational climate-assessment surveys, both looking at squadrons from a safety perspective: the Command Safety Assessment (CSA), which assesses an organization's operational practices, and the Maintenance Climate Assessment Survey (MCAS), which assesses an organization's maintenance practices. These items are perception surveys for command personnel.

The CSA focuses on key organizational issues that play a role in the chain of events leading to an aircraft mishap. This assessment was developed by studying high-reliability organizations that operate in high-risk environments but have fewer failures than would be expected.

The CSA is a 15-minute, on-line survey designed for aircrew. An individual's survey results, including demographic data, are anonymous, and results of a unit's survey are available only to your commanding officer via a password-protected web interface. Your unit's results also are combined with other organizations that take the survey. Aggregate results are available on line to commanding officers to use for comparison between or across type aircraft, communities, and coasts. COs can compare their unit's results, item by item, with others' results.

COs can request a survey for their unit by having their ASO get in touch with the points of contact included here. The ASO identifies the number of participants who will take the survey and supervises the survey process at the unit level. When the unit has achieved maximum participation, the ASO notifies the survey POCs, who then contact

the CO to provide a debrief of the survey results.

Although the individual does not get immediate feedback on the survey, the commanding officer uses the results to identify areas of concern. Those results also may dictate where the CO focuses priorities and resources to prevent mishaps.

Some of those results have yielded interesting information. For example, room for improvement exists in several areas: how people perceive safety programs, billet assignments, whether the chain of command follows through with safety statements. Only about 40 percent agree that the safety officer's job, QAR and squadron safety petty officer jobs are sought-after positions. An impressive 96 to 97 percent agree that their commands emphasize safety. However, only about 80 percent agree that their commands enforce the safety rules espoused, such as crew-rest standards.

These results show that more work must be done to make sure that safety is part of the heart, soul and conscience of a command.

The MCAS survey is very similar in form and function to the CSA. Detailed results can be found in the follow-on story by Dr. Figlock.

Tools and Resources:

The command safety-climate-assessment-survey website is www.safetyclimatesurveys.org.

For a list of issue papers generated in response to survey analysis, visit www.safetyclimatesurveys.org/Issue_Papers.htm.

Extensive research papers have been done to examine the relationship between CSA/MCAS results and mishap outcomes. Those papers are available at www.advancedsurveydesign.com/index_files/ResearchPapers.htm.

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Top and Bottom Five CSA Survey Items

By Bob Figlock, Phd.

Historically, some CSA and MCAS survey items have had consistently higher (more favorable) and lower (less favorable) overall response averages than the other survey items. My latest paper examines the top and bottom five ranked survey items for each survey, as rank ordered by their "average scores" (i.e., their mathematical means) based upon survey data collected between July 2000 and May 2006.

The entire paper is lengthy, but I've provided a couple tables that show the challenges ahead.

(a) Reverse scored (i.e., Strongly Disagree = 5, Disagree = 4, . . . Strongly Agree = 1).

Table 1. Top Five CSA Survey Items (ranked by average score)

Naval Ranking (out of 61)	Survey Item	Average Score (out of 5)
1	In my command, we believe safety is an integral part of all flight operations.	4.46
2	Leaders in my command encourage everyone to be safety conscious and to follow the rules.	4.39
3	My command is genuinely concerned about safety.	4.36
4	My command has a reputation for high-quality performance.	4.35
5	My command closely monitors proficiency and currency standards to ensure aircrew are qualified to fly.	4.34

These following results list the question's ranking out of 61 questions and the average score out of 5:

1. In my command, we believe safety is an integral part of all flight operations. (4.46)

The top five (most favorable) CSA survey items deal with issues relating to beliefs, encouragements, concerns, and reputations. The bottom five (least favorable) CSA items deal with more tangible topics, such as resources and equitable workload distribution.

Three of the bottom rank-ordered CSA survey items are closely linked to each other and relate to resources: a lack of experienced personnel, resource adequacy, and operational commitments. Another of the survey items, which deals with morale and motivation, can be indirectly associated with the adequacy of resources and assets.

The MCAS results are equally interesting. Here are a few tables to show the top-and-bottom-five survey items.

Table 2. Bottom Five CSA Survey Items (ranked by average score)

Naval Ranking (out of 61)	Survey Item	Average Score (out of 5)
57	Lack of experienced personnel has adversely affected my command's ability to operate safely.	3.69[a]
58	Morale and motivation in my command are high.	3.68
59	I am provided adequate resources (time, staffing, budget, and equipment) to accomplish my job.	3.51
60	The ASO position is a sought-after billet in my command.	3.36
61	Based upon my command's personnel and other assets, the command is overcommitted.	3.10[a]

Table 3. Top Five MCAS Survey Items (ranked by average score)

Naval Ranking (out of 43)	Survey Item	Average Score (out of 5)
1	CDIs/QARs routinely monitor maintenance evolutions.	4.11
2	The command has a reputation for quality maintenance and sets standards to maintain quality control.	4.04
3	The command adequately reviews and updates safety procedures.	3.99
4	Tool control and support equipment licensing are closely monitored.	3.97
5	Our command promotes safe maintenance.	3.96

Table 4. Bottom Five MCAS Survey Items (ranked by average score)

Naval Ranking (out of 43)	Survey Item	Average Score (out of 5)
39	Multiple job assignments and collateral duties adversely affect maintenance.	3.38
40	Good communication exists up/down the chain of command.	3.34
41	The command recognizes individual safety achievement through rewards and incentives.	3.28
42	Based upon my command's current assets/manning, it is not overcommitted.	3.27
43	Day/night check have equal workloads, and staffing is sufficient on each shift.	3.03

The average scores of all five MCAS top ranked survey items are lower than the top five ranked CSA survey items. This trend has been consistent between CSA and MCAS averages: maintainers (predominantly enlisted respondents) consistently have lower overall averages than aircrew (predominantly officer respondents). In fact, analysis indicated that enlisted aircrew had a greater percentage of unfavorable responses in 58 out of 60 CSA survey items (one was equal), compared to officer response rates.

Similar to the bottom five CSA survey items, three of the bottom five rank-ordered MCAS items relate to resources: the negative influences pertaining to multiple job assignments, organizational commitments based upon adequacy of assets and manning, and distribution of workload between day and night crews. The other two topics contained in the bottom five MCAS survey items deal with communication and individual recognition of safety achievement.

Issue papers are designed to encourage safety dialogue at higher headquarters, as well as at the deck-plate level. The full analysis of top-and-bottom-five items, including a comparison with Army results, is available on-line at: www.safetyclimatesurveys.org/Issue_Papers.htm. ■

PHAN Stephen Early

OPERATIONAL-RISK MANAGEMENT

Whether you call it a program or a process, ORM has been around the fleet long enough so that these three letters have become familiar. *Approach* submissions routinely mention it, and lots of instructors have been trained. But we're far from the finish line. Too many serious mishaps could have been prevented had people used the process. Too many of us still don't manage risks the way we should—a glance at the mishap rates and narratives make this clear.

A major effort is underway to reinvigorate ORM. Naval Safety Center staff, committees and working groups throughout the fleet are working on four major areas: leadership and policy, training and education, assessment, and feedback and monitoring.

An ORM policy document has been developed, addressing both macro and unit levels. A stakeholder conference last July drafted a manual, and a working group called the ORM Cell is working for the Navy Executive Safety Board's Operations Safety Committee.

In progress are a series of quarterly, flag-level messages reinforcing ORM vision and intent one in progress, and an effort is underway to standardize terminology and direct units to review and document the completion of ORM on-line courses. A draft of the ORM instruction is in work, and the instruction will be posted on the Naval Safety Center ORM website when approved. Training and education accomplishments include building a network of involved commands, providing ORM courses to delayed-entry recruits, and creating an improved instructor course. In progress is a revamp of the ORM material on Navy Knowledge Online and provision of standard material for instructors.

The Naval Safety Center survey teams have developed a guide for assessing local ORM efforts that can be integrated into existing assessment processes, and it will be part of the ORM manual.

Finally, under the heading of feedback and monitoring, 17 ORM best practices now are included on the Naval Safety Center website. NSC is working on the next stage of TRACS (Total Risk Assessment and Control System), with the Air Force to revitalize use of this tool. In work is an effort to create a process for assessment teams to input best practices for feedback.

ORM for Maintainers

Maintenance Risk Management (MRM) is a general process for improving communication, effectiveness and safety in aviation operations. Effectiveness is measured through the reduction of maintenance errors and improved individual and unit coordination and performance. MRM is used to change the "safety culture" of aviation maintenance by establishing a pervasive, positive attitude toward safety. Such an attitude, if positively reinforced, can lead to changed behaviors and better performance.

Gordon Dupont, special programs coordinator with Transport Canada, developed a list of human-factor error causes that were present with every maintenance mishap. He gave birth to "The Dirty Dozen." The most common causes of an error in judgment that maintainers make are: pressure, stress, norms, fatigue, distraction, complacency, and the lack of communication, resources, assertiveness, awareness, teamwork, and knowledge, which, in any combination, cause so-called careless errors.

Tools and Resources:

Visit the ORM website at www.safetycenter.navy.mil/orm/.

"ORM—The Way Ahead:" A 27-slide presentation delivered at the FFC Commanders Conference in November 2005, gives a detailed look at where we are and where we want to get to, the model program, and the relationship between ORM and CRM. Visit: www.safetycenter.navy.mil/presentations/orm/Way_Ahead.htm.

There's an index of all *Approach* "ORM Corner" articles since January 2002 at www.safetycenter.navy.mil/orm/ORM_Corner.htm.

ORM University is moving to Navy Knowledge Online (NKO): www.nko.navy.mil.

To request an ORM Application and Integration Training quota, go to www.safetycenter.navy.mil/orm/request.htm.

OPNAVINST 3500.39B, dated July 30, 2004

MCO 3500.27B dated May 5, 2004

Point of Contact:

Ted Wirginis
Naval Safety Center
theodore.wirginis@navy.mil
(757)444-3520 (DSN 564) Ext. 7271 ■

ORM should be a part of your normal daily routine, at home, as well as at work. ORM is a decision-making tool used at all levels.

The five-step process for applying ORM is:

1. To anticipate hazards.
2. To assess their potential for loss.
3. To make risk decisions on those discovered hazards.
4. To implement controls to reduce the risk of those hazards.
5. To supervise and observe the effects of those controls implemented to reduce the risk of the discovered hazards.

There are three levels of applying ORM during your daily activities:

1. Time-critical ORM is an on-the-run mental or oral review of the activity, using the five-step-ORM process, without recording the results on paper. It is the normal level applied in the execution phase of an activity to control hazards introduced by unexpected events and changes to the plan.
2. Deliberate ORM is a full review of the activity, using the five-step-ORM process and recording the results on paper. It is applied in planning operations and for evaluating governing instructions, procedures, and response plans.
3. In-depth ORM is the more detailed risk-assessment review, using advanced tools to assess the risks. It is used for long-term planning of complex operations, introducing new equipment, new tactics, or new training curricula.

There are four principles of ORM when applying ORM to an activity:

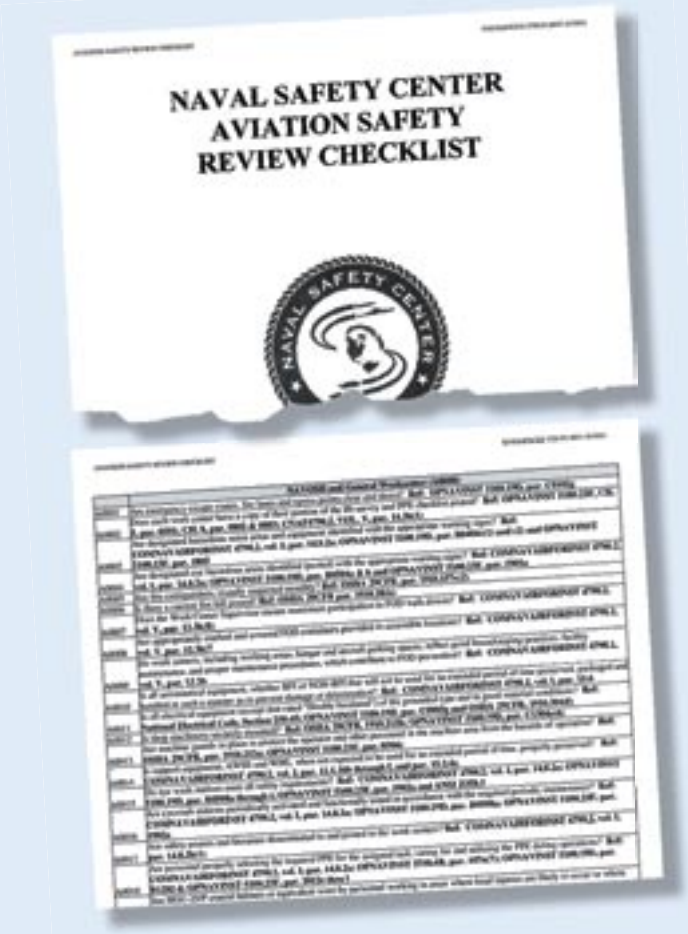
1. Accept risk when the benefit is greater than the risk involved.
2. Accept no unnecessary risk.
3. Anticipate and manage risks by planning ahead.
4. Make risk decisions at the right level.

ORM is applied exactly the same way off duty as it is applied on duty, except each individual is the one making the risk decisions during off-duty activities. Whether you're on- or off-duty, the five-step process of applying ORM is the same, the four principles of ORM are the same, and the three levels of applying ORM are the same. Using the ORM process in all of our activities will help to preserve our most precious resource, our personnel, and reduce the material losses of mishaps.

Maintenance Toolbox on the Web

The Naval Safety Center website contains a huge amount of useful information for all Navy and Marine Corp aviation maintenance professionals—a toolbox of sorts. You can find checklists to use during your everyday routines that help guide you through maintenance processes while providing you with updated references. You can review the most current maintenance-related mishap summaries or look at the most frequently asked questions (FAQs). You even can find information on how to schedule a safety survey, the Maintenance Malpractice Presentation (MMP) and the Maintenance Risk Management (MRM) presentation. The site also provides points of contact to answer aviation maintenance related safety questions.

Photo by Matthew Thomas



The information categories on the website include:

- 2006 Aviation Maintenance Safety Conference: Information on upcoming and past annual conferences that the Naval Safety Center sponsors.
- Safety Alerts: Find major safety-related issues common to naval aviation maintenance.
- Self-Assessment Tools: Tools to evaluate the current maintenance posture at your command.

Aviation Program Guides: These guides provide fleet program managers with a tool to help them establish and maintain their programs. The guides have three sections: fleetwide discrepancies, areas of concern, and program elements that our safety surveyors look at.

Survey Checklists: The section contains the current I-level and O-level checklists. There also are examples of ORM checklists that we've found during safety surveys, so your command can develop similar ones.

Process Observation Evaluation Checklists: Another self-assessment tool that guides a self-evaluation during the execution phase of a process that can be incorporated

into any ORM program. Worksheets cover 31 basic areas of all aviation-maintenance activities. Using these items as a guide will enable activities to get a feel for how effectively program compliance translates to task execution.

Maintenance Mishap Summaries: Descriptions of recent mishaps raise awareness about maintenance safety practices and share the consequences of not following procedures.

Maintenance Malpractice and Maintenance Risk Management Presentations: We offer these hour-long PowerPoint presentations upon request from commands. The MMP uses a mix of slides, pictures, videos, and actual experiences to emphasize the procedures and pitfalls of the aviation-maintenance environment. It targets the deck-plate maintainer (E-6 and below) and aims to recalibrate individual and organizational attitudes. It includes a refresher on operational-risk management, and overviews of ground-crew coordination and human factors. This presentation is best suited for large audiences: aviation squadrons, O- and I-level activities, air stations, aviation facilities and detachments. The MRM focuses on the maintenance manager (E-7 and above) and includes similar content but is available for smaller audiences.

Tools and Resources:

The maintenance section of the Naval Safety Center website is at www.safetycenter.navy.mil/aviation/maintenance.

MMP website: www.safetycenter.navy.mil/aviation/maintenance/maintmalpractice.htm.

Point of Contact:

LCdr. Bert Ortiz
Naval Safety Center Maintenance Officer
bert.ortiz@navy.mil
(757)444-3520 (DSN 564) Ext. 7265 ■

How to Request MMP and MRM Presentations

The Maintenance Malpractice Presentation (MMP) and Maintenance Risk Management presentation usually are scheduled at each site receiving a safety survey at no cost to the unit. Commands must fund presentations requested separately that aren't part of a survey or other published presentation schedule.

Request a presentation at least three weeks in advance through the Naval Safety Center POC, ADC Gary Eldridge at 757-444-3520 (DSN 564) Ext. 7218, gary.eldridge@navy.mil. Funding information must be provided 10 working days before presentation.

To request a video copy of the MMP presentation, send a fax on command letterhead with the following information: date of your presentation, a local shipping address, commercial phone number, and point of contact. The videos are loans and must be returned as soon as possible because of the large demand for them. Requests on command letterhead should be faxed to (757) 444-7049 (DSN 564), attention code 128A.

Tools and Resources:

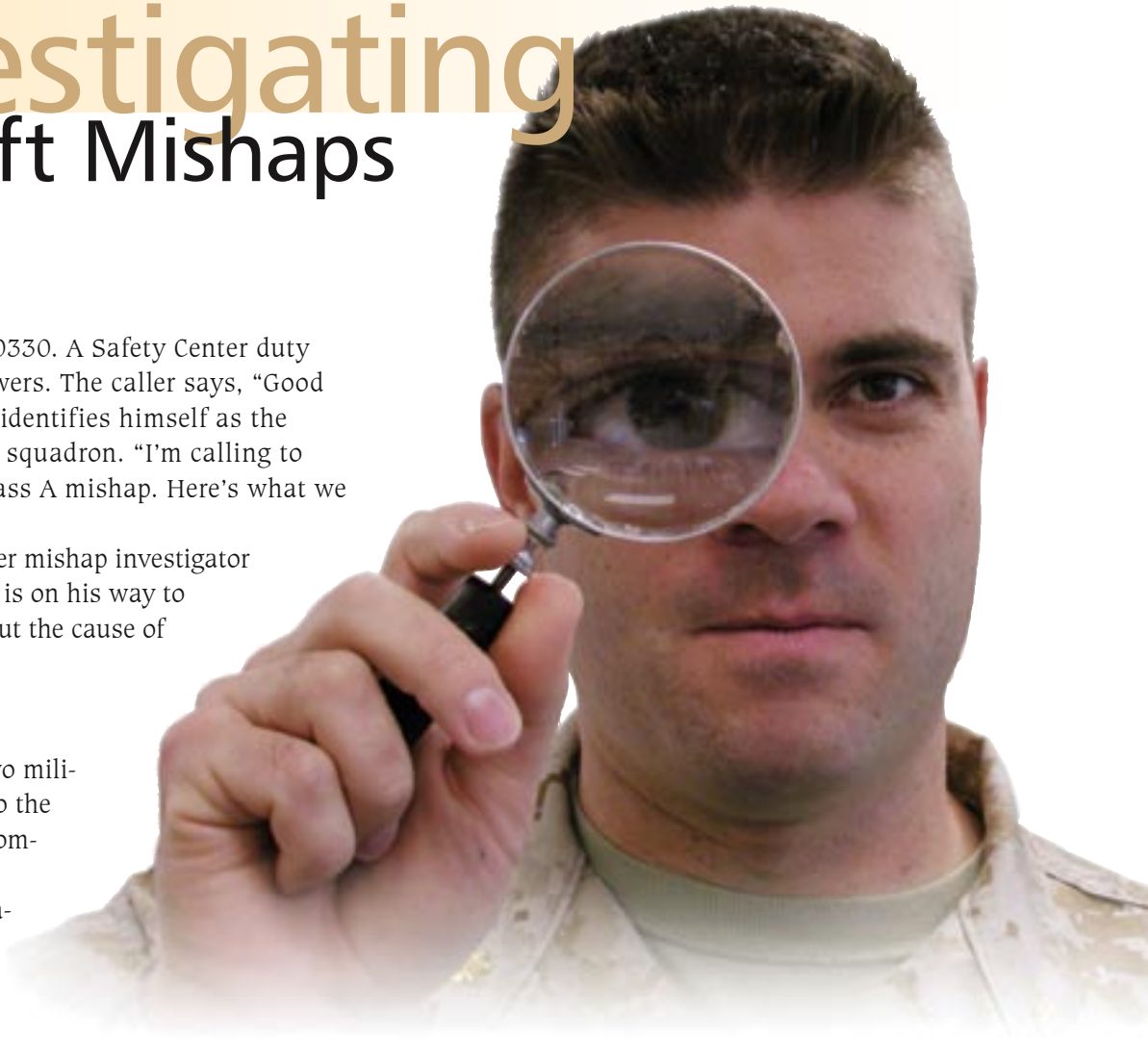
Aviation Maintenance website: safetycenter.navy.mil/aviation/maintenance/.
MMP website: safetycenter.navy.mil/aviation/maintenance/maintmalpractice.htm.

MMP and MRM presentations are made available to all interested units during our aviation safety survey team visits and during our FY06 Aviation MMP/MRM presentation schedule (COMNAVSAFCEN 081925Z AUG 05 and COMNAVSAFECEN 261230Z OCT 05).

Point of Contact:

ADC Gary Eldridge
Naval Safety Center
757-444-3520 (DSN 564) Ext. 7218
gary.eldridge@navy.mil

Investigating Aircraft Mishaps



The phone rings at 0330. A Safety Center duty officer calmly answers. The caller says, "Good morning, sir," and identifies himself as the duty officer from a squadron. "I'm calling to tell you that we've had a Class A mishap. Here's what we know so far…."

With those words, another mishap investigator from the Naval Safety Center is on his way to help a mishap board figure out the cause of the event.

Who we are

The three civilian and two military investigators assigned to the Naval Safety Center have a combined 40 years of experience, with more than 215 investigations. Each investigator has taken numerous courses and attended a host of academies and schools to gain a comprehensive knowledge of the latest investigative techniques for rotary, fixed wing, and tilt-rotor aircraft mishaps.

What we do

The Naval Safety Center investigator's mission is to investigate Navy and Marine Corps aircraft mishaps, determine causal factors in an effort to prevent recurrence, and assist the mishap investigation board (MIB). We assist the controlling custodian with deep-sea-salvage requirements for lost aircraft. We also provide lecturers and agenda items to fleet squadrons for use in safety-training presentations.

Investigators are ready to depart within four hours for anywhere in the world. An expeditious arrival on scene is required to preserve evidence. Upon arrival, the investigator meets with the mishap board, explains his involvement, reviews the data already gathered, and discusses the plan of action. The investigator's next step is to survey the wreckage without interruption, assistance or distraction. This is his chance to look for items of interest or that aren't normal.

What we can do for you

Our investigators have been through the mishap process many times and know what actions and resources will be required for success. We have access to many valuable resources that can contribute to an investigation, including fleet technical-support personnel, aircraft-manufacturer representatives, salvage assets, and aircrew-survivability-equipment experts.

We help with the safety-investigation-report (SIR). Expect the investigator to ask the board many questions about the interpretation of the evidence. The investigator

is there to take the investigation to a level of detail beyond what the board initially may have thought sufficient.

If material failure is suspected—whether it's an engine, accessory, metal fatigue, or software—the investigator will accompany the component in question to the engineering investigation (E.I.). The investigator will oversee the E.I. process, keep the board updated on its progress, and provide the board with results.

What you can do for us

If a mishap occurs, we need as much information as possible via the initial phone report and mishap data report (MDR). This information will help the investigator decide what assets to bring to the scene.

If you are a member of the mishap board, visit the mishap site and gain a firsthand appreciation for the wreckage. The evidence is the starting point for the board's SIR. Make your own observations, and don't decide about probable causes within the first hour or from listening to another's theory on what happened. Just note what you are looking at, and annotate what is of interest to you. Remember what Sherlock Holmes said, "It is unwise, my dear Watson, to speculate in advance of the facts. Invariably it biases the judgment."

Divide and conquer. The senior member should equally divide the required tasks. A daily meeting is good to record each member's data and observations for the day and to set new tasks and goals for the next day.

The challenges

Logistics is one of the biggest challenges a mishap board will face. From potable water at the crash site to hangar space for a possible reconstruction, obtaining the resources can be difficult.

Tools and Resources:

The governing instruction is OPNAVINST 3750.6R. Our investigation website includes a senior member's guide, report forms, and other helpful information. View it at www.safetycenter.navy.mil/aviation/investigations/.

Any questions regarding techniques of aircraft accident investigations can be sent to the Naval Safety Center at www.safetycenter.navy.mil/aviation/feedback.cfm.

Points of Contact:

Maj. Matt Robinson, USMC
Naval Safety Center, head investigator (acting)
Matt.robinson@navy.mil
(757) 444-3520 (DSN-564) Ext. 7233
Bob Vallaster Ext. 7237
Tim Hines Ext. 7241
Dave Clark Ext. 7238 ■

BASH: Avoiding Birds and Beasts

Since 1980, bird strikes, have killed two pilots. And, as of December 2005, BASH incidents have cost the Navy and Marine Corp at least $335 million. But, because of underreporting, the actual cost may be about four times higher.

By Lt. Mark Carstens

On final approach, a pilot looks up and sees a cloud of 10,000 shorebirds between him and the runway—clearly a dangerous situation. Anytime a pilot straps in to fly, the possibility exists of a BASH: a Bird Animal Strike Hazard.

The Naval Safety Center has recorded information about wildlife strikes with naval aircraft since 1980. This data has helped us develop bird detection and deterrent strategies, harassment techniques, and habitat modifications to reduce the number of wildlife strikes at airfields around the world.

The BASH program involves more than just birds: It includes all types of wildlife, including deer, fox, bats, moose, coyotes, snakes, and even fish. Facilities now collecting data on BASH events are realizing just how powerful this data can be in preventing future strikes and for educating pilots and airfield personnel.

All strikes are important, even if the type of bird is unknown, because the data still can show a problem that must be addressed. As commands reduce the number of BASH events, facilities will realize reduced maintenance costs and aircraft downtime. This data also is useful to a facility's natural-resources manager in documenting and managing problem areas with species of wildlife that exist on base.

All events and near misses must be reported—whether the aircraft is damaged or not. BASH reports now arrive at the Naval Safety Center via the relatively new Web-Enabled Safety System (WESS), our web-based, hazard-reporting system. Note that the number of reported strike events has decreased because people are only now becoming familiar with WESS. We

Growing a BASH area. The brush between this taxiway (foreground) and runway (where the P-3 is landing) has doubled in height in the previous year, creating good habitat for deer, coyotes and birds. This brush has since been removed, reducing the BASH threat.

estimate that only 25 percent of the cases now are being reported. As WESS develops and people become more adept with it, the accuracy of the current data will improve.

To report a wildlife-strike event, use the WESS program at https://wess.safetycenter.navy.mil/wess/index.html.

A key to a facility's successful BASH-prevention program is identifying the strike remains and location of the event. If you know what the problem species are, your efforts in harassment and depredation can be targeted. Most facilities have a natural-resources professional on staff who can help identify the remains, so you should save as much as possible.

Tools and Resources:

For more information on the Navy's BASH program, visit the Naval Safety Center website at www.safetycenter.navy.mil/aviation/operations/bash/.

The Navy's BASH program got extensive coverage in the April 2003 issue of *Approach*: www.safetycenter.navy.mil/media/approach/issues/apr03/.

The University of Puget Sound bird identification resources site: www.ups.edu/biology/museum/wingphotos.

The Bird Strike Committee USA site: www.birdstrike.org/commlink/links.htm.

Points of Contact:

Lt. Mark Carstens
Naval Safety Center
Aviation Facilities Branch Head, Fuels Analyst, and BASH Analyst
(757) 444-3520 (DSN 564) Ext. 7281
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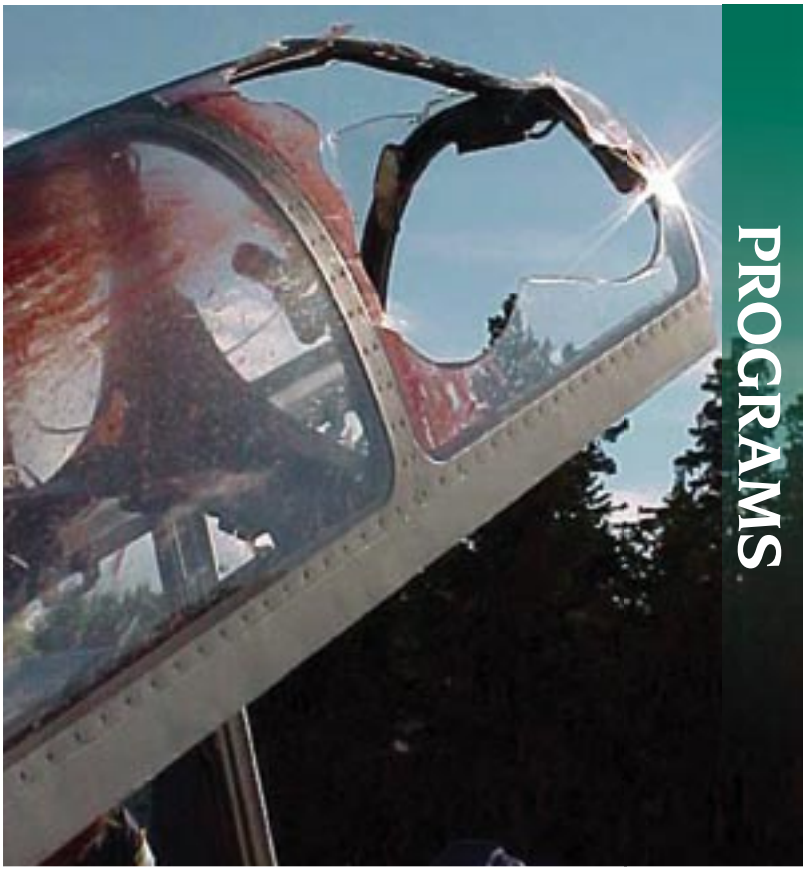
You can get more information from Matt Klope, the Navy and Marine Corps BASH program manager. Any strike remains that cannot be locally identified also should be forwarded to him.

Matthew Klope
Navy BASH Program Manager
NAS Whidbey Island
1115 W. Lexington St, Bldg. 108
Oak Harbor, WA 98278
(360) 257-1468 (DSN 820)
matt.klope@navy.mil ■



Aeromedical

Tools You Can Use—Resources for Flight Surgeons, AMSOs, and ASOs

The Naval Safety Center Aeromedical Division offers several tools to help prevent mishaps. The most comprehensive is a CD we provide upon request titled, Aviation/Aeromedical Resources, commonly called "The Ultimate Guide to Aviation Safety." Here's an overview of the CD's contents:

Aviation Safety Guidance:

This section has a comprehensive library of safety-related publications, instructions, and media products. Safety instructions for all the armed services, the DoT, FAA, and international organizations. There are videos, lectures and briefs, and sample documents covering everything from mishap plans to hazard reports. Numerous "fill-in-the-blank" forms help you put together reports and standardize paperwork. A PDF version of the new DoD Human-Factors directive—DoD HFACS—simplifies sorting through all the codes.

Aircraft Mishap Hazard and Rescue Guide:

Ever wonder where the danger areas are around the aircraft across the flight line from you? This section has all that and more, including an Air Force tech manual that lists hazard areas, rescue information, and color-coded charts on every aircraft flown by DoD, NASA, and NATO. It also contains information on hazmat, PPE, and general aircraft hazards. This tool answers just about any aircraft hazard-related technical question.

Aeromedical Safety Resources:

Here's the stuff that's great for flight docs. While many of the same resources in the Aviation Safety Guidance section are linked here as well, the focus is on tools and resources for aeromedical folks. There are MOUs, the Aeromedical Survey Checklist, and a link to the electronic version of the Mishap Pocket Guide, which is a definitive reference for flight surgeons in the event of a mishap. The CD has information on the fatigue-avoidance scheduling tool (FAST) to help monitor sleep and performance. It also is a valuable planning tool.

Tools and Resources:

The CD also has POCs for all the service safety centers, and several good Internet links of use to all. The Naval Safety Center and School of Aviation Safety websites are linked from the CD, and there is an "explore" option to let you search the CD for specific information.

The Naval Safety Center's aeromedical website has many links to aviation and safety information from sources around the world. Visit it at www.safetycenter.navy.mil/aviation/aeromedical/.

Points of Contact:

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Naval Safety Center
Aeromedical Department Head
(757) 444-3520 (DSN 564) Ext. 7228
john.lee12@navy.mil

Cdr. Kevin Brooks, MC Ext. 7268
LCdr. Greg Ostrander Ext. 7229
LCdr. Deborah White Ext. 7231 ■

To Err Is Human, But To HFACS Is Divine: Getting at the Who, What and Why

By LCdr. Deborah White

More than 80 percent of naval-aviation mishaps are caused through human error. To decrease mishap rates, we need to get a better handle on why people are making errors. The DoD Human Factors Analysis and Classification System (HFACS) is a tool to help aviation-mishap boards (AMBs) and commands determine the contributing causes that led individuals to make their errors.

HFACS looks at four levels of human failure: acts, preconditions, supervision, and organizational influences. The first step is looking at what the person did wrong—at the acts level. This mistake could be a skill-based error or a violation of specific rules or procedures. Too often, investigations stop at this level, but to fix the problem, one must ask, Why did the person do it? The answer gets closer to the root cause of the mishap. Did bad weather play a hand in the event? Was the person fatigued? Was the person fixated on a specific task? Was a crew not communicating with each other? These questions must be considered when looking at the preconditions of the individuals. HFACS then forces individuals to look at the supervision provided to an individual. In other words, what or how did the command contribute to the person's error? HFACS then directs the investigator to look at the organizational influences that may have contributed to the event. For instance, Were the instructions clearly written? Were enough resources provided to the squadrons to conduct the missions? Was there a top-down push to get the mission done at all costs? Did we identify the various levels of influence on an individual allows us to target areas that need improvement.

HFACS is not just a tool used for a mishap investigation; it can be used to determine why a specific shop or department continues to make the same errors on a specific procedure. It allows a command to focus on the items that need to be fixed.

The program also can be used as an ORM tool to brainstorm potential human-factor errors that might occur during an evolution, and to look at why they might happen. In understanding what could happen, organizations can develop mitigation strategies to prevent human error.

The DoD HFAC document provides an interactive model that allows the user to click on a box, get redirected to the definition for a specific error, and access the most common types of human errors seen in a specific topic area—nanocodes. View the DoD HFACS document at www.safetycenter.navy.mil/aviation/aeromedical/.

For assistance, contact LCdr. Deborah White, Naval Safety Center at deborah.j.white@navy.mil.

Aviation-Safety-Survey Program

This program provides the requesting unit's commanding officer with a snapshot of the command's safety posture. The survey team is a sort of consultant. A survey isn't an inspection but a tool the CO can use for process improvement. As a matter of policy, the results of a safety survey are not releasable outside the surveyed command. Waivers to this policy are only at the express direction of the Commander, Naval Safety Center.

To schedule a safety survey call our point of contact below. The aviation-survey team follows a fiscal-year schedule, traveling to various fleet-concentration locations throughout the U.S. and overseas. These two-week, safety-survey trips offer several commands in the travel area the opportunity to schedule and receive a one-day survey team visit.

A Typical Survey: After a 0745 in-brief with the CO and the XO, the survey-team lead introduces the team members to the command's shop supervisors. They review the command's programs, using the safety-survey checklists. At the end of the day, the CO is debriefed (along with the XO and department heads, if the CO chooses). the survey-team leaders review the findings and observations.

Commands in the local Norfolk area can schedule a safety survey anytime the survey team is in town and available.

The Naval Safety Center does about 100 surveys a year on squadrons and commands based around the world. We find every type of problem with safety programs ranging from simple documentation errors to critical safety-of-flight issues. No special preparation is necessary before receiving a survey, although we suggest a review of your command's safety programs using our checklist.

Tools and Resources:

Visit the safety survey website at www.safetycenter.navy.mil/aviation/surveys.htm.

The Naval Safety Center does about 100 surveys a year on squadrons and commands based around the world.

The Aviation Safety Review Checklists are online at www.safetycenter.navy.mil/aviation/checklists. Several additional instructions are included in this checklist, including NAVSAFECEN 3750 p1 (rev APR 97), NAVSAFECEN 3750 p4 (rev MAR 03), and NAVSAFECEN 3750 p5 (rev JUN 05).

Point of Contact:

Capt. Chris Foley, USMC
Naval Safety Center
(757) 444-3520 (DSN 564) Ext. 7223
chris.foley@navy.mil

Photo by Matthew Thomas

Troubleshooters give the OK signal for a U.S. Marine Corps FA-18C Hornet, assigned to the Red Devils of Marine Fighter Attack Squadron Two Three Two (VMFA-232), as it prepares to be launched from the flight deck aboard the USS *Nimitz* (CVN 68). Navy photo by PH3 Elisabeth Ann Saccotelli.

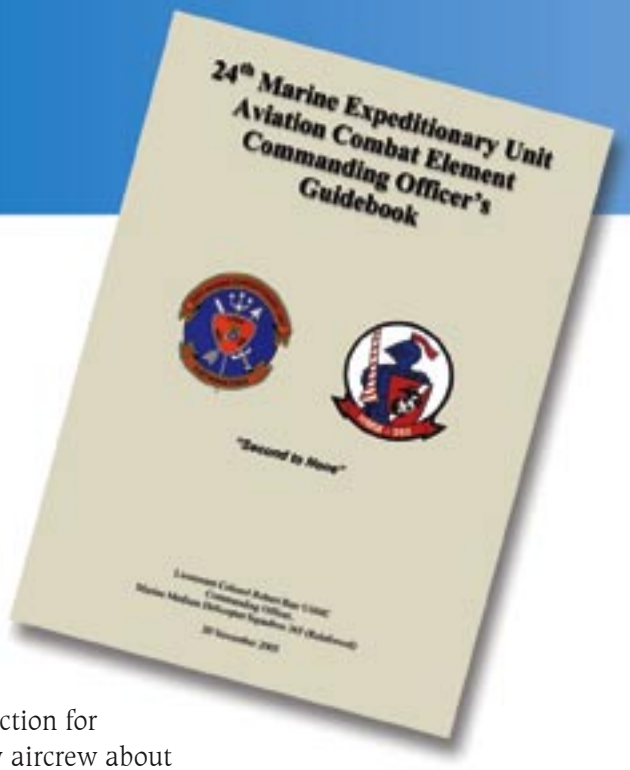
AN David Gann explains arresting gear cable inspection to Mid'n 1C Scott Krushinski aboard USS *Dwight D. Eisenhower* (CVN 69). Navy photo by PHAN Alisha Clay.

Lt. Greg C. Knutson, a pilot assigned to Helicopter Anti-Submarine Squadron Two (HS-2) "Golden Falcons," briefs fellow pilots and air crew prior to an evening combat search and rescue (CSAR) training mission. Navy photo by PH3 M. Jeremie Yoder.

Flight Instructor Lt. Jason Wells, assigned to Training Squadron Four (VT-4), left, preflights his T-34C Turbo Mentor as student Ens. Luis Diez sits in the cockpit. Navy photo by Sheri L. Crowe.

Midshipman Kelly Hogan receives fueling training on an FA-18C Hornet on the flight deck of USS *Dwight D. Eisenhower* (CVN 69) from Airman Apprentice Ivan Pate. Navy photo by PHAN James Wagner.

Aviation



Many Navy and Marine Corps squadrons have created initiatives and launched programs that are making a difference in preventing mishaps. Here are several examples of best practices from aviation and maintenance units.

Commanding Officer's Guidebook

The commanding officer of HMM-365 developed this document to guide leadership in his squadron and to set the tone for the desired safety climate. It is mandatory reading for all the officers and staff non-commissioned officers. It is based on professional experience, as well as the lessons learned from many senior mentors.

The guidebook has two goals. First, it clarifies the command philosophy and leadership-focus areas. Second, it builds upon the collective education and expertise of subordinate leaders in the squadron. The overarching goal is to foster a culture of operational excellence—in the air and on the ground—on duty as well as off. The goal is zero aviation and ground mishaps, and a command climate and safety culture that support that end state.

The 56-page book contains sections on command philosophy; ACE mission and mission essential task list; aviation, ground and personnel safety philosophy; and information from and about the chain of command. The ACE CO's Guidebook is available at www.safetycenter.navy.mil/bestpractices/aviation/downloads/ACE_CO_Guidebook.doc.

Aircrew Check-in and Qualification

VFA-11 developed a way to document the check-in and qualification of new aircrew. Their instruction gives direction for new aircrew about who to see upon check-in and what actions must be completed before flying squadron aircraft. It also guides the qualification process through different levels. The squadron instruction is available at www.safetycenter.navy.mil/bestpractices/aviation/downloads/aircrew_check-in.doc. It provides an example of the check-in process, specific procedures, and a qualifications checklist.

Safety Department Tickler

One squadron developed a tickler to help safety officers and petty officers stay more organized. The comprehensive department tickler lists events and reports required and their periodicity. This simple tracking sheet helps make sure everything is documented, effectively managed, and carried out in accordance with published procedures. A sample tickler is available at www.safetycenter.navy.mil/bestpractices/aviation/Safety_Department_Tickler.htm. ■

Aviation Maintenance

White Hat Ingenuity + AIRSpeed = Safer Work Centers

AS1 Jack Carlson from the AIMD Support Equipment Division, NAS Whidbey Island, figured out how to make his work center a safer place. People who work in electrical and avionics work centers know a wooden rescue cane is required in each shop to rescue personnel who become part of a live circuit. Unfortunately, not all work centers have one, especially in an SE Division. Those who do have a cane frequently can't find it. Petty

Officer Carlson's solution was to have an emergency shock strap and emergency shock cane mounted visibly on the bulkhead. The mounting site has green background with a green-and-white safety tape border. He mounted a label high enough to be seen over the top of any SE that may be in the shop. Other work since centers have adopted this idea, and, now, 90 percent of the SE shops at AIMD Whidbey Island have this safety feature in place. Those shops are better prepared to respond in an emergency.

Crane Training

The 900 division at Whidbey Island also has about 95 percent of their ASs certified as category 3 crane operators. How did they accomplish this? They sent the 900 Division QAR to the Navy crane center's category 3 "train the trainer" course. When he returned, they set up and helped division-wide training. They now have one of the highest percentages of trained operators the Naval Safety Center has seen.

Battery Storage

During a survey at HMT-303 MCAS Camp Pendleton, a Naval Safety Center survey team found an exceptionally good battery-storage solution. Their NICAD battery lockers were clean and organized. It simply took an aggressive maintainer who was determined enough to bring the program together. Simple solutions often work best for even complicated programs.

Hydraulic Contamination

Many commands have good programs, but the one at HSC-28 was exceptional, both for its recordkeeping and overall operation. This squadron had a plan for how, where, when, and to what standard they would complete the samples. The work area is kept immaculate, and all the tools and equipment for conducting samples are readily available. The area is self-contained and can be easily transported on dets or deployments.

Program Management Spreadsheets and Databases

It takes initiative and time to coordinate and build trackers that will automate program management. Here are a few examples:

- Technical Directive Management: Tracks technical directives and kits to ensure all modifications are completed when required.
- Oil Consumption: Tracks consumption, which is an often-overlooked program and process.
- Tool Room: One squadron tracked all equipment. An automated program helped them keep accurate records.
- Flight-Deck Quals: Always a problem for some squadrons. This automated system ensures that warnings of due dates are clearly visible.
- Fuel-Cell Maintenance: A comprehensive system thoroughly tracks the process and required steps.

Other squadrons developed tracking programs for such things as audits and QA follow-ups. For additional details visit the Naval Safety Center's best practices webpage at www.safetycenter.navy.mil/bestpractices/aviation. ■

TRENDS

Introduction

This section discusses mishap causes and statistical information for fixed wing and helos. We provide a summary of mishaps, mishap rates, fatalities, fatality rates and costs. The data for current year, last six years and history of the aircraft can be used to show trends in mishap rates for each aircraft. Bar charts cover the last five years to show how we're doing recently. The mishap-rate information for FY02 is the baseline figures that we use to measure our progress toward the goal of 75 percent mishap reduction. More detailed information is available on our aviation-statistics webpage at www.safetycenter.navy.mil/statistics/aviation/.

As the mishap numbers decline, the challenges to sustain continual improvement increases. Our analysts examine causal factors and trends so that programs and processes can be developed, and mishaps prevented.

We know that human error accounts for more than 80 percent of our mishaps. As you review the top-ten list below, look at each item with a critical eye and consider preventive actions that would counter each one.

Top 10 Aircrew Related Cause Factors

1. Failure of aircrew coordination
2. Improper use of flight controls in the air; not take off and landing
3. Violation of existing regulations, instruction and/or NATOPS
4. Indequate flight preparation and/or aircraft preflight
5. Misjudged distance, altitude and/or position
6. Exceeded ability and/or experience
7. Landing phase ashore (multiple sub-factors)
8. Improper use of miscellaneous equipment
9. Failure to supervise flight properly
10. Failure to recognize, accurately assess and/or diagnose

Trends Overview

A pilot has completed the operational portion of a mission, and it's time to get back to Mother. But the pilot suddenly senses something is wrong. The onset of hypoxia is suspected, so the pilot checks the oxygen system, and…

This scenario probably is familiar to many aviators. Was there a mishap? If the pilot responded properly to the hypoxia indications, then the mission ended with a safe landing. When we don't follow procedures, and don't have a solid understanding of NATOPS, mishaps occur—the data supports this conclusion.

As our analysts review hazreps and mishap data, we have found many common areas of concern that repeatedly are mentioned. Here is a summary of the information our analysts have taken from the reports, along with their comments and suggestions.

NATOPS

Aircrew should focus on emergency procedures and NATOPS knowledge with quizzes, NATOPS postings, questions, and scenarios of the day. Matched with studying and review of information, yearly tests should challenge the aviator. NATOPS checks should be rigorous tests of knowledge and skill in the aircraft with multiple emergencies and thorough debriefs. The NATOPS program should be as challenging as the Strike Fighter Weapons Training (SFWT) or Air Combat Tactics Instructor (ACTI) programs. Close observation and coordination will be required to make sure aircrews are current, as well as proficient in the aircraft, and obtaining aircraft qualifications. Make sure that squadron procedures are standardized and that briefings thoroughly cover unusual circumstances.

ORM

A tool in place to help aircrew and groundcrew make sound decisions, as well as avoid rule violations. An appreciation of ORM is necessary for it to be effective, and strong leadership plays a critical role.

OPERATIONAL RISK MANAGEMENT

5-Step Process

- Identify hazards
- Assess hazards
- Make risk decisions
- Implement controls
- Supervise (watch for changes)

Photo by Matthew Thomas

CRM

The program must be reviewed and updated for the single-seat aviator. Crew resource management for the administrative phase of flight must be used. CRM should evolve with the aviator: introduced in primary, developed in intermediate and advanced, with specific platform training at the FRS, and continued training and advancement in fleet squadrons. Emergency scenarios should be shared and discussed to improve aircrew CRM capability. The use of CRM specific simulators, with follow-on training in the aircraft, will sharpen these skills.

Photo by PH2 Michael Sandberg. Modified.

CREW RESOURCE MANAGEMENT

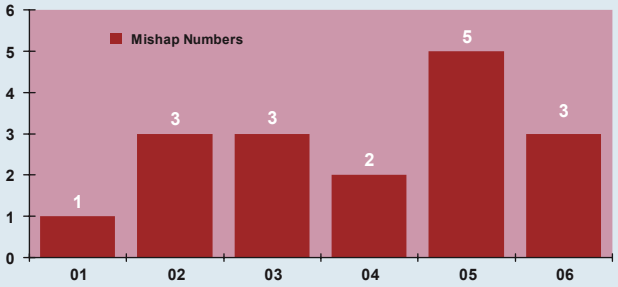
- Situational Awareness
- Assertiveness
- Decision Making
- Communication
- Leadership
- Adaptability/Flexibility
- Mission analysis

Graphs and Charts

We've provided a graph that shows the last six-years of Class A mishaps, and a chart that shows mishaps, mishap rates, fatalities, fatality rates, and cost. We want to show the trends that have occurred in the near, mid and long term. You can use this information, which is divided by communities, to see the progress of your aircraft toward the 75 percent mishap-reduction challenge. Aircraft that have not had any mishaps since entering fleet service are not listed. Aircraft that have not had a mishap in the last six years will have a chart but no graph.

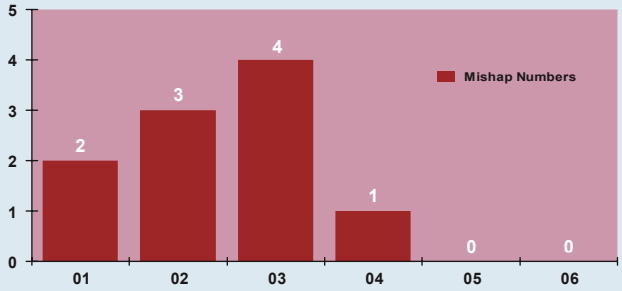
Fighter-Attack

AV-8



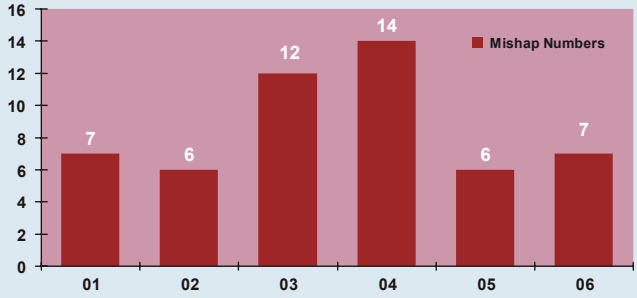
	Mishaps	Mishap Rate	Fatalities	Fatality Rate	Dollars
FY06 thru 15 Sep	3	8.23	0	0.0	$ 59M
FY01-05	14	6.96	2	0.99	$ 388.2M
Since 1980	116	12.28	31	3.28	$ 2B

F-14



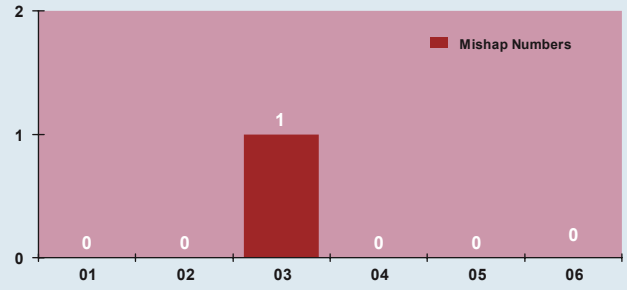
	Mishaps	Mishap Rate	Fatalities	Fatality Rate	Dollars
FY06 thru 15 Sep	0	0.0	0	0.0	$ 0
FY01-05	10	5.11	3	1.53	$ 356.6M
Since 1980	114	5.29	47	2.18	$ 2.7B

F-18



	Mishaps	Mishap Rate	Fatalities	Fatality Rate	Dollars
FY06 thru 15 Sep	7	2.26	2	0.65	$ 261M
FY01-05	45	3.09	18	1.23	$ 1.6B
Since 1980	171	3.22	76	1.43	$ 5.1B

F-5



	Mishaps	Mishap Rate	Fatalities	Fatality Rate	Dollars
FY06 thru 15 Sep	0	0.0	0	0.0	$ 0
FY01-05	1	2.25	1	2.25	$ 4M
Since 1980	6	2.90	2	0.97	$ 14.9M

Material Deficiencies

These aircraft problems need to be fixed. To that end, squadrons need to be persistent in submitting hazreps and hazardous-material reports (HMRs) so that the system can channel resources to address them. Squadrons must continue to write high-quality reports with solid analysis and recommendations.

Photo by PH1 Hana'lei Shimana

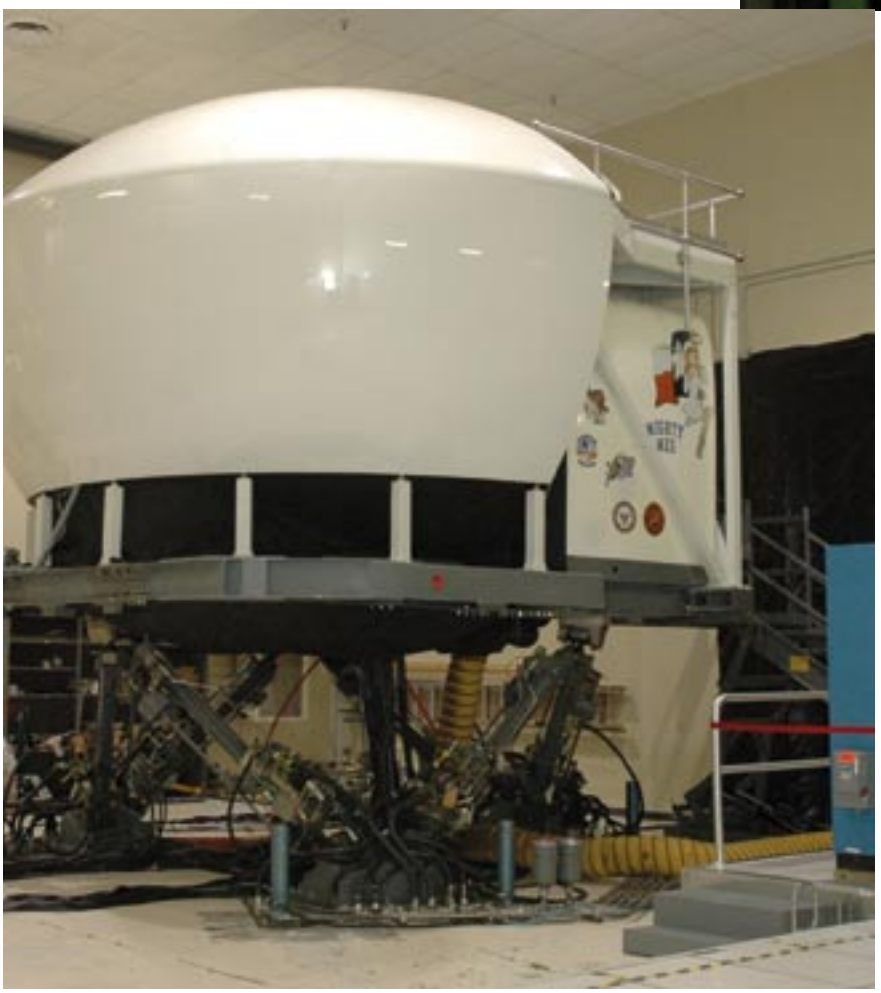


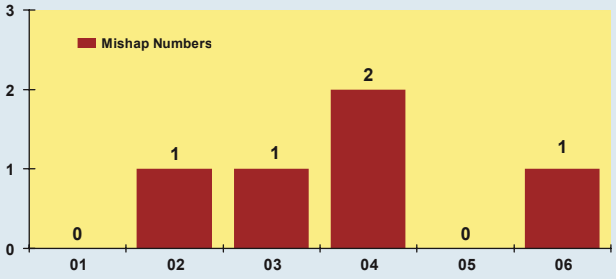
Photo by Mass Communication Specialist Eric A. Clement

Simulators

Maximizing the use of simulator training to hone the flying and CRM skills of aircrews in various scenarios is a relatively low-cost and low-risk approach, with follow-on training in the aircraft. Aircrew should review NATOPS emergency procedures, and discuss ORM-decision processes while in the simulator. The best way to combat skill-based errors is to get more practice in the simulator or the aircraft.

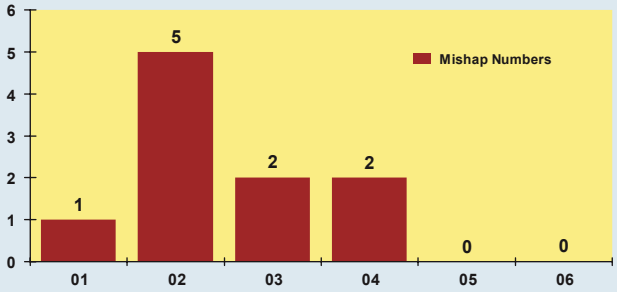
Helicopter

AH-1



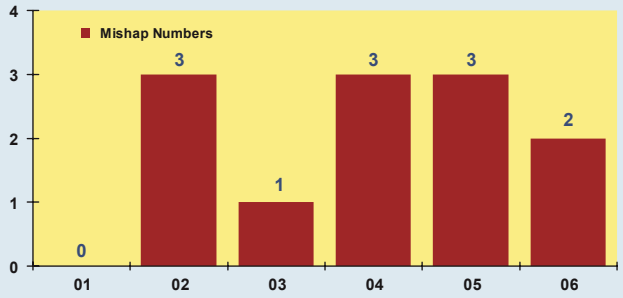
	Mishaps	Mishap Rate	Fatalities	Fatality Rate	Dollars
FY06 thru 15 Sep	1	2.29	2	4.59	$ 13.6M
FY01-05	4	1.90	4	1.90	$ 82.4M
Since 1980	34	3.52	42	4.77	$ 306.2M

H-1 less AH-1



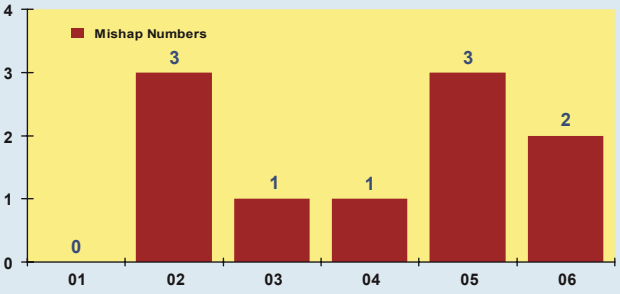
	Mishaps	Mishap Rate	Fatalities	Fatality Rate	Dollars
FY06 thru 15 Sep	0	0.0	0	0.0	$ 0
FY01-05	10	7.31	12	8.77	$ 28.8M
Since 1980	44	3.68	88	7.36	$ 108.1M

H-53



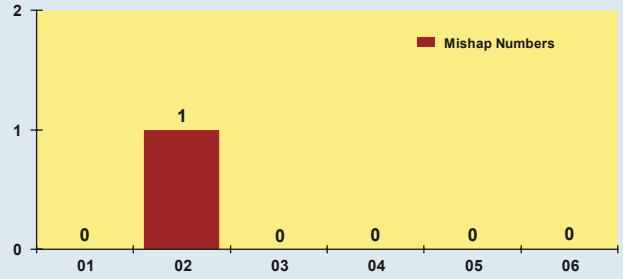
	Mishaps	Mishap Rate	Fatalities	Fatality Rate	Dollars
FY06 thru 15 Sep	2	4.24	10	21.18	$ 47.9M
FY01-05	10	3.71	39	14.47	$ 180.5M
Since 1980	53	3.55	210	14.06	$ 545.2M

H-60



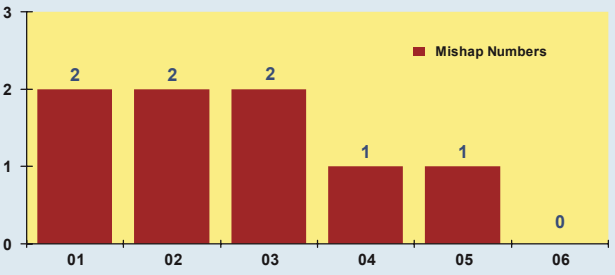
	Mishaps	Mishap Rate	Fatalities	Fatality Rate	Dollars
FY06 thru 15 Sep	2	1.53	3	2.29	$ 23.1M
FY01-05	8	1.22	7	1.07	$ 83.5M
Since 1980	38	1.72	39	1.77	$ 503.4M

H-3



	Mishaps	Mishap Rate	Fatalities	Fatality Rate	Dollars
FY06 thru 15 Sep	0	0.0	0	0.0	$ 0
FY01-05	1	1.22	0	0.0	$ 3.4M
Since 1980	38	2.95	18	1.4	$ 97.8M

H-46



	Mishaps	Mishap Rate	Fatalities	Fatality Rate	Dollars
FY06 thru 15 Sep	0	0.0	0	0.0	$ 0M
FY01-05	8	2.02	20	5.04	$ 45.8M
Since 1980	79	3.22	168	6.85	$ 228.7M

Photo by PHAN James R. Evans

Maintenance Training

Procedures and practices should be reviewed to make sure that mechs have enough time for training and for finishing their work on the aircraft. Training should be dedicated to all facets of maintenance, with an increased focus on ground aircraft moves.

Human Factors

Over 80 percent of mishaps have a human causal factor. Here are several strategies that have been mentioned in several reports and have helped counter human error:

- Revamped ORM and CRM processes at the squadron/detachment level
- Expanded training requirements in the work-up schedule
- Revised NATOPS procedures
- Re-emphasized oversight of ORM, crew rest, and operating procedures by ship/aircrew team.

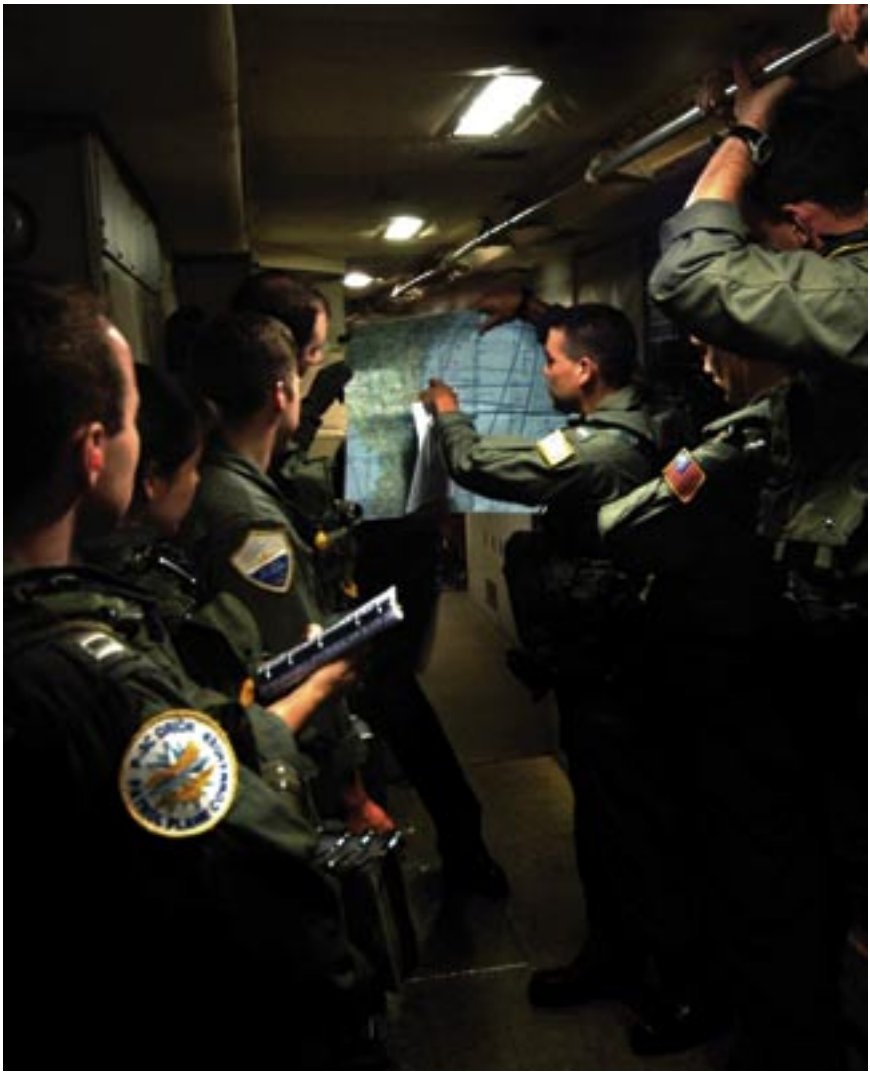


Photo by PH2 Johnathan Roark

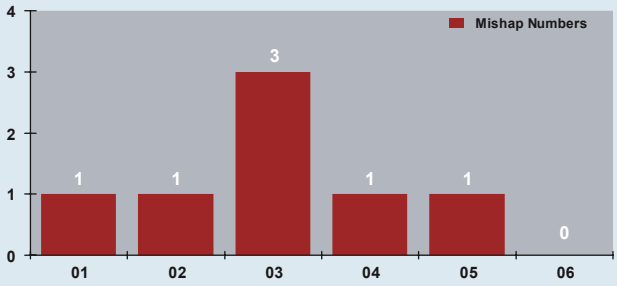
Patrol/Reconnaissance/ASW

P-3

	Mishaps	Mishap Rate	Fatalities	Fatality Rate	Dollars
FY06 thru 15 Sep	0	0.0	0	0.0	$ 0
FY01-05	0	0.0	0	0.0	$ 0
Since 1980	8	0.17	41	0.87	$ 125.4M

Photo by PH2 Richard J. Brunson

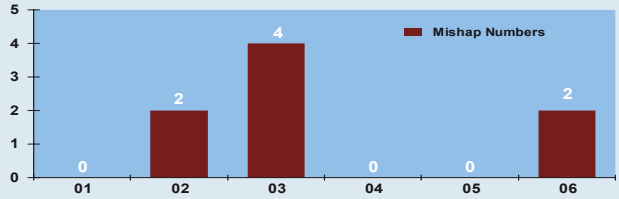
S-3



	Mishaps	Mishap Rate	Fatalities	Fatality Rate	Dollars
FY06 thru 15 Sep	0	0.0	0	0.0	$ 0
FY01-05	7	3.76	9	4.84	$ 194.3M
Since 1980	32	2.29	49	3.50	$ 598.4M

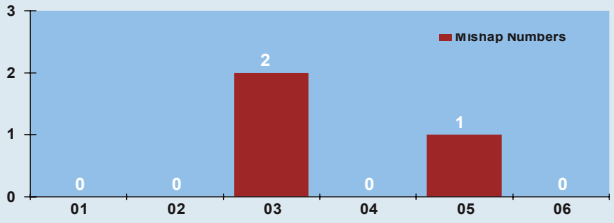
Electronic Warfare and Early Warning

EA-6B



	Mishaps	Mishap Rate	Fatalities	Fatality Rate	Dollars
FY06 thru 15 Sep	2	4.71	0	0.0	$ 38.9M
FY01-05	6	2.98	0	0.0	$133.8M
Since 1980	41	4.32	62	6.53	$ 802M

E-2



	Mishaps	Mishap Rate	Fatalities	Fatality Rate	Dollars
FY06 thru 15 Sep	0	0.0	0	0.0	$ 0
FY01-05	3	2.29	0	0.0	$ 4.7M
Since 1980	11	1.24	13	1.47	$ 189.2M

Photo by PH2 Mark J. Rebilas

BASH

The opportunity to be involved in a midair with birds is present each time aircrews man-up for a mission. Aggressive BASH programs can mitigate the bird and animal strike hazard. Knowledge of local bird-concentration areas and constant vigilance and communication on the part of aircrew and tower controllers will promote a successful see-and-avoid strategy.

Briefings

Increasing the emphasis on CRM and ORM through continuing discussion during preflight and postflight briefings will aid in the aircrew's thought process during emergency situations.

Continual and aggressive application of ORM and CRM, along with emphasis on stone-cold knowledge of basic flying and emergency procedures, is the best process to mitigate the remaining hazards.

Training

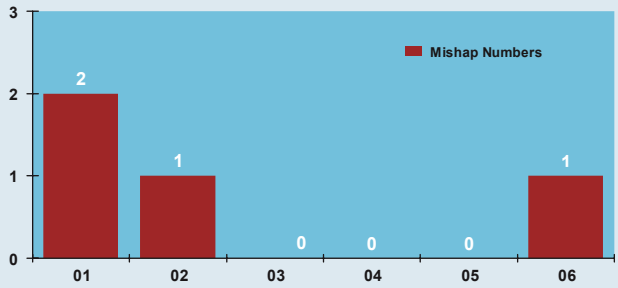
T-2

	Mishaps	Mishap Rate	Fatalities	Fatality Rate	Dollars
FY06 thru 15 Sep	0	0.0	0	0.0	$ 0
FY01-05	0	0.0	0	0.0	$ 0
Since 1980	29	2.13	24	1.76	$ 35.2M

T-44

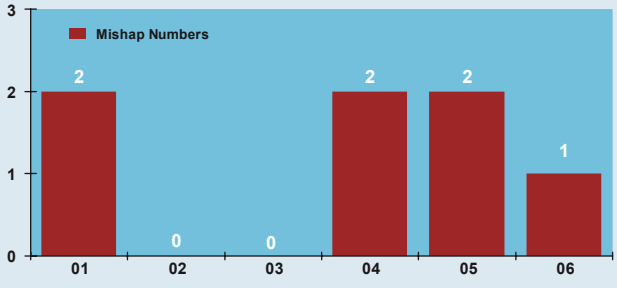
	Mishaps	Mishap Rate	Fatalities	Fatality Rate	Dollars
FY06 thru 15 Sep	0	0.0	0	0.0	$ 0
FY01-05	0	0.0	0	0.0	$ 0
Since 1980	5	0.59	12	1.41	$ 9.6M

T-34



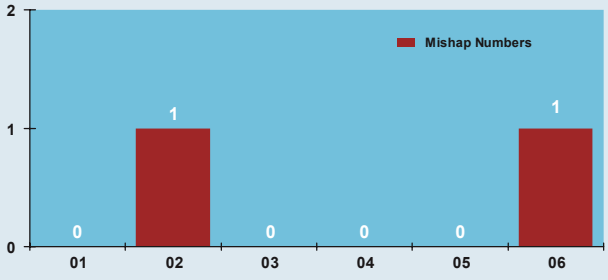
	Mishaps	Mishap Rate	Fatalities	Fatality Rate	Dollars
FY06 thru 15 Sep	1	1.09	2	2.19	$ 2.8M
FY01-05	3	0.42	4	0.57	$ 6.3M
Since 1980	32	0.77	46	1.10	$ 49.3M

T-45



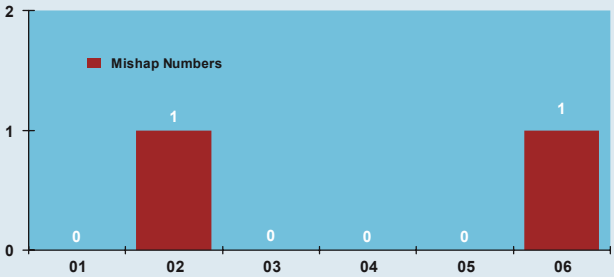
	Mishaps	Mishap Rate	Fatalities	Fatality Rate	Dollars
FY06 thru 15 Sep	1	1.69	0	0.0	$ 24.6M
FY01-05	6	1.77	3	0.89	$ 114.2M
Since 1989	18	2.63	5	0.73	$ 308.7M

T-39



	Mishaps	Mishap Rate	Fatalities	Fatality Rate	Dollars
FY06 thru 15 Sep	1	11.08	4	44.33	$ 5.9M
FY01-05	1	1.51	7	10.59	$ 10.2M
Since 1980	4	0.94	14	3.31	$ 20.8M

TH-57



	Mishaps	Mishap Rate	Fatalities	Fatality Rate	Dollars
FY06 thru 15 Sep	1	2.71	1	2.71	$ 2.1M
FY01-05	1	0.45	0	0.0	$ 3.4M
Since 1980	2	0.12	1	0.06	$ 5.5M

Cargo and Passenger

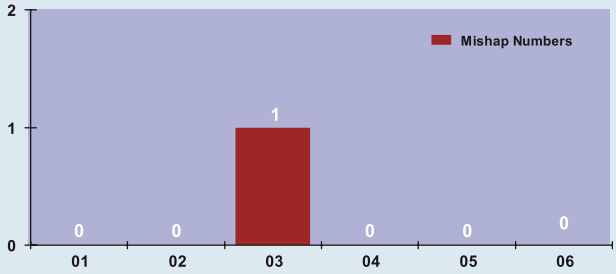
Photo by PH3 Lawrence Braxton

C-12

	Mishaps	Mishap Rate	Fatalities	Fatality Rate	Dollars
FY06 thru 15 Sep	0	0.0	0	0.0	$ 0
FY01-05	0	0.0	0	0.0	$ 0
Since 1980	1	0.07	1	0.07	$ 1.5M

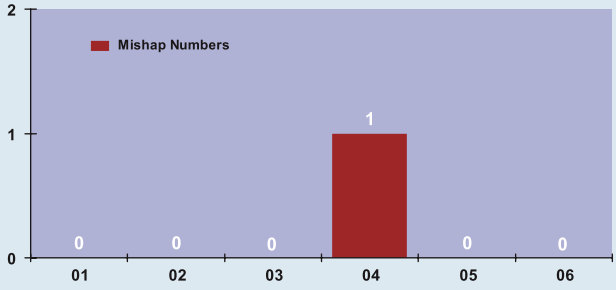
Photo by PH1 Edward G. Martens

C-2



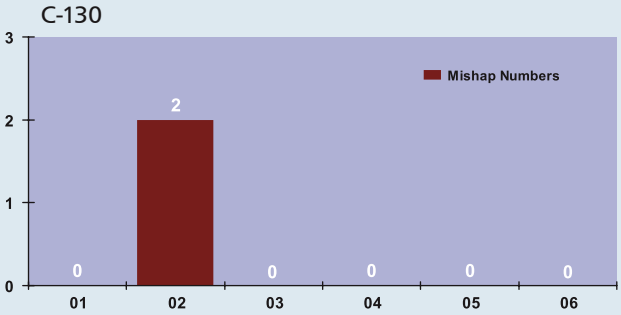
	Mishaps	Mishap Rate	Fatalities	Fatality Rate	Dollars
FY06 thru 15Sep	0	0.0	0	0.0	$ 0
FY01-05	1	1.84	0	0.0	$ .8M
Since 1980	3	1.06	1	0.35	$ 4M

C-35



	Mishaps	Mishap Rate	Fatalities	Fatality Rate	Dollars
FY06 thru 15 Sep	0	0.0	0	0.0	$ 0
FY01-05	1	30.09	4	120.37	$ 10.1M
Since 2000	1	18.65	4	74.59	$ 10.1M

C-130



	Mishaps	Mishap Rate	Fatalities	Fatality Rate	Dollars
FY06 thru 15 Sep	0	0.0	0	0.0	$ 0
FY01-05	2	0.77	7	2.7	$ 21.1M
Since 1980	2	0.14	7	0.5	$ 21.1M

Mishap and Survey Trends Within Aviation Maintenance

By Capt. Chris Foley, USMC

Only one maintenance-related mishap occurred in FY06, so no specific trend can be determined. However, like many maintenance managers, I have spent much of my time pondering the various situations that most Navy and Marine Corps units face. The increase in operational commitments, reduction in people and resources, and the time to train being cut in half, has everyone concerned about how to reduce the number of human-factor errors in aviation. As challenging as the reduction effort may seem, tools are available to assist fleet units, and I can share program trends that the Naval Safety Center sees during the nearly 100 safety surveys we do each year.

Those safety surveys provide the fleet with a valuable tool to help maintain a command's effectiveness, improve their safety posture, and identify trends—good and bad. It's important to discuss some of the trends discovered at commands we've surveyed.

Recordkeeping, training, PMS, tool control, and battery safety are all concerns. Aircraft logbooks, AESR screening, TD incorporation within the specific compliance timeframe, and 4790/51 recordkeeping also plagued many commands.

These discrepancies clearly show the problem is largely a training issue, and supervisors need to closely monitor training above to solve these problems. Training in general, whether it's NAMP initial, NAVOSH, ERT, or annual/quarterly training is not documented, or not done at all.

QA also has its share of problems: Audits without follow-ups, audits not being done, Central Technical Publications Librarian (CTPL) quarterly training not being accomplished, or Dispersed Technical Publications Librarian (DTPL) work-center verifications not completed. SE pre-operational inspections are being done correctly, but the correct cards are not being used, and periodic inspections of static grounding points and cables are not being done.

Another area where we see common trends is with the respirator program. I can't emphasize this point enough: **INSPECT** your program at least once a year. Also, make sure all respirators are inspected, cleaned and stowed

Photo by Matthew Thomas

properly. Sounds easy, but you'd be surprised how many commands don't get it right.

Hazmat is another problem area, and commands need to make sure all hazmat is uniquely identified for reference, retrieval and cross-reference between the label, MSDS, AUL and inventory. A hazardous material of another sort is lithium batteries. These batteries have received a lot of attention in the past year because they have a bad habit of blowing up. Our first concern is to make sure no Saft-brand lithium batteries are in stock. Second, we need to make sure they are stored properly. Lithium batteries **cannot** be stored in a manned space or stored with any other batteries. They must have their own locker, because they are special items.

I'm always amazed that I still find not one, but several tools not accounted for in the tool container, tool inventory, or the command's master tool-control plan. CNAF 4790.2 clearly defines how multi-piece tools are to be managed. It states, "All tools that are multiple-piece shall be identified in detail." For example, "stamping dye set 10 pieces plus 2 piece case total 12," or "feeler/depth gauge 14 blades," or "hacksaw with blade."

You might say most tools have multi-pieces, and, although this might be true, common sense must apply when we look at each tool. The general rule of thumb is that if a tool has parts that are removable (by hand), then the tool must be accounted for as a multi-piece tool, it's that simple. These aren't all the problem areas our survey teams have found, but they show the trends that clearly are present and the problems that should be addressed. ■

Helicopter Detachment Trends and Syndromes

By ADCS(AW) Michael Tate

The detachment concept always has posed different types of challenges. From the huge amount of cross-training to operating and doing maintenance on small ship decks with continual motion, these problems are compounded when we add a small group of Sailors who must maintain eight to 10 complete sets of NAMP-related programs and do all deck functions like fueling, spotting, and launch and recovery. Yet, detachment ops bring a great feeling of pride to Sailors who are able to accomplish all these tasks. However, with this additional tasking, it is easy to let something slip through the cracks.

In the past year, tools have become the victim of this high-tempo world. It is very easy for a tool-control program to become less standardized when various dets are out: One is in POM, and three others are preparing to deploy. The squadron tool manager and homeguard QA must complete audits to review the detachment's toolboxes and to inspect the condition of SE when the detachment

PH2 Leland Comer

is back home. It's easy to say that the audits were done while underway, forgetting sometimes just how hard these Sailors are working while at sea. These dets do not have personnel whose sole purpose is QA. Having an outside set of eyes review a program will help make sure all the squadron dets are standardized.

Programs begin to vary in basic ways: how BOS/EOS inventories are annotated or if they are annotated. Multi-piece tools are recorded as a single piece. Replacement documents fall victim to "fill or kill," and the homeguard tool room doesn't receive all the required info. Tool control is an area where the homeguard can provide the eyes that can reap huge dividends.

I remember being in a squadron for two years, coming back from detachment, and receiving a welcome aboard from someone who had checked in just a few months after me. Detachment maintainers can get very detached from the homeguard. For this reason, it's critical for squadrons that operate detachments not to let tool standardization fall victim to this unique method of operations. ■

Class C Mishap Trends

By AMC(AW) Paul Hofstad

During FY06, there were 128 Class C mishaps that involved 141 aircraft. More importantly, there were six Class C mishaps that involved injury to personnel, resulting in 21 lost workdays. The following provides a breakdown of the top six causal factors for Class C mishaps in and around the fleet:

1. Fifteen of the mishaps involved aircraft under the positive control of aircrew, maintenance personnel or yellowshirts being taxied, towed or directed into other objects, such as aircraft or buildings. Equal blame can be shared across the board on this one as aircrew and maintenance personnel (squadron and yellowshirts) had instances when they lost focus of the aircraft or were in too much of a hurry.

2. Ten of the mishaps resulted from "things falling off aircraft," better known as TFOA. These items ranged from engine-bay doors to cowlings. In a couple of the mishaps, these pieces hit and damaged aircraft before falling to earth.

3. Support equipment damaged eight aircraft. The causes ranged from a piece of gear not being tied down to maintainers towing the gear into aircraft.

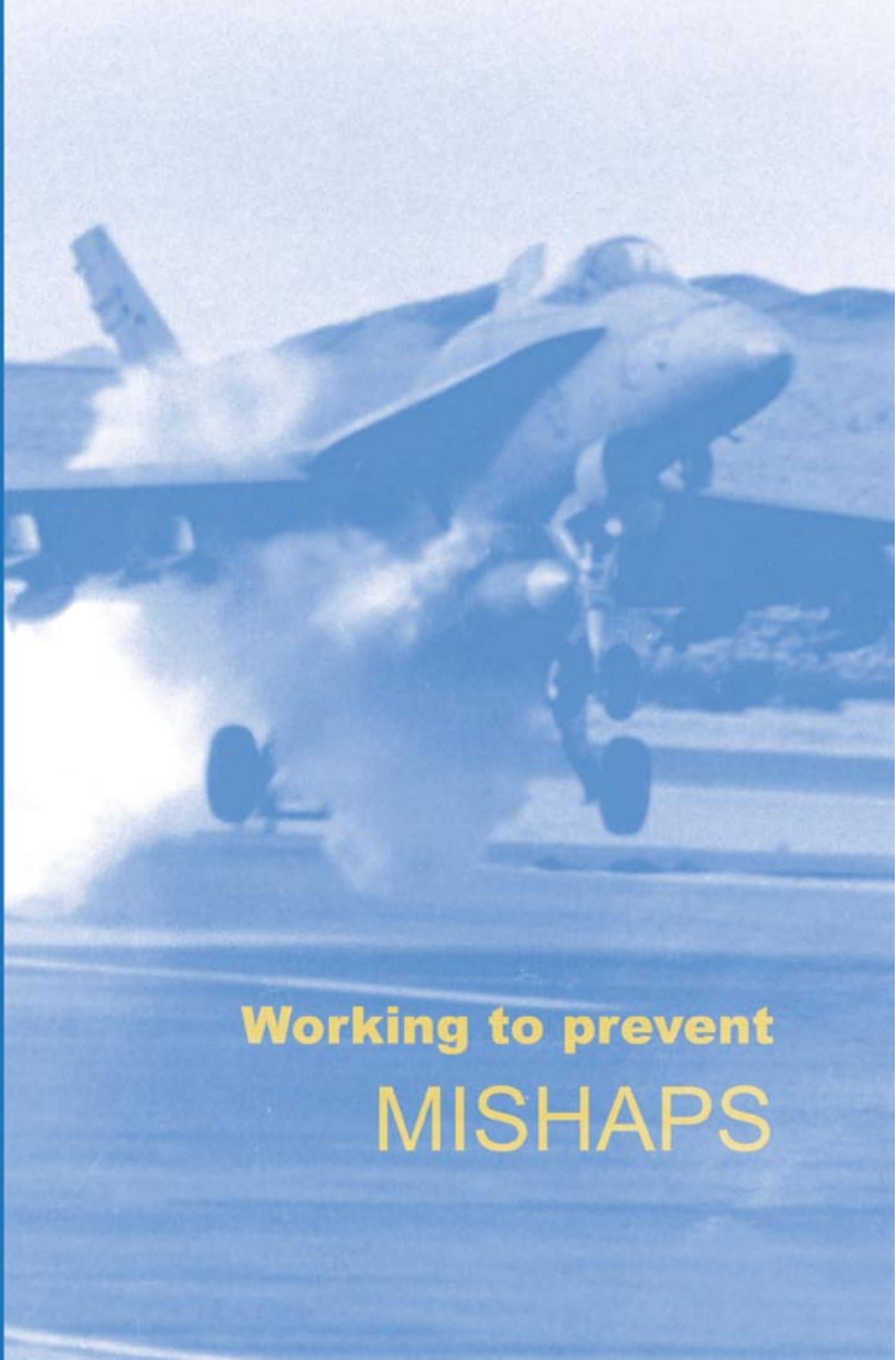
4. Foreign-object damage (FOD) also damaged eight aircraft, and half of the FOD incidents were from objects departing the aircraft and being sucked down the intake during takeoff or in flight. One of the FOD mishaps is worth mentioning because it directly involved maintenance personnel. A technician got too close to the intake and felt a tug on his head. The lenses from his goggles were sucked off his cranial and straight down the intake—just a little too close for comfort.

5. In five Class C mishaps, seven sub-components were jettisoned from aircraft, including three drop tanks and two canopies. Neither of these incidents happened in flight: One was jettisoned during a preflight inspection and the other on postflight inspection.

6. Four F-18 canopies were destroyed as a result of the exhaust from other aircraft. Advances in technology certainly have made the maintenance person's job easier in the last 10 years or so, but it's not without cost. As with anything new, we have to learn its characteristics and capabilities. This problem will take concerted effort to control.

We still have FOD, TFOA and SE issues. With the advances in technologies, we pay a hefty price when one of our assets is damaged. More than 50 of the Class C mishaps were in the group described, which is half of this year's total. Most of these mishaps occurred because of direct maintenance errors, and the Navy and Marine Corps shelled out $6,445,376 in repair costs on these Class C mishaps alone. Maintainers are doing a good job, but we can do better. Commit to excellence. ■

MISHAP SUMMARY



Working to prevent

MISHAPS

This section provides detailed information on all Class A mishaps for the fiscal year (as of 15 September). The Class A rate at this date was 1.92, compared to 1.96 in FY05. This section also provides data on the cost of mishaps in dollars and dead shipmates. We need to identify and fix repeat problems, and invite efforts to help reduce mishaps.

Class A Mishaps FY06

During the fiscal year, there have been 24 mishaps involving 26 aircraft. The dollar cost totaled $487,629,384, but the highest cost was the 13 shipmates lost in these mishaps:

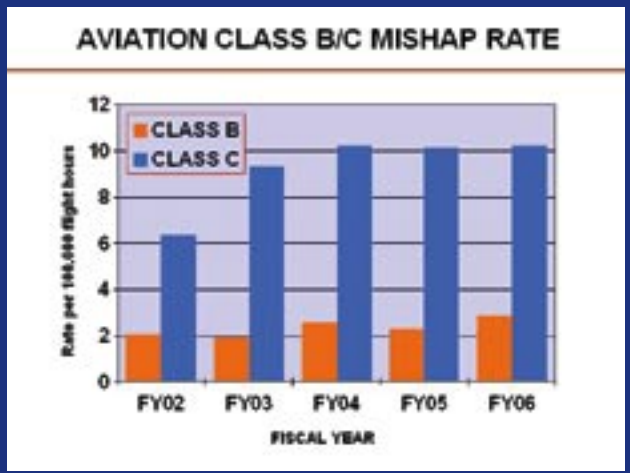
Date	Aircraft	Command	Narrative	Cost in Millions
10/04/05	MH-53E	HM-15	Aircrewman departed aircraft. No aircraft damage. One fatality.	0.27
10/14/05	FA-18C	VFA-106	Hornet on weapons training mission lost at sea.	34.9
10/27/05	T-45C	VT-7	Engine FOD by ingestion of flight deck crewman's cranial.	1.1
10/31/05	T-45C	VT-22	Bird strike during VFR landing pattern, aircraft departed controlled flight, crew ejected.	24.6
12/06/05	AV-8B	VMAT-203	Aircraft fire during handling sortie resulted in ejection. No injury.	29.0
12/13/05	SH-60B	HSL-48	Helo struck water upon shipboard departure. Three lost at sea.	20.9
01/10/06	T-39N	VT-86	Aircraft crashed on a low-level training flight. Four fatalities.	5.9
01/18/06	FA-18C	VFA-97	Hornet crashed during night-bombing training event.	36.2
01/27/06	T-34C	VT-27	Mentor crashed in backyard of house near airfield. Two fatalities.	2.8
01/28/06	FA-18C	VFA-25	Aircraft struck ramp and went over side. Pilot ejected. No injury.	44.6
02/06/06	FA-18D	VFA-125	Pilot ejected after aircraft control lost after multiple emergencies.	35.1
02/17/06	CH-53E	HMH-464	Midair collision between two aircraft in same flt (training over water).	46.9
02/21/06	FA-18C	VMFA-122	Aircraft lost at sea during air to air training flight	35.1
03/03/06	EA-6B	VAQ-135	Prowler crashed during low-level flight after engine failure. Crew safely ejected.	37.4
03/25/06	AV-8B	VMA-513	Harrier landed on closed runway. No injuries, but the aircraft and construction equipment damaged.	1.0

03/27/06	MV-22B	VMMT-204	During post engine-start checks, aircraft became airborne and landed hard.	7.1
04/30/06	FA-18E	VFA-14	Right engine fire during takeoff. Pilot aborted and egressed on runway.	4.3
05/05/06	FA-18A+	VFA-201	Hornet had severe bleed-air leak during flight, burning portion of the aircraft.	1.0
05/15/06	SH-60F	HS-8	Main rotor blades and stab damaged during aircraft precautionary landing.	21.4
05/27/06	AH-1W	HMLA-169	HMLA-169 Aircraft struck water while doing a post-phase functional check flight.	13.6
05/30/06	TH-57B	HT-8	During fam flight aircraft crashed into trees. Two major injuries and one fatality.	2.1
06/16/06	EA-6B	VAQ-12	Aircraft ran off runway on landing rollout. Starboard gear collapsed.	1.6
06/26/06	FA-18C	VFA-125	Midair collision between two aircraft (training mission). One fatality.	71.3
07/02/06	AV-8B	HMM-365	Harrier settled into water on carrier-controlled approach. Pilot ejected.	29.0

Class B and C Summary

In fiscal year 2006, 36 Class B mishaps occurred that involved 40 aircraft and cost the Navy and Marine Corps $15.3 million dollars in damages and 128 Class C mishaps that involved 141 aircraft and cost $7.9 million dollars.

This chart shows the number of Class B and C mishaps over time. These are leading indicators for more serious mishaps to come. Class B mishaps are just a step away from an A, and Class C mishaps easily could be a B or an A. We must work to reduce all mishaps across the board, including these categories. Class A mishaps are important, but they only reflect the tip of the iceberg. ■



Aviation Safety: *The Way Ahead*

Aviation3750 offers tools for improving aviation-safety programs. The statistics and trend information can help set priorities and guide decisions. The mishap summaries make people more aware of specific, real-life hazards and risks. Four of the programs highlighted in this guide promise to play key roles in improving safety programs: ORM, climate assessments, culture workshops, and safety surveys.

We're moving forward on ORM. One major area of effort is building a safety-training continuum that begins

at boot camp and is reinforced throughout the careers of all personnel. Also, we're developing a system for assessing how a command is applying ORM; this system will be used during evaluated fleet exercises and appraisals. We also intend to provide more best practices and lessons learned. We will work to make sure that ORM is inculcated throughout the fleet.

Now that we've accumulated a meaningful amount of climate-survey data, we must begin to include useful invention strategies into the survey results. Analysis of the data can highlight the areas of highest risk. Information gleaned from CSA and MCAS data allows commanding officers to target areas that need attention, work to reduce mishaps, and move their commands forward. Also planned is the development of a joint-service survey tool.

The Culture Workshop program continues to expand. Surface, Subsurface and Marine Ground Combat communities have adopted the concept and use the program. The

Naval Safety Center is working to become the standardization and training model manager for these programs. On the aviation side, the addition of more facilitators, both active duty and reserves, will enable us to complete 140 Culture Workshops a year. This schedule will ensure every squadron can get a workshop once every two years.

The Naval Safety Center will continue doing safety surveys, but future surveys will feature specialized teams. We plan to increase our focus on ORM assessments and will offer specific assist visits. As always, it will be up to the surveyed commands to review and take action on the results.

When every Sailor, Marine, and civilian more effectively manages the risk for every task or event, the mishap rates will decline. It takes just one simple mistake, lack of judgment, or momentary loss of attention to cause a mishap. This effort, and the attention leaders place on it, sets the course for the way ahead. ■

MAGAZINES

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ORM Training

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PHOTOS AND ILLUSTRATIONS

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A U.S. Marine Corps CH-46 helicopter lands on a desert landing strip.


An AV-8B Harrier launches from a flight deck.


An F/A-18C Hornet deploys flares during training exercise.


Rotor-tip vortices mark the descent of an AH-1W Super Cobra as the helicopter is guided aboard ship.

POSTERS

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VIDEO COLLECTION

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A 2-wire rapidly retracts and knocks a mech to the deck.


An airman crossing the flight deck with a Hornet on final.


The wing of a T-45 knocks down a flight-deck greenshirt to the deck.


An A-6E engine sucks the cranial off the head of a greenshirt.

Photo by PH2 Aaron Burden. Modified.