



The Safety Sigma

Mission Readiness through Operational Safety



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From the Director: Had a Mishap? Don't Take the Easy Way Out

CAPT Bob "Cosmo" Conway, USN – Director

This article is primarily addressed to you potential AMB Senior Members out there. You've had a mishap. Nobody was hurt, thank God, but no matter how you cost it, the dollar amount falls within a reportable mishap category. I've been there and done that and know that what follows, even for a Class B or Class C, are too many hours not focused on the squadron's mission because the mishap must be investigated and reported. And these days, even one hour away from normal squadron business is too many. The big question now for the Skipper, the senior member and the rest of the AMB is how can I expedite this investigation and SIR so we can get back to regular squadron business as soon as possible? There's no harm in wanting this but there are several temptations that must be avoided in order to achieve a quality SIR product that will, in fact, prevent future mishaps similar to the one you are working on.

The largest contributor to mishap causal factors is human factors (HF). Realizing this, DoD has spent significant time, money and other resources on the issue. The HFACS or Human Factors Analysis and Classification System is a DoD-wide accepted taxonomy that helps quantify the prevalent HFs in DoD, and in our case, Naval Aviation. The Naval Safety Center has published a handy-dandy pocket reference booklet that can make any and all squadron personnel experts or at least conversational on the subject. In that pocket reference are listed the four main categories of HFACS, their varying numbers of sub-categories as well as every HF "nano-code" known to man.

Looking at these nano-codes, I (the senior or other AMB member) see all sorts of HFs that apply to the mishap being investigated and worded so succinctly, too! – Hey, this is going to make this investigation easy. All I have to do is see what nano-codes apply, list them, write the analysis and BAM! we're done and back to normal business. If that is your thinking – STOP RIGHT THERE!!!

While seemingly comprehensive, basing your investigation using only the HFACS nano-codes can and will bias the investigation and degrade the quality of the SIR and potentially degrade prevention efforts of similar mishaps. A better and highly recommended way of doing business is as follows. Recall the ORM-X at ASO and ASC school. There, through brainstorming, root causes to several "resultants", or

things you don't want to have happen, were determined. Use the same procedure in analyzing the evidence and facts of the mishap. Once that brainstorming has been exhausted, bounce those findings off the HFACS main and sub-categories – but not the nano-codes. This process will ensure that you have evaluated "everything that could have possibly led to the mishap" (OPNAVINST 3750.6R para 607.d.1) and not biased it by just checking the nano-codes. Once complete, list your accepted and rejected causal factors, associate and write the analyses, then, and only then, assign nano-codes to the causal factors per OPNAVINST 3750.6R.

This method will allow you to achieve the most comprehensive investigation and the most robust preventative measures for the future. While it takes a bit more time and keeps you away from your primary mission, in the long run you will make Naval Aviation stronger and that is a worthy goal in anybody's book! 



An MH-60S lands on the USS Pearl Harbor. (Photo by Petty Officer 2nd Class Jason Behnke, US Navy)

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Man: Why Not Self Medicate?

CDR Jack "Bags" Wyland, MC, USN – Aeromedical

The final report on the tragic Sep 7, 2011 crash that killed the entire Lokomotiv Yaroslavl hockey team in Russia pointed to multiple contributing factors not the least of which included the unapproved use of sedatives by one of the pilots. While not overly common, the improper use of medications continues to be reported as contributing to aircraft accidents in private, commercial and military aviation. A review by the DOT/FAA involving 1683 pilots killed during a 4 year period in the 1990s revealed that greater than five percent of those pilots were flying while under the influence of a controlled dangerous substance (1). Over the past few years, medications tied to aviation accidents have included prescription drugs such as antidepressants and sleep aids as well as commonly used over-the-counter medications for allergy relief and mild pain. The decision to improperly use a medication sets up a precondition that although easily avoidable, could result in an event just as serious as any inflight error.

Medications can impact safety of flight by two means. First, the desired effect can be so pronounced that it can hamper the individual's ability to carry out mission requirements. An example of this would be the individual who is taking high blood pressure medication prescribed by someone other than their military flight surgeon/civilian AME. There are many blood pressure medications available and they work in many different ways. When first starting a new medication, as well as at other unforeseen times, there is the potential for them to work better than expected and lower blood pressure or heart rate to significantly low levels. On the ground this is usually not a serious event and can often be addressed simply by sitting and waiting until one feels better then adjusting future doses. In flight though, this option is much less feasible.

Secondly, all medications, including over-the-counter medications, can have side effects. The consequences of these unintended effects can range from a minor nuisance like in the case of a rash; to rapid incapacitation as can occur in serious allergic reactions. Furthermore, over-the-counter medications are often a compound of multiple medications which require greater effort on the part of the user to ensure a certain harmful ingredient is not included in the formula.

Aside from medications, the condition itself for which one chooses to take a medication can impact safety of flight. Common symptoms such as pain or insomnia may occur as the initial indication of a serious condition or the symptom alone can impair one's ability to fly safely.

Finally, interactions between various medications or the concomitant use with alcohol can enhance the normal effects, worsen side effects or vastly increase or decrease the length of time a medication is in your system.

Remember to contribute to an environment of safety and discuss all sickness and medication use with your flight surgeon. That's what we're here for. 

References: (1) Prevalence of Drugs and Alcohol in Fatal Civil Aviation Accidents Between 1994 and 1998; DOT/FAA/AM-00/21; June 2000



An F-35B conducts flight tests aboard the USS Wasp. (Photo by Seaman Natasha R. Chalk, US Navy)

Machine: What Is Creep and How Does It Affect Me?

Mr. Rick "Zeus" Wartman – Fixed Wing Aero-Structures Instructor

Creep is a condition that causes a component to permanently strain (stretch) over time even though the stress on the component is within the elastic region. The primary location on your aircraft that is affected by creep is the turbine blades within the engine. The three conditions that are necessary for creep to occur are time, temperature and load. It is typical of all metals that any increase in applied stress or temperature will increase the creep rate and reduce the time required to cause failure. The creep damage is accumulated throughout the life of a component with the times at high stress and temperature causing the most rapid rate of strain. In order for a component to perform satisfactorily in service, the spectrum of varying loads and temperatures must not cause a critical accumulation of creep damage. In other words service use should not cause creep sufficient deformation that leads to a failure sometimes known as stress rupture.

The elongation of turbine blades due to creep is one of the primary reasons an aircraft engine requires overhaul. The amount of time between overhauls is a function of how the engine is used. Many of the modern aircraft engines have some form of digital control system that is used to control the engine and also to log its usage. This is helpful to measure the amount of creep that occurs to the engine turbine blades since the creep rate is a function of both load and temperature.

Most aircraft have high power settings to allow for unique time periods when more power is required. During these periods of high power, the digital control system will record them and reduce the amount of remaining time left on the engine due to the increase in creep caused by the higher temperature and load.

Some of these aircraft are designed such that the digital control system will only reduce the creep life of the components once a certain amount of time has expired at the

higher power setting. It needs to be understood that an increase in creep rate will occur the moment the temperature or load (RPM) has been increased on the component. The operator should not make a routine of operating the engine at the higher power setting and then reducing the power setting just prior to the amount of elapsed time necessary for the digital control system to record it. If this is done, the life of the engine will be reduced yet the digital control system will be unaware of this reduction in life. 

Medium: Frequency, Simplicity, Impact, Teamwork

CDR Dave "Ivan" Ivezic – Associate Director / Programs Instructor

“They” say about 5% of the information taught during a classroom lecture is retained by the student. The retention rate for discussion-based learning jumps up to 50%. For the 45% of you ASO students that were dreaming about fruity adult beverages on the warm sand in Pensacola Beach instead of retaining the *Hoopla* lecture, this article is for you.

We discuss in class that no part of the ASO job is very difficult. Every element of your Aviation Safety Program is relatively easy to execute. The difficulty comes when you have to manage every element of the program and lead the risk management and cultural change effort of several hundred shipmates with several hundred individual personalities. We teach several safety tools and provide bits of wisdom you can use for successful accomplishment. Admittedly, some of those “bits of wisdom” are (a lot) smaller than others. Some are significant concepts we encourage you to use in all aspects of your job as an ASO.

Frequency, Simplicity, Impact. These three elements should frame any Aviation Safety effort. They allow the ASO to narrow the scope of their individual efforts and still allow for a robust program. Allow me to explain.

Frequency. How often have you seen the Skipper, XO, Department Heads, or other leaders in your command identify a hazardous situation and dedicate a large amount of resources to fix it? New programs, procedures, or training are established which fix the immediate problem, but then die on the vine within a few weeks or months because there is no sustainment or buy-in built into the new stuff. Don’t let this happen to your Safety efforts. If it’s worth doing, then ensure it is done periodically and with credibility. Metaphor time: are people going to better remember the sound of a hammer striking a bell once per month or a stick tapping against the bell every day. That’s why CAPT Conway shows the Will Farrell, Blue Oyster Cult, “More Cow Bell” skit in every class. Make sure your people are hearing the tapping of your Safety messages every day.

Simplicity. We can spend a lot of resources to make a few of our Safety Programs perfect or use those same resources to make all of our Programs effective. I recommend simple

effectiveness for all of your ASO efforts as opposed to isolated perfection for a few of them.

Impact. Similarly, we can spend a lot of resources ensuring frequency and simplicity, but if the end result is a Safety flop, then get rid of it or fix it. For example – how much time do your aircrew spend filling out Risk Assessment Worksheets? Is it a complicated worksheet? Is it effective or just a pencil-whipping exercise? A lot of ASOs coming through the class report that the Risk Assessment Worksheets are a preflight pencil whipping exercise. If so, fix it.

Teamwork. Everybody is a Safety Officer, right? Well, kind of. Let’s talk specifically about your Safety Team – CO, XO, Ground Safety Officer, Aviation Safety Petty Officer or NCO, QAO, Aviation Safety Council, Enlisted Safety Committee, Human Factors Council, AMB, SWO, PAO. All these people have a part in your Command Aviation Safety Program. Use them to help solve problems, identify hazards, plan, investigate hazards, and maintain a safety culture. The Aviation Safety Program has too many variables and facets for even the most talented officer to handle solo. Succeed with your team or sink alone. 



An MH-60S of HSC-12 conducts Replenishment at Sea (RAS). (Photo by Petty Officer 2nd Class Jonathan P. Idle, US Navy)

Mishaps: The Investigation is not Finished Until the Reporting Paperwork is Complete

CDR Dirk "Dutch" Hart, USN – Reporting Instructor

Statistics support that it is more likely that someone in your squadron will crash a car and be injured before they crash a naval aircraft. Chances are that the squadron will have a non-aviation related mishap to investigate and report than one involving a naval aircraft. These types of mishaps are conducted in accordance with (IAW) the OPNAVINST 5102.1 (series) and reported on-line via the Web-enabled Aviation Mishap Hazard Reporting System (WAMHRS). The investigation, notification, and reporting responsibilities are very similar to what is expected in a naval aviation mishap IAW the OPNAVINST 3750.6 (series) and WAMHRS data entry. For more information on the private motor vehicle mishaps, GOTO: <http://safetycenter.navy.mil/> select the WESS tab, then: NEW! PMV-GMV WESS Training.

Of course you want to manage a pro-active safety program rather than reactive. To bring some of that preventive safety "hoopla" into your aviation unit you can sign up for the Naval Safety Center's latest edition of the 'Summary of Mishaps', the world's leading source of information about how not to do stuff and what happens when you do it anyway. These are all the non-aviation related mishaps that a safety program manager may be likely to see, and if communicated to the entire squadron in a light-hearted way, actually prevent. As the last edition reports, "remember that nothing is so bad that you can't make it worse by doing something dumb in a hurry."

Note: To sign up to the Friday Funnies list server, send a blank email to: summary_of_mishaps-subscribe-request@listserv.safetycenter.navy.mil. 



Aboard the USS Lincoln, an E-2C of VAW-116 launches into blue skies. (Photo by Petty Officer 2nd Class Brian Morales, US Navy)

OPNAVINST 3750.6 Refresher:

A naval aviation mishap signals a failure in the Naval Aviation Safety Program. It is evidence naval aviation failed to detect and eradicate the hazards that caused a mishap before it was too late. It is not too late, however, to keep it from happening again – which is why naval aviation investigates aviation mishaps with such vigor.

- Ch 6, Par 601

Semper Paratus: Your Unit Permanent Mishap Board: Trained and Ready for Anything

LCDR Ally "Showgirl" Shuler, USCG – Coast Guard Instructor

When is the last time you scrubbed your Pre-Mishap Plan (PMP) with a fine-tooth comb? Are all your phone numbers updated? Do the members of your Unit Permanent Mishap Board (UPMB) know what to do if a mishap were to occur at your unit? Does the brand new nugget who just showed up from flight school know how to exercise the PMP as ODO? The Safety Environmental Health (SEH) Manual, COMDTINST M5200.47 (series), states that, "The unit's Pre-Mishap Plan shall provide guidance to ensure the effective completion of the numerous time-critical tasks required as a result of a major mishap." The UPMB's execution of that plan will ensure a smooth transition when the Commandant's Mishap Analysis Board (MAB) arrives at your unit to take over the investigation. Make that transition easy, and save yourself a headache by preparing now.

First of all, let's take a look at what the SEH Manual says about your UPMB composition and knowledge. Chapter 2 states that each member:

- Must be appointed (along with an alternate) in the pre-mishap plan,
- Must be **thoroughly familiar** with procedures and requirements before a mishap occurs,
- And should have a **working knowledge** of the Safety Environmental Health Manual, relevant directives, and aircraft mishap analysis procedures.

The annual pre-mishap plan drill can check all these blocks as you train towards a simulated scenario and incorporate information from the SEH Manual. However, the constant drumbeat from you, the FSO, ensures familiarity and a working knowledge. Consider a safety newsletter or simply even a monthly safety focus email to each member of your board which highlights a section of the SEH Manual. This ensures that UPMB training occurs more than just once a year. Another excellent source of information for training comes from the [Mishap Investigation Guide \(MIG\)](#), which can be found on the CG-1131 website. The MIG is the hidden gem for all Coast Guard mishap investigation and fills in the gaps from the SEH Manual. It is also a crucial read if one of your members is called up to be part of an MAB.

Secondly, let's look at the scope of the UPMB. According Chapter 2 of the SEH Manual, "Investigative action by the unit permanent mishap board should be limited to securing and protecting the mishap site and gathering records and files." This limited list, however, takes into account a myriad of sub-bullets contained within each of these categories, including telephone reports and preliminary mishap messages, rescue of the downed crew, dealing with inquiries from the

press, and rumor control, just to name a few. It is important to know that you cannot possibly train or prepare for every contingency, but having a well-exercised Permanent Mishap Board will mitigate some of the surprises that may occur.

Finally, once the mishap site has been secured and duties of the PMP have been carried out, the UPMB must be prepared to host the Commandant's MAB. The MAB host unit will provide emergency medical care and clerical support, office space with secure storage capability, communications, transportation, specialized clothing, and a litany of other services and resources for the MAB. Chapter 2 of the SEH Manual and the MIG delineate specific duties for both the PMUB and the MAB.

In short, look at the Class A mishaps which have occurred recently. Understand the pitfalls of a weak PMP and read about them in Chapter 3 of the SEH Manual. A mishap will not always occur at home field. Preparation is key, and as the FSO you have the greatest impact on a well-trained and effective Unit Permanent Mishap Board. Semper Paratus. 



A Coast Guard C-130 Hercules and two MH-60 Jayhawk helicopters from Air Station Clearwater, Fla., conduct a fly-over for the 32nd anniversary of the Coast Guard Cutter Blackthorn memorial Jan. 28, 2012 in St. Petersburg. The Blackthorn sank after colliding with the tanker Capricorn near the Sunshine Skyway Bridge, in St. Petersburg, Jan. 28, 1980. (Photo by Petty Officer 3rd Class Tara Molle)

Crew Resource Management: The Importance of a Good Scan

LT Marilyn "Vespa" Walsh – CRM programs

In the world of aviation, few skills are more critical to safe flying than building and maintaining situational awareness. The US Navy teaches techniques to do just that as part of its Crew Resource Management training. The Navy defines Situational Awareness, as it relates to aviation, as the degree of accuracy by which one's perception of the current environment mirrors reality. The deterioration of situation awareness has been identified as a causal factor in a majority

of aviation mishaps attributable to human error. Consequently, attaining and preserving a high degree of situational awareness is arguably one of the most important of the 7 Critical Skills. One's cockpit scan - perceiving and processing vast amounts of information - directly influences their level of situational awareness.

A good cockpit scan strikes a balance between two extremes on the spectrum of attention; complete channelization on the one end and insufficient dwell time on the other. Observe any American motorist and you'll likely see drivers exhibiting not just these extremes (is that guy texting and driving?) but infinite variations between them. An aircraft cockpit is no different. Your radio, your instruments, your crew, and your mind all compete for your attention. As professional aviators, you know that your safety and mission effectiveness depend on your ability to balance your attention. You've learned this truth from first-hand experience. American drivers, even those aware of the danger involved, continually allow themselves to be distracted on the road. They may not be dropping weapons in combat, but their inattention is equally deadly behind the wheel of their super-suburbans. So, as we head into 2012 keep your head on a swivel and set the focus on basic skills, such as a good scan. 

Vehicle Squadron Two at Marine Corps Air Station Cherry Point. For ASO Class 12-1, the recipients were Lieutenant Commander Donald Costello, USN, of Electronic Attack Squadrons 129 and 138; and Lieutenant Michael Chockalok, USCG, of HITRON, Jacksonville, Florida. 



An EA-6B of VAQ-131 lands aboard the USS Lincoln. (Photo by Petty Officer 2nd Class Brian Morales, US Navy)



The Commandant of the Marine Corps and Sergeant Major of the Marine Corps board a CH-53E during a recent visit to Afghanistan. (Photo by Sergeant Mallory S. VanderSchans, USMC)

SAS Hails and Bails:

We bid a sad farewell to CDR Dirk "Dutch" Hart, USN who has executed PCS orders to Bahrain. As a Reporting instructor for the last three years, Dutch has shared his extensive experience and humor with hundreds of Aviation Safety Officers and Commanders throughout the Fleet. The Crew Resource Management Division bid adieu to Captain Joe "Dahmer" Faller, USMC who has moved to the bright lights and big city of New York. Joining the CRM staff is Captain Thomas "Francis" Key, USMC who will be teaching the 7 Critical Skills of Crew Resource Management. 

Doc Bank Memorial Distinction: ASO student recipients

The Milt "Doc" Bank Memorial Distinction, recognizes the student or students in each graduating ASO class that best exemplify the characteristics of the late, great Doc Bank: motivation, intelligence, imagination and aptitude as a potential future ASO Instructor. The recipient of this award in ASO Class 11-6 was Lieutenant Kelly Deutermann, USCG, of Coast Guard Air Station Humboldt Bay, CA. The recipients in ASO Class 11-7 were Lieutenant William Chard, USN, of Training Squadron 10 at NAS Pensacola; and Captain Aleksandr Martin-Nims, USMC, of Marine Unmanned Aerial

The Safety Sigma is published quarterly by the Naval School of Aviation Safety located at NAS Pensacola, Florida. If you have a question for the staff, or are interested in attending Aviation Safety Officer, Aviation Safety Command, or Crew Resource Management Instructor training, please visit our website at <https://www.netc.navy.mil/nascweb/sas/index.htm> or call (850) 452-3181. If you would like to submit a short article for publication, please contact LtCol Stephen "Bender" Dickerson at (850) 452-5145 or stephen.m.dickerson1@navy.mil.