The Safety Sigma

Mission Readiness through Operational Safety

Summer 2011 **Volume II, Number 3**

From the Director: You Can Have Your Cake and Eat It Too, Safety Culture-wise That Is

CAPT Bob "Cosmo" Conway, USN – Director

A culture of safety or a culture of professionalism and excellence - which is better and what should we strive for? All too often we find ourselves in the dilemma of blending safety and operations, sometimes blending them as well as oil and water. What difference does it make what kind of culture we should strive for?

To help in deciding which culture to achieve, let's start with some basic definitions. Safety first (pun intended). Paraphrasing from Webster's Dictionary, safety is the prevention of damage, breakage, and injury. That's simple enough; now on to "culture". Again paraphrasing from Webster's, culture is the integrated patterns of human knowledge, belief, and behavior. Also condensing Uttal's (1983) definition of culture and combining with Webster's, we can substitute the phrase "behavioral norm" for the word culture. So if we want a culture of safety, we want to establish behavioral norms that prevent damage, breakage, and injury – that's good, right?

"Outstanding course – made me wish I had been through ASO school years ago."

– Recent ASC Graduate –

Not so fast, what about esprit de corps, mission readiness, unit cohesiveness, high morale, retention, and the like? Is there a way to establish one culture or set of behavioral norms that enable all of this and prevent damage, breakage, and injury too? Absolutely, and it starts with establishing a positive command climate, one that is conducive to and fosters a culture of professionalism and excellence. Now all we need to define is professionalism and excellence, but this will take on many faces and tones as established and defined by the commanding officer. The CO establishes, is responsible for, and controls the command climate; this is a simple fact. It is the CO's responsibility to define his rule set (policy), explain his interpretation of those rules (philosophy), and establish a series of goals and objectives for the command (vision). The CO must also communicate this throughout the command (read: delegate) at all times using verbal communication as little as possible. What? Yes that's right, it's called walking the talk. Hanging a policy statement on the wall in an 8x10 black frame does nothing to establish a positive climate. Acting it out, leading by example, setting and maintaining high standards, and holding folks accountable does.

Now while this is easy to describe, the execution of this excellence model takes a total, dedicated effort much like the approach a professional golfer takes to winning the Masters or U.S. Open. That sort of effort is an intense, 24/7 effort all just to shave as much (or as little) as one stroke off their game to beat the other golfer tied walking up to the 18th tee. (That is unless you were Rory McIlroy at last month's US Open…) For CO's, XO's CMC's, SgtMaj's, DH's, NCO's, and so on at the unit level, all must take on this approach and mentality and be each other's keeper in maintaining the standard of excellence and professionalism.

Sounds difficult? It can be done and is being done throughout Naval Aviation. An easy example is the 25-30 squadrons per year who go completely mishap free. That's Class A, B, C, AGM, FRM, FM, POV (4 and 2 wheel), recreational off duty, PT mishaps, and the like. Are they just lucky? My experience and observations from over four years as the CNAF Safety ACOS and SAS Director says it's not and that in the vast majority these squadrons are adhering to tried and true command excellence models.

If you are interested in what makes a command successful and how you can emulate great commands of the past, jump into the literature. There is plenty available and I recommend you start with the extremely easy read of "Charting the Course to Command Excellence." Just Google the title and you'll find it easily. In focusing on excellence, professionalism, motivation, commitment, morale, and values in your command, you can have your cake and eat it too including the prevention of damage, breakage and injury (a safety culture) as a pure by-product of your success.

INSIDE

Man: A Brief Overview of the Aeromedical Contributions to Aviation Safety

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

As the new Doc at the School of Aviation Safety I chose the origins and impact the aeromedical field has made on aviation safety as my first Sigma newsletter submission. I believe you need to understand where you came from in order to move forward. Only two years following the first human balloon flight by the Montgolfier brothers in 1783, two Frenchmen, Jean-Francois Pilatre De Rozier and Pierre Romain became the first aviation mishap fatalities while attempting to cross the English Channel. Since that time, much effort has been expended to increase safe operations in the flight environment.

While early flights focused on the advancement of balloons, many of the pioneering aeronauts were trained physicians and physiologists and these individuals concentrated much of their efforts on the man-environment interface. Initial attempts to deal with the risks of high altitude flight often proved tragic, with multiple injuries and deaths occurring during flights. By the end of the 19th century enough expertise had been garnered to allow for initial engineering and policy controls that addressed issues such as hypoxia and thermal injury.

With the advent of fixed wing aircraft in the early 1900's came a need for more precise control inputs. This contributed to the budding field of anthropometrics (though the term was not used as we do now). The aircraft response to these control inputs required an improved understanding of how physiologic inputs such as vision, hearing and proprioception related to certain issues like visual illusions and vestibular mismatch.

As wars often do, WWI offered many instances to study and improve the aeromedical field and the military took the lead with the establishment of the U.S. Army School of Aviation Medicine in 1918. The U.S. Navy followed shortly thereafter designating their first flight surgeons in 1922 while on the civilian side the U.S. Department of Commerce established their first Medical Director of Aeronautics in 1926. Since then, the various military and civilian agencies have routinely worked together sharing data and ideas that have improved the overall safety of aviation. With the value of the aircraft having been proved in WWI, and with the rapidly improving performance of aircraft demonstrated to large crowds by barnstormers and thrill seekers, research quickened and great strides were made in initial medical screening, survival gear use, and an even better understanding of acceleration and hypoxia.

WWII again resulted in rapid aeromedical advancements including the development of the first functional ejection seats and G suits along with initial consideration of how human factors, primarily fatigue and illness, can contribute to flight safety.

After WWII, commercial aviation became widely accepted by the general public as a viable means of transportation and research into passenger comfort became pronounced. Some well publicized tragedies forced advancements in accident survivability and investigation. In 1958, the Federal Aviation Administration (FAA) was established, taking on the role of managing nearly all aspects of civil aviation including crew and aircraft certification, safety research, code enforcement and accident investigation. The National Aeronautics and Space Administration (NASA) was also established in 1958 and has greatly added to advancements in numerous terrestrial and space concerns such as barotrauma, cancer, sleep hygiene, blood and immune system diseases, mental health and human factors. The military at this time concentrated their efforts on high performance aircraft with medical personnel looking at the associated effects on aircrew (a big shout out goes to Col Stapp, USAF Flight Surgeon) along with advancements in the relatively new field of rotary wing aircraft which required special research into matters such as vibration, crash survivability and the development of the MEDEVAC system. Finally, the establishment of the Naval Air Training and Operating Procedures Standardization (NATOPS) program, perhaps the greatest contribution of all time to Naval Aviation, also occurred during this period to which aeromedical personnel contributed greatly.

More recent aeromedical contributions have included improved medical screening and waiver policies, aeromedical training, CRM and human performance. The aeromedical contribution to aviation safety has and will continue to be accomplished through the dedication of those in the field.

E-2Cs of VAW-115 (Photo by Petty Officer 3rd Class Jarod Hodge, US Navy)

Congratulations!

Lieutenant Peter "BB,BG, or UB" Walker was recently awarded the Embry-Riddle Outstanding Instructor of the Year, Southeast Region for teaching excellence as an Embry-Riddle Adjunct Professor.

Machine: Become a Translator

Maj. Stephen "Bender" Dickerson – Rotary Wing Aerodynamics Instructor

In June 2009, 2011 Air France flight 447 crashed over the Atlantic with the loss of all 228 lives on board. After an exhaustive search, salvage teams have recovered the flight data recorders, and some portions of the chain of events which led to the mishap have been made public. While it is too early to make any definitive statements regarding the causal factors, some information from those final minutes has been released which begins to paint a picture of the scene. The *Wall Street Journal* (*WSJ*) reported on May 12: "Investigators already concluded that except for malfunctioning airspeed probes, there were no other mechanical, electrical or system errors." The *Guardian* in the United Kingdom also reported on the incident: "Unable to calculate speed because monitors were showing an impossible drop from 275 knots to 60 knots, one of the pilots appeared to make a fatal assumption that the plane was flying too fast and was in danger of breaching "coffin corner": the narrow aerodynamic envelope that keeps a plane flying at cruise altitude." The *WSJ* article goes on to state: "Upon receiving a second stall warning, the crew increased engine thrust substantially—part of standard practice to cope with such a situation. But for the next 50 seconds, the pilot at the controls did something that safety experts consider anathema: He continued to pull the jet's nose up, despite the threat of worsening the stall." The conflicting information apparently displayed on the aircraft instruments during this mishap is a good reminder of why we must learn to relate the information from all our instruments to our systems knowledge and to our flight experience.

A CH-53E of HMH-461 conducts TRAP of a Canadian CH-47 in OEF. (Photo by Sgt Thomas W. Dowd, USMC)

At any point in time, an aircraft's behavior, or state, can be defined through six equations of motion which relate translations, rates, and accelerations along the three coordinate axis'; the angular rotations, rates, and accelerations around these axis'; and the Euler angles more commonly thought of as bank, pitch and heading angles. The information displayed by our aircraft instruments allows us to interpret these equations of motions into more familiar forms. What every aviator should have been taught at one point was that no single item of information is enough to explain the complete behavior of our aircraft, hence the need to develop a good instrument scan early in our training as professional aviators. Only through the knowledge gained by observing multiple aircraft parameters can we accurately assess the performance of our aircraft.

When instruments fail, our experience should help us realize that something is amiss. Since the aircraft state is unique, then changes in one variable will affect the others which should in turn be reflected by the aircraft instruments. When this doesn't happen, aircrew must refer to their aerodynamics and systems knowledge to try to determine what is actually happening to their aircraft and to then choose an appropriate course of action. For example, no matter what aircraft you fly you have probably become accustomed to a certain power setting and pitch angle (fuselage pitch for rotary-wing, angle of attack for fixed-wing) relative to your flight regime. Depending on your type, model, series (T/M/S) aircraft, there is usually a "get well" or normal power that corresponds to your aircraft profile. Whether on downwind in the landing pattern, straight and level at altitude, or landing at your home field with a certain gross weight, experience has delineated this power setting. What would you think if your indicated airspeed was 40 knots slow but your pitch (or alpha) and power (collective or throttle) setting were where you normally set them? Would your eyes dart to the VSI or altimeter? What other instruments would you scan to find clarification? Then what would you do with your power setting? What if you were in the landing pattern and those instruments were indicating normal, showing straight and level flight? Would you suspect a problem with aircraft configuration? Perhaps a faulty airspeed reading? You might then also think about how your particular aircraft senses the airspeed and presents that information to you. What other systems, such as automatic flight control systems, are tied to that sensor? How are those systems responding? Are your 'seat of the pants' inputs telling you something totally different? Now what do you do?

This example train of thought depends on understanding the aerodynamics which keep our aircraft flying. With all other factors being equal, the aircraft would not fly 40 knots slow without affecting other variables of the aircraft state, which would in turn be indicated through the aircraft instruments. That information is only useful if we as aviators can use our understanding of fundamental aerodynamics and apply the data which is given by those instruments. Mission accomplishment depends on our ability to translate given information into appropriate action. Are you an effective translator?

Celebrating a Century of Naval Aviation

On March 4, 1911 the first appropriation funds for Naval Aviation were provided to the Bureau of Navigation in the amount of $25,000 for "experimental work in the development of aviation for naval purposes."

Medium: Your Cake and Eat It Too? How Do You Measure That Captain?

Mr. Bob "Opus" Hahn – Programs / Academics Director

The links between safety, leadership, professionalism, and organizational effectiveness (that's mission readiness in our profession) are real. Captain Conway talks about the glue that bonds together the safety-leadership-professionalism-mission readiness links. The safety literature is replete with examples of how it works. SIRs are replete with examples of what happens when it fails. How can the CO and ASO measure these links and concepts? More importantly, how do the CO and ASO take the concepts CAPT Conway talks about in his article above and put it into practice in his or her squadron?

Safety Culture and Programs are the answer.

The squadron's safety programs provide specific guidance in our daily actions. Leadership and culture provide the belief in those programs. Esprit de corps motivates the team (squadron) to do the right thing, and to do things right. Your specific safety programs will keep the squadron in alignment with Navy and Marine Corps safety goals, as well as provide the daily steps and actions squadron personnel must take to meet safety goals. The research has shown that programs that are alive and well generally keep us out of trouble. The trick for the CO and ASO (and the squadron) is to ensure that programs are healthy, that they align with the current operational environment and mission of the squadron; and that they are understood, and practiced by all.

A good measure of the effectiveness of your safety programs is to determine if they guide people in the (seemingly millions) decisions they make all through the day. Take a hard look at your squadron. Are people doing what the guidance tells them to do? Are they thinking about the task they are about to undertake by assessing the situation; balancing or assessing the resources they have at hand; communicating with leaders and subordinates effectively; and doing it right, then debriefing? (This example is your ORM program in action.)

Another measure of effectiveness of your squadron's programs is compliance. That is, is the squadron conducting surveys, safety standdowns, and mishap drills in accordance with applicable instructions? Is the squadron meeting standards with respect to percentage of personnel in compliance with training requirements and ASAP reporting (for those squadrons that have implemented ASAP)? Does the squadron transmit relevant and useful HAZREPs when hazards are identified? Generally speaking, there is a correlation between measures of compliance with programmatic standards and professionalism in the squadron. The trick here for the CO and the ASO is not to allow these programs to devolve into the 'check in the block' approach. When that happens … watch out!

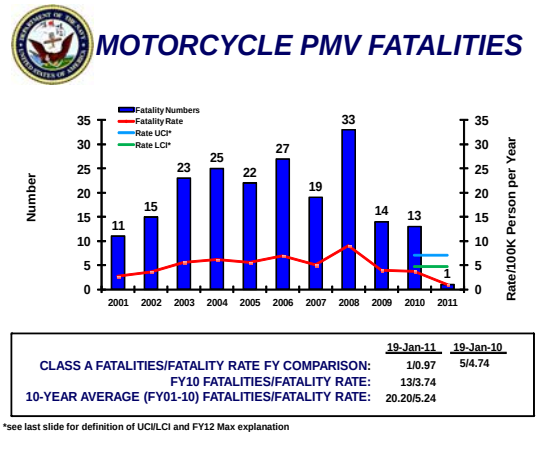
Here's a measure of effectiveness that is generally associated with programs' success: morale. Generally speaking, morale accrues from good leadership, and officers, Sailors, and Marines who are proud of their unit. The trick here for the CO and the ASO is how do you measure morale? Tough to absolutely quantify, but generally speaking, you know it when it's bad, and you know it when it's good! The Navy and Marine Corps have a long tradition of excellent leadership. There is a link between your leadership as CO or ASO and professionalism and safety in your squadron.

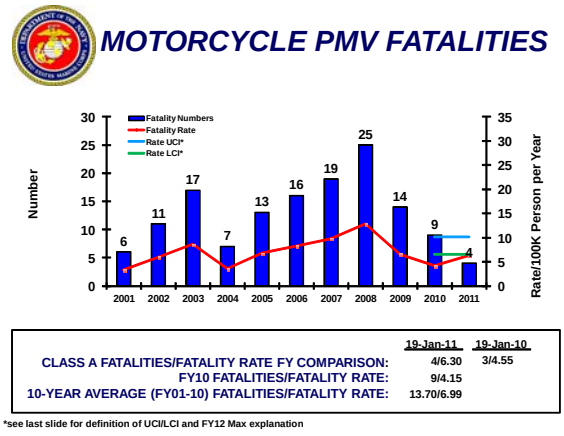
The ultimate measure of success of this process and your safety programs is a mishap that doesn't happen.

Mishaps: Reporting Motor Vehicle Mishaps

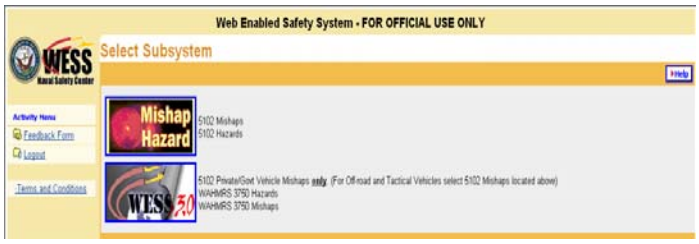
CDR Dirk "Dutch" Hart, USN – Reporting Instructor

The School of Aviation Safety is in the business of promoting free communication and promulgating new information, while continually promoting safety. Aviation Safety is our cornerstone, but the Navy's goal is for zero preventable mishaps. We must continually investigate mishaps, determine the causal factors, and make recommendations to prevent recurrence and REPORT. That being said, the new Naval Safety Center (NSC) WESS motor-vehicle mishap module is here!!!





The NSC unveiled an improved WESS module for reporting private motor-vehicle (PMV) and government motor-vehicle (GMV) mishaps. What's in? Improved screen flow: More data can be entered on each page, ending the need to navigate through dozens of pages. Improved causal factors: Motor-vehicle HFACS will replace the old causal factors. What's out? The PMV MIR: Navy units will no longer be required to send a separate, 23-page mishap investigation report (MIR) for class A/B PMV mishaps. All information is input via the WESS 3.0 software.



For additional information contact: Bonnie Revell (757) 444-3520, ext. 7138; DSN 564 (bonnie.revell@navy.mil) or Dan Dray, (757) 444-3520, ext. 7134; DSN 564 (daniel.dray@navy.mil) for questions concerning the new motor vehicle module. A PowerPoint training guide for the new motor-vehicle module is posted on the NSC website home page http://safetycenter.navy.mil/ NEW! PMV-GMV WESS Training or direct to: http://www.public.navy.mil/navsafecen/Documents/WESS/PMV-GMV_WESS_Trng.pptx

A C-130 and MH-60 from Air Station Elizabeth City conduct a Search and Rescue Mission.

Semper Paratus: The Naval Safety Center Website…It's for Coasties, too!

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

Ever need a new idea for a safety stand down? Has your AirSta had the same tired looking safety posters on the wall since your CO was a nugget? Looking for a new guest speaker or subject matter expert? Try the Naval Safety Center website. User friendly and newly updated, the website has an inordinate amount of material that can help you in your every day job as an FSO. Some key points to highlight:

- Old versions of *Approach* and *Mech* magazine. Maybe you read an article a few years ago and would love to find it again. Scan through *Approach* editions going as far back as 2007. Also find points of contact for submitting new articles.
- Safety Hoopla Posters. Tons of poster ideas are available for you on the website. Don't see one that you like? Send your ideas to the NSC and they will make new posters for you…for free!
- Ground safety. NSC has tons of ideas for seasonal safety campaigns, driving safety, and recreational safety, including videos. Save yourself the hassle of re-inventing the wheel!
- Aeromedical Support. Get a quick refresher on HFACS or reorder that handy HFACS flip book that you lost on the plane ride home from ASO school. Also find a myriad of other Aeromed type training and points of contact.

The list goes on from here. Next time you need something, and you have no idea where to find it, the NSC website is a great place to start. And as always, we are also available at SAS to help point you in the right direction. Fly safe and Semper Paratus.

Crew Resource Management: High Stakes Decisions

Capt. Joe "Dahmer" Faller, USMC – USMC CRM programs

The critical skill of Decision Making (DM) is used constantly by aviators and leaders, particularly in the Time-Critical environment of the aircraft. The decision making process in aviation involves time pressure, uncertainty, high stakes, team and organizational constraints, changing conditions and varying amounts of experience. At those times, we are not necessarily using classical decision processes of listing pros and cons of several options, weighing risks, benefits and probability of outcomes, and comparing options to each other before making a decision.

Aviators often use the Naturalistic Decision Making (NDM) process. When encountering a problem, we match it to a typical situation we recognize. We already understand goals, cues, expectations and typical responses of those situations, which lead us to quickly develop a response. As long as there are no major obstacles that would preclude that solution from being acceptable, we take action. We do not need a perfect solution, just one that works.

Recently, members of the CRM office attended the 10th International NDM Conference in an effort to further incorporate the best ideas of the NDM community into the Navy and Marine Corps CRM program. NDM has

applications to fields such as police, firefighters, medical responders, the FAA and ATC, nuclear power, rail and public transportation, sports, cyber-security and simulator development. Researchers from all branches of the service attended, as well as those from foreign militaries. Numerous heavyweights of the community were in attendance, including Gary Klein, a leader in the field for decades. Keynote speakers addressed cutting edge ways of how NDM is being incorporated into a wide range of fields.

The NDM community is concerned with human performance in the above environments, and naval aviation has long been a leader. The conference featured a tremendous number of topics applicable to naval aviation including development of experts, overconfidence, tradeoffs of decisions, automation, teamwork, the use of local dialects, perception and judgment, and recognition training.

Many at the conference spoke highly of naval aviators, and it is important to continue to lead the way as expert decision makers. There is great potential in exploring how decisions are made in your community during CRM training, as well as practicing and critiquing the decision making process in your aircraft to continually improve the skill. For more ideas and information on incorporating naturalistic decision making into your community, contact your platform CRM program manager, local CRM instructors and the CRM office in Pensacola.

OPNAVINST 3750.6 Refresher:

"There is no such thing as operational necessity in a training environment."
- Ch 1, Par 105.f.(2)

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. There was one recipient in ASO Class 11-4: Maj. Victor Olear, USMC, of Marine Aircraft Group 49 (MAG-49) at JRB Willow Grove, Pennsylvania. There were two recipients in ASO Class 11-5: Lt. Cmdr. David Halpern, USN, of Air Test & Evaluation Squadron 23 (VX-23 The Salty Dogs) at Naval Air Station Patuxent River, Maryland; and Lt. Ryan MacLeod, USNR, of Fleet Logistics Support Squadron 53 (VR-53 Capitol Express) at Andrews AFB, Maryland.

SAS Turnover Season: **Farewells & Hails**

We fondly say farewell to several SAS instructors this summer as they move on to their next challenges in life. CDR Walt "Lunar" Dalitsch, CDR Jake Ryan, LtCol Bartt "Pinto" Greene, LCDR T.J. "Donuts" Staffieri, Maj. Bernard "Woots" Cernosek, and LT Peter "BB" Walker have transitioned or will soon transition to their next assignments or retirement. They have all made significant contributions to the Fleet and directly influenced Naval Aviation Safety through their teachings. Checking aboard SAS this summer are CDR Jack "Bags" Wyland, Maj. Stephen "Bender" Dickerson, LCDR Kurt "POTY" Uhlmann, Maj. Matt "Throb" Robinson, and LCDR Phil "Dr. Phil" Fatolitis.

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 Maj Stephen "Bender" Dickerson at (850) 452-5145 or stephen.m.dickerson1@navy.mil.