

MECH

VOL. 68, NO. 1
Spring | Summer

Having an Effective Safety Management System

Identify, manage and eliminate risk

TOOLS & TRICKS OF THE TRADE

Tool Control Program ensures we have the right tools for the job

THE DIRTY DOZEN

The top 12 human factors that contribute to aviation maintenance mishaps

Aviation Structural Mechanic 1st Class David Tejeso performs maintenance on an E/A-18G Growler.
U.S. Navy photo by Mass Communication Specialist 3rd Class David Rowe



ENABLING WARFIGHTER READINESS

NAVALSAFETYCOMMAND.NAVY.MIL



From the Maintenance Officer

Greetings from the Naval Safety Command. As we move into Spring 2023, I am optimistic this issue of *MECH* Magazine will find you all doing well, operating safely and supporting the Chief of Naval Operations' "Get Real, Get Better" initiative. Regardless of pay grade or title, it is our responsibility to watch out for each other in every aspect of our job duties. We must be continually vigilant in the ever-changing and high-risk environments we operate in. Watch out for yourself and just as importantly, watch out for your shipmates. Safety is an all-hands responsibility and it takes everyone, officer, enlisted and civilian to reach our safety goals.

It has never been more apparent in the history of our great Navy that we must lead by example, set the standard daily and always perform our assigned duties while continuing to manage risk for our success well into the future. Whether on an aircraft, test bench or launch and recovery system, performing "by the book" maintenance has never been more critical. It takes all of us really stepping back and thinking about how we operate daily.

Over my 34 years in the Navy, I've witnessed some unsafe acts that I wished I'd stopped or reported. I suppose the "creep" sets in from time to time for all of us and often normalized deviation becomes the practiced norm. This normalized deviation becomes an accepted habit pattern that many think can be hard to break when in reality it is not. Right is right and wrong is wrong - it really is that simple. If any of you witness maintenance being performed incorrectly, procedures not being followed or leadership demanding a shortcut of any sort, do the right thing and stop the practice or report it to the appropriate levels in the chain of command. Yes, chiefs may not always be happy about it, but at the end of the day, they will be much more comfortable keeping everyone safe. Let's all reengage and reinvigorate our safety programs and overall mindfulness, participation and commitment to doing things right, by the book and most importantly, doing it safely.

I hope to see you around the fleet soon as we travel to conduct our local area assessments. When you see us, please take the time to ask us questions about anything safety or maintenance related. The best part of our jobs is to get out and about to talk to Sailors and Marines and teach them how to be safe and professional and to also have fun and enjoy what they are doing.

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Mishaps cost time and resources. They take our Sailors, Marines and civilian employees away from their units and workplaces, cause injuries and damage equipment and weapons. Mishaps diminish our readiness.

The goal of this magazine is to help ensure personnel can devote their time and energy to the mission. We believe there is only one way to conduct any task: the way that follows the rules and takes precautions against hazards.

Photos and artwork are representative and do not necessarily show the people or equipment discussed. We reserve the right to edit all manuscripts. Reference to commercial products does not imply Navy endorsement.



U.S. Navy photo by Mass Communication Specialist Seaman Leon Vonguyen

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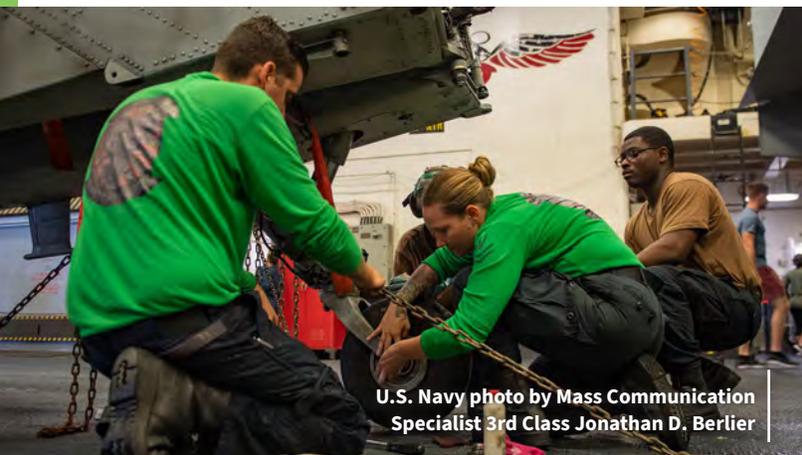
FAME! WHAT'S ALL THE FUSS ABOUT?

By Master Chief Aviation Maintenance
Administrationman Arlene Williams

The Dirty Dozen

By Master Chief Aircraft Maintainer Chris Snow

Get real, get better is the Chief of Naval Operations' vision that every Navy leader applies a set of Navy-proven leadership and problem-solving best practices that empower our people to achieve exceptional performance. As I travel through the fleet conducting local area assessments, I have witnessed maintainers embrace this call to action. However, I have also observed maintainers practicing maintenance processes who need to follow the applicable maintenance instruction, local command procedures or naval aviation maintenance operating procedures. These authorized processes are the 90% solution for completing error and mishap-free maintenance, inspections, and ground support operations. Still, there are some things technical maintenance instructions, local command procedures and wing instructions don't account for.



To understand why maintainers continue to have issues with performing proper maintenance, we need to take a deeper dive and investigate human factors as they pertain to aviation maintenance. What are human factors anyway? The Federal Aviation Administration (FAA) defines human factors as a “multidisciplinary effort to generate and compile information about human capabilities and limitations and apply that information to equipment, systems, facilities, procedures, jobs, environments, training, staffing, and personnel management for safe, comfortable, and effective human performance.” According to the FAA, about 80% of maintenance errors involve human factors that can waste time, cause injuries, or even contribute to accidents. When narrowed down to the 12 most common human factors found in those mishaps, this list is often called the “Dirty Dozen.” Here are the top 12 human factors that contribute to aviation maintenance mishaps:

1. Lack of Communication – This item tops the Dirty Dozen because it's critical. Sometimes verbal directions aren't appropriately conveyed, aren't complete or are misinterpreted by the recipient. Many people think this mainly pertains to communication between senior

leadership and junior personnel, but this covers everything from pass-downs between shifts, during task assignments, during an actual task like operational checks, from maintenance control to work centers and vice versa, and also junior personnel up through the chain of command when they are having issues that can affect their work performance. The list could go on.

- 2. Complacency** – When Sailors and Marines perform the same tasks routinely, they may become over-confident, thinking the work is too easy. Consequently, they become less vigilant about checking for mistakes. This is one of the most cited human factors in Navy and Marine Corps aviation maintenance-related and ground mishaps.
- 3. Lack of Knowledge** – Just because a maintenance technician is qualified as a collateral duty inspector does not guarantee their knowledge base. Sometimes technicians are assigned tasks outside of their scope of experience and knowledge because of pressure from supervision, and sometimes they overstate their actual abilities. This lack of knowledge can have grave results.
- 4. Distractions** – Anything that takes your attention away from the task at hand. Distractions are one of the leading causes of forgetting things, including what has or has not been completed in the maintenance task. Distractions are one of the most frequent primary causal factors in aviation ground mishaps, including maintenance and line operations. If you find yourself distracted during maintenance, take a breather and a break; if needed, reread your publications and go three steps back when restarting the task. This is also the time when safety observers, Quality Assurance representatives (QARs), and hangar and flight line chiefs must be engaged and observant.
- 5. Lack of Teamwork** – is a failure to work together to accomplish a shared goal. Teamwork involves everyone understanding and agreeing on actions to be taken. Personality differences in the workplace must be left outside the workplace and leadership should emphasize that lack of teamwork can affect safety in the shop, flight line and hangar bay. Another consideration for this factor is regarding the supervisory role; supervisors should know their people, each individual's strengths and weaknesses, who works best together, and should set up teams for success when considering those factors.
- 6. Fatigue** – is a major human factor contributing to many maintenance errors. Fatigue can be mental, physical or emotional. Emotional fatigue can greatly impact a person's mental and physical performance. Stress, overwork, not getting enough quality sleep can also lead to fatigue. A fatigued Sailor or Marine may be easily distracted and experience abnormal mood swings. Fatigue results in increased mistakes, poor judgment and wrong decisions. Fatigued maintainers may also lower their professional work standards.

7. Lack of Resources – includes not having enough manpower, equipment, documentation, time, parts, etc., to complete a task. Operations planners and maintenance managers need to consider lack of resources when planning operations and maintenance. There is a specific safe and effective capacity for each operation and each day for the resources a given unit has. We must be mindful not to overstretch our resources because that tends to produce poor results.

8. Pressure – Whether the pressure is real or perceived, the implications are the same. Aircraft maintenance technicians should refrain from allowing pressure on time to get in the way of finishing aircraft maintenance correctly and safely. This is extremely important for Navy and Marine Corps maintenance leaders, managers, supervisors and technicians to remember, primarily when their unit operates in a training environment, which is most of our operations. We have numerous maintenance, aircraft towing and support equipment movement mishaps in which technicians and line division personnel sensed pressure, so they rushed through some tasks, which led to some mishap, whether damage to equipment or injury to self or others.

9. Lack of Assertiveness – Assertiveness is a communication and behavioral style that allows us to express feelings, opinions, concerns, beliefs and needs positively and productively. When we are assertive, we also invite and allow others to assert themselves without feeling threatened, undermined or that we've lost face. Speaking one's mind assertively is not to be confused with aggression. It is about communicating directly but honestly and appropriately, giving respect to the opinions and needs of others, but not compromising our own standards.

10. Stress – can harm job performance, whether it's caused by workplace issues or personal struggles. Manage stress before it affects your work. If under a great deal of stress, communicate that to supervisors. Managers and supervisors who know they have people under a great deal of stress should not assign those people to tasks that are considered high-risk or affect flight-related safety. Here again, is where proper oversight and supervision are critical.

11. Lack of Awareness – is a failure to recognize a situation, understand what it is, and predict the possible results. It would be best to see the whole picture so you do not develop tunnel vision. This is where good pre-assessment, pre-task discussion or brief, post-task “stop, look, listen,” and post-task discussion or debrief are highly critical and helpful to ensure everyone is on the same page and aware. Here is also why it is essential for hangar and line chiefs, QARs, aircraft crew leads and supervisors to constantly be out on the deckplates overseeing what is going on in the hangar and out on the flight line. Most communities are good about having proper oversight on the flight line and flight decks, especially for launches. Still, in mishaps and

on assessments, squadrons tend to be poorly overseeing work in the hangar. This is one of the primary instances when instructions don't cover everything and maintenance managers, supervisors, technicians and line division personnel should be asking, “What is different today? What is different about this specific evolution or task based on the environment it is being conducted in?”

12. Norms – are short for “normal,” or how things are typically done. They are unwritten rules that are followed or tolerated by most of the organization. Harmful norms can detract from established safety standards and cause accidents to occur. Be aware that just because it seems normal does not make it correct. The easiest way to accomplish something may not be the standard. Most procedures are developed by people with a great deal of knowledge and experience and with engineers for aircraft maintenance procedures. Therefore the procedures are designed the way they are and in the sequence they are for a reason. There is an old saying within aviation that you must follow procedures and instructions because they were “written in blood.” Most everything we do in aviation maintenance and flight support has procedures and checklists because something catastrophic happened to prompt their creation.

We all make mistakes. That's human nature. But the reality we face in naval aviation is terribly unforgiving of human error. Even a slight mistake can cause a fatal accident. So, squadron leaders, managers, QARs, supervisors and technicians should be cognizant of human factors and human nature to constantly perform active risk management. Doing so will minimize the likelihood of the Dirty Dozen occurring and causing an error or mishap in your unit. Squadron leaders down to the most junior maintenance technicians need to recognize the warning signs and, most importantly, learn how to avoid their effects. To learn more about human factors in aviation maintenance, read Chapter 14 of the *FAA's Aviation Maintenance Technicians Handbook* and also visit the *FAA Aviation Maintenance Human Factors website* which has numerous resources to help educate and raise awareness to support a more effective safety culture and safety management system. The FAA and civilian aviation industry think human factors in aviation maintenance are so important that they have mandated it as a learning requirement in FAA airframes and powerplants' aviation maintenance technicians' initial training and certification, and they get an annual refreshment on them as well.

*FAA's Aviation
Maintenance
Technicians:
Human Factors*



*FAA Aviation
Maintenance
Human Factors
website*

Having an Effective SMS Sustains Safety Mindset

Aviation Machinist's Mate 3rd Class Bobby Guzman reads the operational risk management list before attaching the rotor blade to an MH-60S Sea Hawk helicopter, assigned to the "Chargers" of Helicopter Sea Combat Squadron 14, in the hangar bay aboard USS Abraham Lincoln (CVN 72).

By Chief Warrant Officer Brian Baker

Over my last several years at the Naval Safety Command (NAVSAFECOM), I have witnessed a disturbing trend within naval aviation maintenance. When performing safety assessments, we find few squadrons promoting safety and educating people on risk management (RM) beyond the bare minimum requirements of required Navy Occupational and Health (NAVOSH) safety lectures. At NAVSAFECOM, we create many products to help you educate your team and remind them why they must perform a good risk assessment and manage the risks properly for each task. Additionally, these products help better risk assessors, risk managers and risk eliminators, therefore, helping your team have a better safety management system (SMS).

Within the maintenance department, this stems from Naval aviation maintenance technicians' basic education on RM, resource management and human factors

and how they all tie together to either produce an effective or ineffective SMS. We are not educating our maintenance professionals on the fundamentals as we should so each person within the maintenance department clearly understands their role. They don't really understand how critical their minute-by-minute actions, on and off duty, are to providing the safest work environment, the highest quality work and, therefore, the most highly reliable naval aviation mission support. The civilian aviation management, maintenance workforce and line support personnel are required to learn about these fundamentals before earning their certifications and refresh on them at a minimum annually. Where we may fail at our primary training, such as "A," "C," "F" and "T" schools, we can make up for it in our individual units if we choose to. Our NAVSAFECOM public and CAC-enabled websites are a great place to get resources to help educate your entire unit and get them actively

engaged in better identifying, managing or eliminating risks, therefore, sustaining a more effective SMS.

COMNAVAIRFORINST 4790.2D, *Naval Aviation Maintenance Programs (NAMP)*, Chapter 10.41, gives an overview of the aviation maintenance safety program. The instruction provides resources to educate, assign responsibilities, outline training beyond basic NAVOSH requirements and provide minimum requirements to help establish and maintain an effective SMS throughout the Naval Aviation Enterprise (NAE). Safety is a byproduct of good RM and good RM must be practiced by all personnel to produce an effective SMS, which in most cases will also help produce an effective quality management system (QMS). All hands within maintenance departments are educated on and take ownership of Chapter 10.41, much like we all are supposed to do with the remainder of the *NAMP*.

There are six fairly consistent issues with Chapter 10.41 in the *NAMP*. First, aviation maintenance safety program managers and ground safety representatives are usually not familiar with nor read the cited overarching guiding instructions to establish and maintain an effective SMS throughout the Navy and how our Navy maintains the occupational safety and health standards our federal government requires. Aviation maintenance and ground safety personnel are expected to read and understand the referenced instructions to apply them within their unit, teach others how to apply them and use them to ensure the entire unit has a sustained effective SMS. All instructions are important, but it is critical to read the relatively new *OPNAV Manual (M) 5100.23*, Change 2. Readers will understand why establishing and maintaining an effective and efficient SMS is crucial to their unit's and our Navy's readiness and effectiveness.

The second most common issue regarding failure to follow the *NAMP* to support an effective SMS is the program manager needing to understand paragraph 10.41.3.2 regarding Safety Stand Down (SSD). In this paragraph, the *NAMP* states, "All maintenance activities must conduct quarterly SSD focusing on operational requirements, performing duties in the work center, and off-duty activities to align with the fleet Safety Management System (SMS) per reference (g)." Thus, aviation units should not only conduct the standard quarterly SSDs to cover overarching themes for off-duty safety, but all units conducting aviation maintenance should also have a SSD to discuss safety-related issues and trends with their actual work. The training should cover topics like negative maintenance quality and safety lapses within the unit that quarter, especially noting trends. Additionally, the top ways aviation maintenance technicians and Line Division personnel are damaging aircraft in their area of maintenance responsibility. For example, at least twice a year, squadron maintenance personnel should train on and discuss the prevention of the top five ways technicians and Line Division personnel are damaging the specific type-model-series aircraft the unit operates or

maintains. This discussion could also include common ways maintenance personnel injure themselves. In the remaining two quarters, the unit can discuss the frequent ways by rate/MOS/work center across NAE technicians are failing to follow the basic maintenance practices for the rate/MOS/work center and conduct training on where they are found in applicable instructions. These discussions should also cover the leading causal factors, the vast majority being human factors. This is an excellent opportunity to educate and keep all maintenance department personnel aware of the leading "Dirty Dozen" human factors of aviation maintenance mishaps and why it is so critical to practice good, effective RM at all levels within the maintenance department. More sources to help educate people on human factors in aviation maintenance that most often lead to maintenance-related mishaps can be found at:

FAA's Aviation Maintenance Technicians Handbook: Human Factors



Human Factors in Maintenance Resources for Mechanics

FAA's Dirty Dozen Human Factors Errors



These sessions can also be used for units to consider purposeful RM practices, whether it's something from a squadron or Wing High Risk Maintenance Evolution local command procedures (LCP) or instruction, or a quick one minute pre-evolution brief/self-check and two minute post-evolution brief/self-check. Related materials can be found at the NAVSAFECOM's poster resources for Aviation Maintenance Checklist, or by referring to:

FAA's Before-and-After Procedure Following Task Cards



Other topics should include changing operational pace, weather, operational

location, shifting of main hours flying and upcoming heavy maintenance not often performed, but this list is not all-inclusive. The key to making this training successful and promoting a successful SMS is it needs to talk about risks that are or will be relevant to the personnel receiving it. Their training needs to resonate with them and make them think about better ways to assess and better manage risks associated with their duties. We have also created some tools to assist with this via our Maintenance Risk Management (MRM) webpage, which can be found on our CAC-enabled site by visiting:

Maintenance Risk Management Presentation



The third most common issue we discover during local area safety assessments is Aviation Maintenance Safety Program Managers (Quality Assurance Supervisors), Aviation Ground Safety Officers, Aviation Safety Petty Officers or those responsible for ensuring safe and quality maintenance and flight line support are not familiar with all of the resources available on our public and CAC-enabled websites. The *NAMP* guides the Aviation Maintenance Safety Program Manager to utilize the CAC-enabled website via paragraph 10.41.5.4, which covers the Program Manager's responsibilities. *NAMP* paragraph 10.41.5.4.e states, "Ensure quarterly inspections of maintenance division, maintenance equipment and facilities are performed utilizing the NAVOSH Safety Walk-Through Checklist on NAVSAFECOM's website:

Aviation Maintenance Best Practices



Discrepancies will be routed to the MO via the QAO for corrective actions by the applicable division." But the *OPNAV Manual 5100.23H*, Change 2, also references using and being familiar with our command websites for resources available within each to help establish and maintain an effective SMS. Due to our

Continued on Page 9 →

topics and data sensitivity, most of our aviation maintenance safety resources are on the CAC-enabled website. As long as you have a CAC, and play a role in aviation, you can request access to our secure website by visiting:

*CAC-Secured
NAVSAFECOM
Website*



To request access, select the “CAC or PIV Certificate” link on the left-hand side of the page, which will bring up a new text box asking why access is needed. The requester should include their aviation unit and the reason for needing access. For example, to help support an effective SMS within the aviation unit attached to or safety is an all-hands effort. Within the next three business days the requester should be granted access to the CAC-enabled website. If there are delays in acquiring access, the requester should contact NAVSAFECOM’s Safety Promotions Directorate by calling (757) 444-3520. Once a user gains access, review both websites to see what resources are there to promote more effective RM and safety management. I would start with the following links:

Aircraft Maintenance



ASO Toolbox

*CAC-Secured Safety
Awareness Products*



The fourth most common issue is the need for more promotion, distribution, reading and incorporation of *MECH* magazine, Safety Awareness products and Aviation Safety Blogs into maintenance training and qualification boards. I often look for copies of *MECH* magazine, Safety Awareness products such as Safety Awareness dispatches, Sanitized Safety Incident Reports (SSIRs) and Aviation Safety Blogs being distributed throughout a unit’s maintenance department. Still, many units tell me they are not receiving

any of the products. This is an area where Quality Assurance and the Aviation Maintenance Safety Program Manager can help by ensuring the Maintenance Department is getting relevant safety promotion material or going to our website to download and distribute them. Present and past issues of *MECH* Magazine are available digitally:

NAVSAFECOM’s Magazines



Some Safety Awareness products and Aviation Safety Blogs are available on our public website:

*Public Safety
Awareness Products*



Aviation Safety Blogs

Still, many of the best aviation operations and maintenance lessons learned and SSIRs are available only on our CAC-enabled website:

*CAC-Secured
Aviation Safety
Awareness Products*



The better units we assess distribute this information in multiple ways, such as having a Maintenance Safety Board next to important command information that most people stop to read, such as watch bills and upcoming unit schedules. These products can also be placed in magazine holders of restroom stall doors and in binders in break areas. Some units also put this type of information on digital large screen display boards and TVs in main passageways. The best units we assess incorporate applicable products as additional PQS required reading and ask questions developed from the product, such as “why do you think we chose that (whatever product) as extra required reading as part of your qualification process? What did you learn?” This offers an excellent opportunity to understand and discuss the candidate’s knowledge of RM and human factors. It also reinforces command and maintenance leadership’s

desire to have an effective SMS, what to do when the individual is unsure or uncomfortable with a task, elements of their job, or someone else’s actions that don’t align with the procedure and good RM. Procedures can also be unclear or do not account for everything.

Personnel in the maintenance department often need to be aware of mishaps and hazards associated with their type-model-series aircraft or job specialty. Maintenance Department personnel should hear about maintenance-related mishaps and hazards at the quarterly training and as soon as an event happens or something HAZREP-related is discovered. This communication among the maintenance community would enable awareness and ensure that similar issues will not occur on the flight line, in the CAG and throughout NAE. Being transparent and sharing our mistakes is associated with the “Get Real” part of the Chief of Naval Operations (CNO’s) “Get Real, Get Better” initiative. We MUST be transparent with our mistakes and “out of the norm” findings to bring awareness and prevent complacency while performing our daily tasks. Sharing the events across the flight lines and quick follow-up discussions at maintenance meetings helps remind people how quickly something can go wrong in our line of work and the possibility of finding something out of the ordinary wrong. Discussing these events helps the reporting unit learn from the mistake to “Get better,” but it can also help the entire air wing and the NAE. Reading the *OPNAV M 5100.23* expands on why this is so important. A training tool to help educate aviation personnel on the importance of sharing mistakes and even “near misses” can be found at:

*Importance of Reporting
Near Misses Training Tool*



Unit Aviation Maintenance Safety Program Managers, Wing Aviation Maintenance Safety Program Advisors, Squadron Safety Department staff and Wing Safety Officers maintaining constant communication can assist. These are also good quick mentions for all squadrons who must dial into



A Sailor tracks the simulated progression of a fire aboard USS Paul Ignatius (DDG 117). U.S. Navy photo by Mass Communication Specialist 2nd Class Hannah Fry

Review Chapters 3-5, 9, 12-13, 24 and 35:

Navy Safety
and Occupational
Health Manual



I have no doubt we would see an improvement both in RM and safety at the unit level and overall at the NAE level by taking the following actions:

- Naval aviation technical training courses should focus on teaching and engraining more of the above practices.
- TYCOMS, Type Wings and MAWs should ensure their subordinate units are using and following the resources above.
- Individual aviation unit leaders should educate themselves as to what a SMS is and why it's important to have a successful one throughout their entire unit.
- All the leaders in each unit should educate their people on using all of the above resources.

Maintenance Operations Center readiness teleconferences. Learning and “getting better” comes from conducting a thorough investigation, root cause analysis and then sharing how the mishap’s Swiss cheese holes aligned, what should have been done differently to keep them from aligning and any other lessons learned from the event. Not having an event at all or reporting and learning from a “near miss” is what we would rather see more of instead of actual mishaps that degrade readiness and pull from our already scarce people and parts resources.

The final common issue that detracts from having a highly effective SMS within many aviation units stems from the lack of compliance with the NAMP, Chapter 10.41.5.1, statement (b) directing Type Wings and Marine Air Wings (MAW) to “Identify and define high-risk maintenance events unique to their T/M/S aircraft and operational environment, such as aircraft moves and dynamic events, and publish Aviation Maintenance Evolution ORM worksheets with the factors listed in reference (d).” The issues we find regarding this stem from Type Wings or MAWs not developing the list for their subordinate units, or they do a very poor job identifying and defining common high-risk maintenance evolutions because they have not looked at mishap trends associated with the type-model-series aircraft they oversee. Also, the squadron maintenance leaders are not ensuring that everyone knows about the Wing or MAW instruction/ LCP/or notice and they are not enforcing purposeful risk assessment and management utilizing some sort of RM worksheet as outlined in the NAMP. Our maintenance-related mishap rates have been increasing for almost a decade now

and, as our aircraft and weapon systems get more sophisticated and expensive, these mishaps take a greater toll on our limited resources and mission readiness. As stated before, our procedures do not account for everything a Sailor or Marine needs to complete every task assigned to them. Therefore we need every technician to ask what is different about today? What is different about this specific maintenance evolution? We need the maintenance supervisors to be assured that the correct technicians or people are involved with the evolution at hand, engaged and clear on their role. All risks have been identified, discussed, and mitigated to prevent the opportunity for a mishap. It is also vital to conduct debriefs so technicians and teams can talk about where improvements can be made for future evolutions and who will ensure those suggestions are taken for action. This is how we support the CNO’s “Get Real, Get Better.” Be mindful that the Type-Wing’s and MAW’s compliance with this is not all-encompassing and purposeful RM must be practiced for everything we do in Naval Aviation. Here again, we have some products to help you with this, as mentioned in the discussion above, for the second most prevalent issue we find. The following links can also provide additional assistance with this shortfall:

Joint Risk
Assessment Tool



Review *MRM Prevention Strategies*, *MRM NSC Mishap Prevention Aides* and *MRM Concepts of ORM* and *TCRM*:

Aviation MRM



Naval Aviation Maintenance MUST get better educated on all of the above and we must support the concepts to improve our operational reliability, as well as our aircraft and personnel readiness, so that we stop wasting our precious resources repairing preventable mishaps while also ensuring we have a more capable and ready Naval air force to protect and assist our nation, our allies, our interest around the world, and keep the world’s sea lanes open for safe travel. When individual units use the above recommendations, they will in turn build a more effective, efficient, and sustainable SMS which will also support a better quality management system as well.

If you have any suggestions for improvements to what we offer to help you in the fleet, or you have RM and safety-related questions, email us. We are to support you and we want to help you have a successful SMS in your maintenance departments and units.

Cryptologic Technician (Maintenance) 1st Class Christopher Shonts performs required maintenance on a belknap pole aboard USS George H.W. Bush (CVN 77). U.S. Navy photo by Mass Communication Specialist 2nd Class Jacqueline Pitts

Fall Protection Deserves Your Attention

By Senior Chief Aviation Machinist's Mate Anil Ramdeen

Falls from heights are a leading cause of work-related injuries and fatalities. They are the leading cause in construction and the second most common cause in general industry. The Department of Navy continues to experience severe fall-related mishaps, which lead to reduced readiness and productivity and high medical and compensation costs and suffering to victims and their families.

Every assessment conducted by the Naval Safety Command has identified numerous fall protection (FP) discrepancies consistent across the aviation, surface and submarine communities. Some examples are: No establishment of a FP program, an established program but not effective, aircraft maintenance stands used by a squadron were designed for different model aircraft, aviation maintainers working on top of a large aircraft without FP gear, loose guardrails surrounding an air traffic control tower house's exterior catwalk and unprotected edges of mezzanine level decks in multiple aircraft hangars.

Mishap reports from October 2021 to October 2022 include multiple injuries from falling off leading edge extensions of fighter aircraft, several instances of service members falling off helicopters, with both models of MH-60s leading the number of incidents, and some instances of Sailors falling off E-2s in the aviation enterprise. In the naval surface enterprise, there are numerous instances of Sailors falling through open scuttles on ships, open hatches not roped off, no sign indicating the hatch was open and no safety chains to prevent the fall.

Personnel who work at heights must be appropriately trained and equipped. Not only is training required, but there is too much room for error and confusion when it comes to a person trying to protect themselves at height without proper knowledge and equipment. Many personnel have died or were seriously injured from fall accidents. Arm your personnel with the expertise and equipment to keep themselves safe.

In *OPNAV M-5100.23*, Chapter 13 provides requirements to establish and manage the FP Program to protect Navy civilians and military personnel from the hazards of falling from heights. Fall protection must be provided to Navy personnel exposed to fall hazards on

any elevated walking/working surface with unprotected sides, roofs, holes or openings from which there is a possibility of falling four feet or more to a lower level. Commands, units and activities must select FP measures compatible with the type of work performed. If fall hazards cannot be eliminated, FP can be provided via the following systems:

-  Guardrail systems for walking/working surfaces with unprotected sides or edges.
-  Work platforms when working from an elevated platform of four feet or higher.
-  Safety nets for when walking/working surface with an unprotected side or edge or when working over water or other surfaces where guardrails are impractical.
-  Personal fall arrest systems to arrest a person in a fall from a working level.
-  Positioning system to allow a person to work with both hands free while being supported on elevated vertical or inclined work surfaces.
-  Restraint system to restrain a person from reaching a fall hazard.
-  Climbing ladder fall arrest system to arrest the fall of a user wearing a full body harness.
-  Covers to place over a gap or open space in a floor, roof, or horizontal walking/working surface with two inches or more in its least dimension.

Falls are preventable. Careful planning, preparation and training lay the necessary groundwork for an accident-free workplace. All FP programs shall consist of a Fall-Hazard survey, fall protection and prevention plan and a fall-arrest rescue plan. The *OPNAV M-5100.23* and the *DON Fall Protection Guide* on the Naval Safety Command website provide additional information and step-by-step instructions on establishing, managing and implementing a FP Program.

For those rare instances when fall protection gear is impractical, i.e., on the flight deck of an aircraft carrier troubleshooting an aircraft that incurred a mechanical issue on start-up for a launch, waivers or exceptions can be requested using the guidelines outlined in the *OPNAV Manual 5100.23H Change 2* in Section B covering Organization and Coordination, Chapter 1, paragraph B0105, which covers alternate standards, deviations and the waiver process. Otherwise, commands should follow the requirements outlined in the *OPNAV Manual 5100.23H Change 2*, which outlines the DON's requirements to meet federal and international occupational safety and health standards to protect our most valuable assets — our people.

BRAVO ZULU

★ SAILORS AND MARINES PREVENTING MISHAPS ★



Mr. Larry Washington and Mr. Shawn Diggs

During a recent aircraft wash, prop wash from Fleet Logistics Support Squadron 62 (VR-62) adversely affected VSE personnel and equipment. The wash rack, located directly behind aircraft parking spot 13A, is routinely used by C-130 aircraft. This placed the wash crew directly in the path of the C-130's prop wash causing maintenance stands to be blown over, sometimes while personnel were still on the stands. Thankfully, no injury to personnel or damage to aircraft was experienced in this scenario.

Mr. Larry Washington and Mr. Shawn Diggs immediately addressed this safety concern to the unit's safety department. With the safety department's coordination, the two led a group meeting with VR-62's maintenance and safety leadership to detect all risks and explore resolutions. Instead of suppressing bad news, their efforts brought to light a deficiency and, in doing so, embraced Commander, Naval Air Forces' (COMNAVAIRFOR) initiative of creating a learning organization.

Bravo Zulu is a naval signal originally sent by semaphore flags and in English, simply means "Well done."



U.S. Navy photo by Mass Communication Specialist 3rd Class Adam Butler



Shocking Search & Rescue

By Senior Chief Naval Aircrewman-Helicopter Erica Gibson

In the summer of 2020, I was a student going through Helicopter Sea Combat (HSC-2), the MH-60S Fleet Replacement Squadron (FRS). It was time to complete our search and rescue (SAR) jumps syllabus event. It was an annual requalification for myself, but for the other seven rescue swimmers on the flight, it was their initial qualification as Category I students. During the jumps, we train and qualify in direct deployment (DD) procedures. During DD, the rescue swimmer deploys from a 70-foot hover via the helicopter's rescue hoist into the water.

I was the first to go in starting our DD procedures. As I was lowered from the helicopter to the water, I felt an initial shock travel through my hands. Then as my fins touched the surface of the water, I felt a huge shock start at my right hand and travel throughout my body exiting out my left foot. When I was hoisted back into the aircraft, I notified the crew chief. As the DDs continued, another swimmer experienced the same type of shock. Following the two incidents of electrical shock within a 15-minute timeframe, I instructed the crew to “knock it off,” and we returned to base.

After we landed, I discovered that shocking during hoisting evolutions was common in the HSC MH-60S community and was

unfortunately accepted as a risk. I was baffled by the experience because I have never been shocked by the other H-60 platforms (SH-60F/HH-60H/MH-60R). I discussed the shocking occurrence with the aircrew leading chief petty officer of the schoolhouse at the time, and we submitted an Aviation Safety Action Program (ASAP) and Hazard Report to ensure proper reporting requirements were met.

Earlier this year, the Search and Rescue Model Manager (SARMM) released SARGRAM Consolidation March 2022, requiring HAZREPs from commands for shock-related incidents. Community leadership knows that incidents are happening, but commands aren't reporting them. Additionally, Naval Air Systems Command (NAVAIR) sent out an Interim Flight Clearance (IFC) (P 290616Z APR21 COMNAVAIRLANT NORFOLK, VA). The IFC authorizes using the Life Saving Systems Hoist Static Discharge (HSD) cable. The cable costs \$89 and is currently used by the U.S. Coast Guard. Did I bother to convince the command to order it knowing this information? No. We were busy with a high OPTEMPO and I went back and forth with the Paraloft, or parachute maintenance facilities, on who would take ownership and maintenance of the cable if ordered. When we had a shocking incident in the command during an overland hoisting evolution, I finally convinced all the stakeholders it



U.S. Navy photo by Mass Communication Specialist Seaman Apprentice Sawyer Connally



U.S. Navy photo by Mass Communication Specialist 2nd Class Jesse Schwab

was time to eliminate the risk. Two separate shocking incidents had occurred during a single evolution. In the first incident, the rescue swimmer felt a painful shock while direct deployed to the deck, having to drop to their knees to fully dissipate the shock. In the second incident, the safety observer was struck by the rescue basket (due to rotor down wash) before it landed on the deck and grounded out. The safety observer felt increasing muscle convulsions 40-60 minutes post-shock. Both Sailors were sent to medical for evaluation.

Medical evaluation, with an electrocardiogram post-shocking incident, is critical. Many sources state up to 2,000 volts of continuous charge are enough to fry internal organs. I recommend watching the video on YouTube of a **U.S. Coast Guard rescue swimmer getting shocked** on the hoist during DD to understand its severity.

View the YouTube video of a U.S. Coast Guard rescue swimmer getting shocked



When performing a hoisting evolution, swimmers are at risk of shock due to the inability to ground out the hoist. The H-60 helicopters are known to continuously generate 15,000 to 20,000 volts of static electricity. No sources currently identify the exact voltage that dissipates from the rescue hoist when grounding out. To prevent our rescue swimmers at HSC-28 from becoming shocked or hurt, we ordered 14 of the HSD cables (one per aircraft) and provided training to the shop by following the IFC

guidance on HSD cable use overwater and overland. Although the cable is a bit of an inconvenience being 10 feet in length and in the way while working with rescue equipment, it is worth every bit of risk mitigation.

Across the naval enterprise, we are put into situations daily that require risk management (RM). We are all familiar with the RM process; still, we, the most powerful global naval force, are failing to “implement controls” and accepting unnecessary risks at the cost of our ships, our aircraft and more importantly, our warfighters. We are normalizing deviation by cutting corners, finding workarounds, accepting the hazardous “norms” and not correctly self-assessing and self-correcting. With deviation comes not meeting our warfighting readiness and not supporting our chief of naval operations’ “Get Real, Get Better” initiative. Who is accepting responsibility for this?

Following due diligence, I have written a SAR Action Item Chit for SARMM to mandate HSD cable incorporation into MH-60R/ MH-60S SAR curtains. In addition to the cable being available to mitigate risks during hoisting evolutions, the chit also mandates educating our community on HSD cable usage and static electricity discharge phenomenon through learning resources such as SAR lectures, wing and squadron SOPs and applicable type/model/series NATOPS. To get to the main culprit and identify the amount of risk taken, a separate action item to test rescue hoist static discharge during hoisting evolutions was also submitted to NAVAIR’s airworthiness website.



No Later Than When? Corrosion Adherence

Aviation Structural Mechanic 2nd Class Vallerie Kim paints a plane fitting in the hangar bay aboard USS John C. Stennis (CVN 74) during a transit through the Strait of Hormuz.

While conducting assessments on squadrons throughout the Naval Aviation Enterprise, Naval Safety Command assessment teams commonly see a failure to document the “No Later Than” date in the system reason block on corrosion treatment work orders.

By Senior Chief Aviation Structural Mechanic Todd M. Brown

In Naval aviation maintenance, there is a never-ending battle to prevent and treat corrosion on aircraft. In fact, *NAVAIR 01-1A-509-1*, Cleaning and Corrosion Control, Chapter 2, paragraph 2.2 states, “As a general rule, maintenance personnel should assume corrosion is ongoing, regardless of visible physical evidence.” Furthermore, paragraph 2.4.1 states, “The prevention and control of corrosion on aircraft and related equipment is a command responsibility. Each command SHALL place special

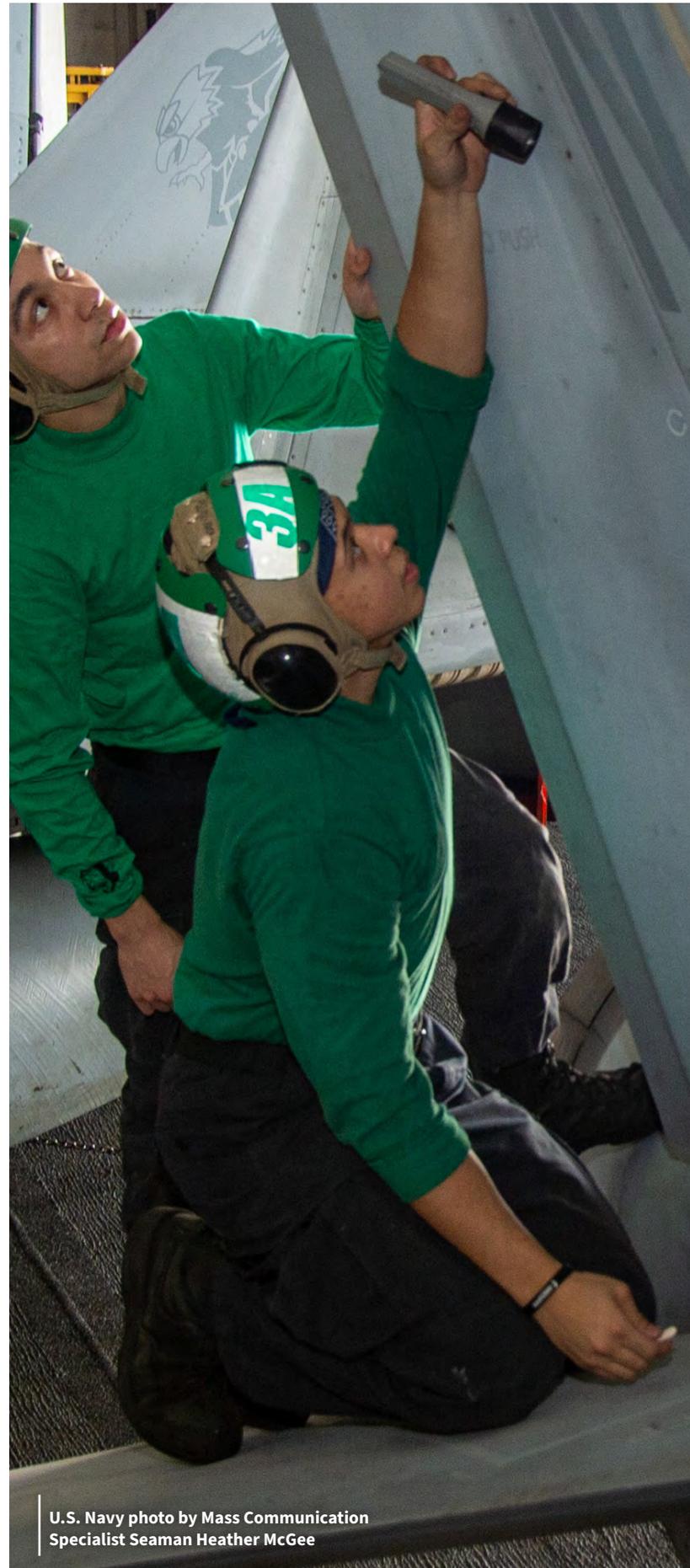
emphasis on the importance of the corrosion control program and lend its full support to ensure that corrosion prevention and control receive sufficient priority to be accomplished along with other required maintenance.” Equally important is ensuring maintenance action forms (MAFs) are written correctly to ensure compliance with Commander, Naval Air Forces Instruction 4790.2D, *Naval Aviation Maintenance Program (NAMP)*.

While conducting assessments on squadrons throughout the Naval Aviation Enterprise, Naval Safety Command assessment teams commonly see a failure to document the “No Later Than” date in the system reason block on corrosion treatment work orders. This is a mandated requirement dictated by *COMNAVAIRFORINST 4790.2D*, Chapter 5, which states, “All inspections, technical directives, forced removals and corrosion treatment work orders must contain the applicable “no later than” date or time annotated in the ‘system reason’ block.” **While this omission may appear a minor discrepancy, it ultimately results in squadrons flying down aircraft.** Within the first 10 minutes or so, at multiple squadrons, we have found aircraft flown with an outstanding corrosion discrepancy that exceeded the 28-day restriction set forth by the *NAMP*. Those overdue corrosion gripes lacked the “No Later Than” date in the system reason block. Ensuring the date is entered helps the work center identify which corrosion gripes should be worked first. The date in the system reason block also allows the individual to sign Safe-for-Flight to ensure no corrosion gripe has exceeded 28 days when screening the Aircraft Discrepancy Book.

NLT 28 DAYS

So, what if the permanent repair or painting of bare metal is not feasible within 28 calendar days? The *NAMP* states “the discrepant area must be cleaned, inspected, and re-protected at least once every 28 days until the permanent repair can be completed. In lieu of work order sign-off or coding the work order as a DOWN discrepancy, an in-process inspection may be entered on the discrepancy work order each time the cleaning, inspection and re-protection action is performed.” Doing this allows the work order to be extended for another 28 days. If this is the route taken until a permanent solution is performed, ensure you update the “system reason” block with the new “No Later Than” date.

While we are becoming more efficient in treating and preventing corrosion, we must also ensure that procedural compliance is maintained from start to finish. Procedural compliance begins with initiating the MAF per the *NAMP* as applicable. Simply adhering to the policy will significantly decrease the number of times an airplane is flown with a down corrosion gripe. Work center supervisors need to ensure that their work center is adequately trained in all aspects of performing maintenance, including proper documentation and “in-process.” If you’re sitting behind the maintenance desk, be sure not to approve a work order that has not been initiated correctly. Instead, call the individual to maintenance control and provide training before approving the MAF. Calling the individual to maintenance control not only educates the individual who initiated the maintenance action form, but that person can also go back and share that information with their work center. In the end, it’s all about being self-aware with the ability to self-assess and self-correct while continually learning to preserve warfighting readiness.



U.S. Navy photo by Mass Communication Specialist Seaman Heather McGee

BRAVO ZULU

★ SAILORS AND MARINES PREVENTING MISHAPS ★



**Aviation Structural Mechanic
2nd Class Samuel Russell**

Aviation Structural Mechanic 2nd Class Samuel Russell, with Patrol and Reconnaissance Squadron (VP 30), was performing a turnaround inspection on aircraft 435, when he discovered a metal identification plate in the port main landing gear wheel well area. Russell notified maintenance control and work center 120 of the found identification plate. After a thorough investigation, the identification plate was matched to a hydraulic line in the vicinity of the wheel well that was missing. It was concluded that at some point in flight, the plate may have been dislodged. Due to Russell's actions and follow through, a potential mishap was avoided.



**Aviation Electrician's Mate
2nd Class David Velez Castello**

While performing the duties of Flight Line Security Rover, Aviation Electrician's Mate 2nd Class David Velez Castello was checking the security of aircraft 169555 when he heard a hissing noise coming from the No. 3 main landing gear tire. Velez Castello immediately notified maintenance control. Thanks to Velez Castello's quick action, maintenance control initiated further investigation where it was determined the damaged tire had been recently installed on the aircraft but the damage was undetectable at the time of the tire change.

Bravo Zulu is a naval signal originally sent by semaphore flags and in English, simply means "Well done."

Let's Your Lithium Batteries

By Senior Chief Aviation Electrician's Mate Russell G. Gross

Traveling around the country performing safety assessments, we have noticed a common training deficiency in the battery safety program. More specifically, the need for knowledge in the fleet about the NAVSEA S9310-AQ-SAF-010, the Lithium Battery publication.

Lithium batteries are extremely dangerous and have special handling, storage and disposal requirements to decrease their volatility and make them safer.

However, during our assessments, the program manager often needs to become more familiar with the requirements within the publication for their specific type/model/series aircraft and region of duty. When we assess squadron avionics work centers and speak with the battery safety program manager about which work centers use lithium batteries, we often get the "deer in the headlights" look. Often, the reason we get this response is because the program managers do not know who is responsible or what gear uses lithium batteries. Lithium batteries are frequently used in avionics equipment, such as backup power, life support radios and night vision goggles used by aircrew and aircraft pilots. We also often get this response because the program managers are not fully aware of the storage requirements. Lithium batteries must be separated between "New," "Used for Reuse" and short-term "Used for Disposal." This distinction is important for program managers to know so they are not placing used lithium batteries in equipment that requires new batteries.

Typically, when I discover these discrepancies while talking with the program manager, it's not a lack of "buy-in" to the program but a lack of training. So many publications now have cross-locator sheets in the publication binder that gets looked at for inspections, but the program managers seldom go to the link and read the entire publication. This is the new trend for most referenced publications and instructions that aren't readily available in physical print format. When the actual publications used to be in the program manager binders, program managers were much more familiar with all elements of their programs. The publication gives specific guidance on these batteries' proper storage, handling and disposal requirements. These batteries are considered HazMat and must be disposed of accordingly. Lithium batteries present an explosion hazard; therefore, they cannot be stored in a container with other types

of batteries. They also must be stored separately as “New,” “Used for Disposal” or “Used for Reuse.” Batteries must also be stored in separate packaging with both terminals covered and secured. Storing multiple loose lithium batteries in a container creates a fire and explosion hazard. Bare terminals can cause batteries to short, overheat and explode. Strict adherence to proper disposal and storage regulations cannot be overstated.



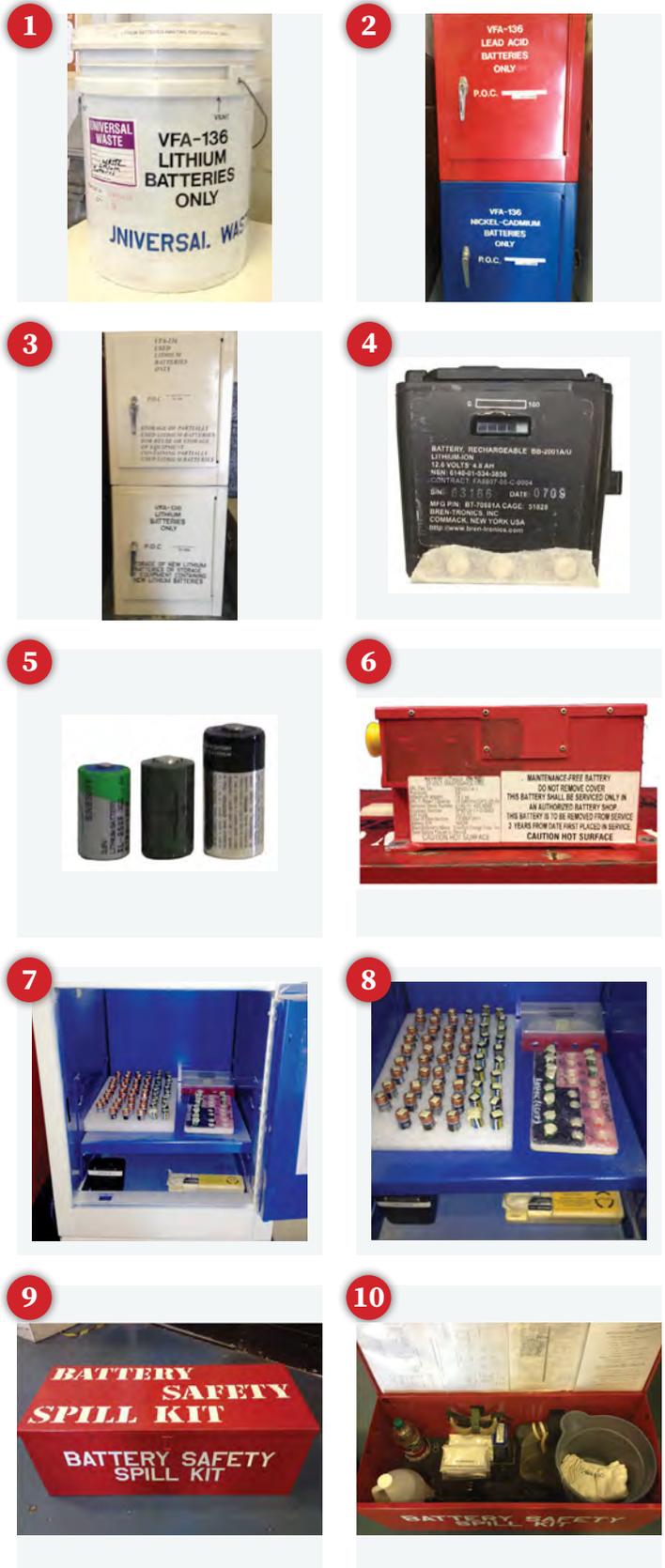
U.S. Marine Corps photo by Yoshie Makiyama

Marines and civilians visit an environmental facility where the guide shows them a lithium battery that exploded in the disposal pick-up track.

As a battery safety program manager, it is crucial as the command’s contact you not only familiarize yourself with the program requirements and regulations, but you take the time to properly train the work centers in your command how to properly handle, store and dispose of lithium batteries. It is also essential that your relief is appropriately trained and knows the correct publications to keep our greatest asset, our people, safe.

Batteries: Do you know proper care, storage and disposal?

1. Lithium battery waste storage
2. Lead acid and nickel-cadmium battery storage units
3. Storage units for lithium batteries. Used lithium batteries should always be stored separately from new lithium batteries
4. PRG-7 radio battery
5. Assorted lithium batteries
6. Aircraft battery
7. Open lithium battery storage
8. Close-up of storage unit, showing contacts of batteries covered
9. Battery safety spill kit
10. Inside battery safety spill kit



Learn more about lithium battery fires from our Safety Awareness team



Lightning Doesn't Strike the Same Place Twice

By Gunnery Sgt. Alex S. Thomason

U.S. Navy photo by Mass Communication Specialist 2nd Class Zack Guth

Everyone has probably heard the age-old saying that “lightning doesn’t strike the same place twice” or “when thunder roars, go indoors” from your parents or grandparents when you were kids. Some may have asked why and some just heeded the warning, doing as they were told. Those who asked why may have gotten an explanation or a “because I said so.” As a maintainer, you may get a similar response from your leader when encountering lightning or a thunderstorm aboard an air station or ship. Is there truth in each of these sayings? What do they mean?

The answer is yes and no. Yes, it is advised to go indoors when you hear thunder. If you hear thunder, you are close enough to the storm to be struck by lightning. A typical thunderstorm is approximately 15 miles in diameter and can last on average 30 minutes. Thunderstorms are dangerous because every thunderstorm produces lightning, despite its size. These storms also often occur with associated dangers like tornadoes, straight-line winds that can exceed 125 mph and cause destruction equal to a tornado, flash floods, hail that can be larger than a softball and fall at speeds faster than 100 mph and wildfires or injuries caused by lightning. Damaging winds such as straight-line winds, downdrafts, macrobursts, microbursts, downbursts, gust fronts, derecho and haboobs

associated with thunderstorms are most dangerous to the aviation community.

What is the difference between a microburst and straight-line winds? During a microburst’s relatively brief lifespan, wind speeds can be comparable to an EF-3 tornado or Category 4 hurricane, whereas while straight-line winds are different than tornadoes, they can cause just as much damage. A microburst is a localized column of sinking air (downdraft) within a

lead to evaporation cooling (sinking air), therefore weakening the updraft. Once this occurs, it can no longer hold the large core of rain or hail up in the thunderstorm. As a result, the core plummets to the ground and it spreads out in all directions as it hits the ground. The location where the microburst first hits the ground experiences the highest winds and most significant damage. Wind speeds in microbursts can reach up to 100 mph or even higher, equivalent to a tornado. Winds this high can cause major

damage to aircraft, other structures and level trees.

A macroburst is an outward burst of strong winds at or near the surface with horizontal dimensions larger than 4 kilometers (2.5 miles) and occurs when a strong downdraft reaches the surface. To visualize this process, imagine how water comes out of a faucet and hits the bottom

of a sink. The column of water is the downdraft and the outward spray at the bottom of the sink is the macroburst. Macroburst winds may begin over a smaller area and then spread out across a wider area, sometimes producing damage like a tornado. Although usually associated with thunderstorms, macrobursts can occur with showers too weak to produce thunder.

A gust front is the leading edge of rain-cooled air that clashes with warmer thunderstorm inflow. Gust fronts



U.S. Navy photo by Mass Communication Specialist 2nd Class Kyle Carlstrom

thunderstorm and is usually less than or equal to 2.5 miles in diameter. Microbursts can cause extensive surface damage and, in some instances, can be life-threatening.

What causes a microburst? It all starts with the development of a thunderstorm and the water droplets or hailstones being suspended within the updraft. Sometimes an updraft is so strong it suspends large amounts of these droplets and hailstones in the upper portions of the thunderstorm. Many factors can

are characterized by a wind shift, temperature drop and gusty winds ahead of a thunderstorm. Sometimes the winds push up the air above them, forming a shelf cloud or detached roll cloud. A derecho is a widespread, long-lived windstorm associated with a band of rapidly moving showers or thunderstorms. A typical derecho consists of numerous microbursts, downbursts, and downburst clusters. By definition, if the wind damage swath extends more than 240 miles (about 400 kilometers) and includes wind gusts of at least 58 mph (93 km/h) or greater along most of its length, the event may be classified as a derecho. A haboob is a wall of dust pushed out along the ground from a thunderstorm downdraft at high speeds.

Unfortunately, over the last few years, the Navy and Marine Corps have had to learn the hard way that it is essential to take severe thunderstorm warnings and lightning within five miles seriously!

Another misunderstanding is the different warnings associated with lightning and thunderstorms. Basic guidance on readiness conditions is contained in *OPNAVINST 3140.24F*, Adverse and Severe Weather Warnings and Conditions of Readiness. More specific guidance can usually be found in amplifying local instructions. There are four thunderstorm conditions: Thunderstorm Watch (T2), thunderstorms with winds below 50 knots or smaller hail expected to develop within 25 nm of the station within six hours; Thunderstorm Warning (T1), thunderstorm with winds below 50 knots or smaller hail expected within 10 nm of the station or expected within one hour; Severe Thunderstorm Watch (Severe T2), severe thunderstorm with winds above 50 knots, hail larger than one inch or tornado activity expected within 25 nm of the station or expected within six hours; and Severe Thunderstorm Warning (Severe T1), severe thunderstorm with winds above 50 knots, hail larger than one inch or tornado activity expected within 10 nm of the station or expected within one hour.

Warnings indicate imminent danger to life and property to those in the storm's path. Lightning Warning (L10):

Lightning with thunderstorms within 10 miles. All ordnance operations shall terminate when lightning is within 10 miles. Lightning Warning (L5): Lightning with thunderstorms within five miles. All outdoor airfield operations shall terminate when lightning is within five miles.

A Severe Thunderstorm Watch tells you when and where severe thunderstorms are likely to occur. Watch the sky and stay tuned to NOAA Weather Radio, commercial radio or television for information. A Severe Thunderstorm Warning is issued when spotters have reported severe weather or it is indicated by radar. Unit duty officers should receive calls and get base alerts when the conditions mentioned above are expected, but units, especially unit maintenance leadership, should do their own diligence and keep track of what the weather is expected to be like throughout their shift and prepare the next shift for success as well.

States; approximately 300 injuries and 100 deaths are associated annually with lightning strikes in the United States. The odds of being struck by lightning in a given year are less than one in a million and almost 90% of all lightning strike victims survive. The odds of being struck multiple times are even less, with the record being seven times in one lifetime. From 2006 through 2021, 444 lightning strike deaths occurred in the United States.

View map of
Lightning Deaths in
the United States



An interesting fact most people don't know, about one-third of lightning injuries occur indoors. Even more alarming, more than one-half of lightning deaths occur after a thunderstorm has passed. Although lightning affects all regions in the United States, the Southeastern states are most at risk.

 <p>Thunderstorms No severe* thunderstorms expected Lightening/flooding threats exist with all thunderstorms</p>	 <p>3 - Enhanced (ENH) Numerous severe storms possible More persistent or widespread, a few intense</p>
 <p>1 - Marginal (MRGL) Isolated severe thunderstorm possible Limited in duration or coverage or intensity</p>	 <p>4 - Moderate (MDT) Widespread severe storms likely Long-lived, widespread and intense</p>
 <p>2 - Slight (SLGT) Scattered severe storms possible Short-lived or not widespread, isolated intense storms possible</p>	 <p>5 - High (HIGH) Widespread severe storms expected Long-lived, very widespread and particularly intense</p>

* The National Weather Service (NWS) defines a severe thunderstorm as measured wind gusts to at least 58 mph, or hail to at least one inch in diameter or a tornado. All thunderstorm categories imply lightning and the potential for flooding. Categories are also tied to the probability of a severe weather event within 25 miles of your location.

Adapted from the *Understanding Severe Thunderstorm Risk Categories* NWS Graphic

About 40 million lightning strikes hit the ground in the United States annually. Each of them have the potential to cause serious injury and death. After flooding, lightning is the second leading cause of weather-related deaths in the United

States. Lightning generally decreases from the southeast to the northwest, except for a few places, such as the Rocky Mountains, where thunderstorms occur regularly during the summer. Florida, Texas, Colorado, North Carolina, Alabama,

Continued on Page 21 →

Arizona, Georgia, Missouri, New Jersey and Pennsylvania have the most lightning deaths and injuries. Florida is considered the “lightning capital” of the country, with more than 2,000 lightning injuries over the past 50 years. Since 2006, only five states (Alaska, Delaware, Hawaii, New Hampshire and Washington) and the U.S. Virgin Islands have reported no lightning deaths.

View graph from the National Weather Services on U.S. Lightning Fatalities from 2012-2022



Coincidentally, U.S. military personnel are a potentially high-risk population for lightning-associated injury and death because military training and operational activities occur outdoors in all weather conditions and within areas of the country with high lightning-associated morbidity and mortality. Identifying features common to lightning strike victims can be used to focus prevention efforts. Persons with outdoor exposure during active military service should be aware of approaching severe weather. They should take reasonable precautions to protect themselves and their fellow Soldiers, Sailors, Airmen and Marines.

main and tail rotor blades, to structural dents and punctures in the airframes from flying debris breaking off the overturned helicopters. No one was injured during the storm and the Navy is still trying to repair the aircraft damage. A severe thunderstorm warning was given for Norfolk before the microburst and damage to the aircraft. Residents reported winds reaching 60 mph, but obviously winds on the flight line reached higher than that because two 30-plus ton MH-53Es were moved around and one blown over like they were plastic lawn chairs. Only a few weeks before the Norfolk incident, a Navy F/A-18 Super Hornet jet was blown overboard off the aircraft carrier USS Harry S. Truman in the Mediterranean Sea. The Navy cited heavy rains and intense winds as the culprit. In July 2017, one Marine aircraft maintenance technician was declared brain-dead and another recovered after lightning struck an MV-22 Osprey at Marine Corps Air Station New River in North Carolina. According to local weather reports, there were thunderstorms that day around noon that continued into the afternoon. The two Marines were struck by lightning while trying to wrap up maintenance on aircraft out on the flight line after

his injuries from the lightning strike. This mishap could have been much worse because four other people were working on the aircraft at the time of the lightning strike. In July 2022, one soldier was killed and nine others were injured when lightning struck during a midmorning military training exercise at Fort Gordon Army Base in Augusta, Georgia. The soldiers were at an annual training event for medical units to refine their processes and medical skills in the field and stressful environments. This is one example from the 14 lightning strike fatalities the United States sustained in 2022. As unpredictable as weather events are on an increasing scale, we in the military must be prepared if one of these phenomena happens where we are training or operating. We must ensure we take weather threats seriously and take appropriate measures to prevent mishaps associated with significant weather events. Most of the incidents mentioned above were preventable had the proper people been paying attention to the weather they could see and reports coming in for the surrounding area. Remember, there are real lightning threats at the very outer edges of the storm, whether out in front, well off to the side or behind the thicker and darker clouds that can be seen in the distance.



U.S. Navy photo by Chief Warrant Officer Brian Baker

During the past couple of years, U.S. military services have experienced some casualties to Mother Nature’s wrath. Nine helicopters assigned to Virginia’s Naval Station Norfolk were damaged in a storm in July 2022. Damaged aircraft included the MH-60 Seahawks and MH-53E Sea Dragons. It was confirmed nine helicopters sustained damage while on deck at the airfield during a severe storm in the area. Known damages to the aircraft span from aircraft being turned over on their side, to broken

T1 had been issued, but before L5 was issued because the fatal lightning strike happened to be one of the first two that occurred within seconds of each other that drove the L5 warning. When L5 is announced, personnel must expeditiously stop what they are doing and exit the flight line to get to a presumed safe place indoors due to the significant risk associated with working outdoors when lightning is occurring within five miles of the flight line. After a week of treatment, the Marine succumbed to

Since before Benjamin Franklin flew his kite with a key attached to a string, we have been fascinated with lightning and thunderstorms. Lightning strikes are unpredictable. Our responsibility is to ensure our brothers and sisters are safe if lightning strikes are probable with imminent thunderstorms. The best detection methods are only helpful if the information is not disseminated immediately. Standing operating procedures need to be in place at operations centers, range control or with the staff duty officer (whoever is designated as the responsible party) for lightning hazard notifications. Most installations already have some form of notification procedures, telephonic or tactical radio, which can be easily adapted to lightning warnings. Features of notification should provide positive real-time verification of message receipt and provide backup or alternate means of notice. Recreational activities, like golf

courses, should also be notified when lightning threatens. Being prepared is one thing, and proper training on the different warnings associated with storms, as listed above, is another in preventing injury or death.

What should you do if you, someone you know, or someone in your proximity is struck by lightning? Below are steps you can follow in such an event.

- Call 9-1-1 as soon as possible and relay your location and as much information as possible.
- Check for breathing, heartbeat, pulse and other injuries such as burns. If breathing has stopped, begin mouth-to-mouth resuscitation.
- If there is no heartbeat, begin CPR if qualified to do so.
- If a pulse is weak, watch closely, and administer mouth-to-mouth resuscitation or CPR if breathing or heartbeat stops.
- Be aware that other injuries may be present such as burns, neurological injuries, broken bones, and/or vision and hearing loss.
- Continue care until help arrives.

Education and preparation are essential to achieving lightning safety. When ensuring you are prepared for these anomalies, a lightning safety plan should be made. Lightning safety plans typically include the following information:

1. When loud thunder is heard, the danger from lightning is very near to you. Lightning's high temperature explodes the surrounding air. This always creates thunder.

2. Immediately tell others the environment is dangerous and everyone should immediately go to safe locations. Safe locations are:

- Fully enclosed vehicles that are grounded by some type of rubber tread and all windows and doors are closed.
- Large permanent buildings (stay away from running water faucets, electrical outlets and land phone lines due to electricity from the lightning that can travel through these conductors).

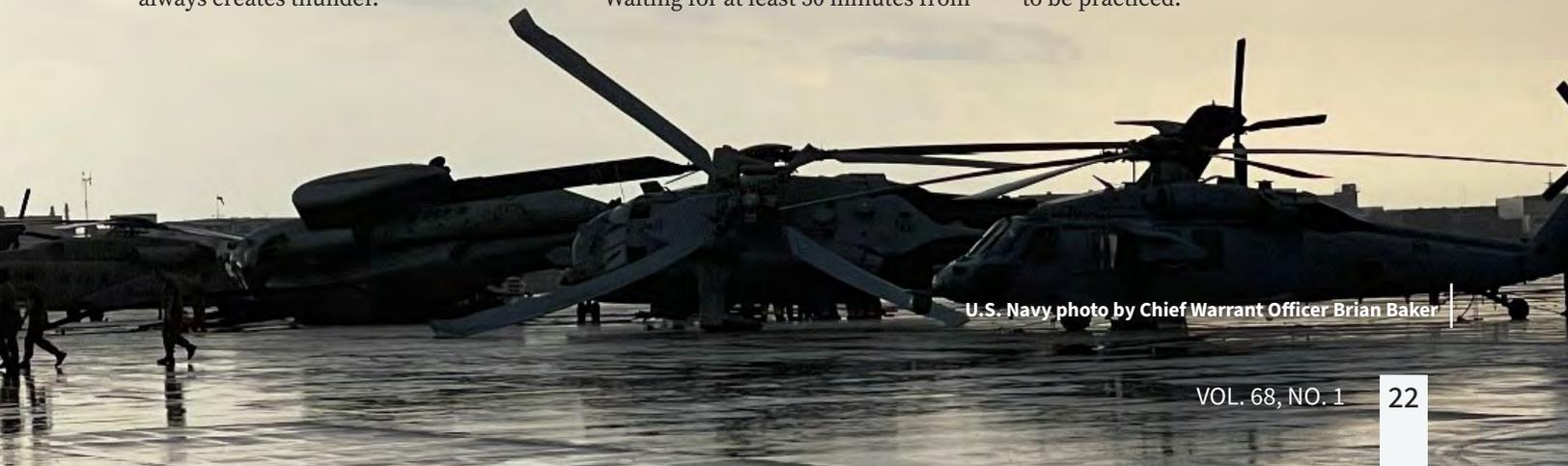
3. NO PLACE OUTSIDE IS SAFE. Avoid being near any metal objects, including fences, machinery, electrical equipment and even aircraft. Avoid solitary trees. Any objects that may produce a metallic upward projection, such as tools or rifles, should be removed and placed horizontally on the ground nearby. Any weapon placed on the ground nearby should be cleared per local procedures before placing it on the ground. Avoid water, open fields, small rain or sun shelters and gazebos. Avoid using the telephone or touching appliances (portable radios and cell phones are safe to use). Move people at least 50 feet away from antenna masts and poles during lightning storms. If unable to take shelter, personnel should move to the lowest spot possible and crouch with feet close together. Groups of people in open or forested areas should disperse to minimize the possibility of multiple injuries from a single lightning strike.

4. When is it safe to go back outside? Waiting for at least 30 minutes from

the last observed lightning or audible sound of thunder before resuming outdoor activities is suggested.

5. People who have been struck by lightning do not carry an electrical charge and are safe to handle. Apply CPR immediately if you are qualified to do so. Get emergency help promptly.

Remember this hazardous weather safety message and teach it to others: "If you can see it (lightning), flee it; if you can hear it (thunder), clear it." Lightning and thunderstorms are a great adversary to maintainers and crewmen alike. We must give them the respect and caution they are due. Education and preparation are essential to achieving lightning safety. A general understanding of these dangers and how to prepare for them will help keep you and your fellow service members safe and alive, the ultimate goal for any leader of any command leader. Unit leaders can also help mitigate risks by not expecting maintenance to be conducted outside under T1 and T2 conditions that cannot be stopped immediately and ensuring all maintenance personnel are in a safe location before the real danger arrives. All aircraft outside on a flight line or on a flight deck should be properly secured for the high winds and severe weather conditions at a minimum when T1 is announced or is imminent. Aircraft like the V-22 in 2017 should be brought inside to be worked on or the maintenance, aircraft move, aircraft servicing or inspection should be delayed when severe thunderstorms are forecasted, especially in any training or non-combat environment. Safety and well-being of personnel and equipment are paramount in non-combat operations and these times call for the best risk management to be practiced.



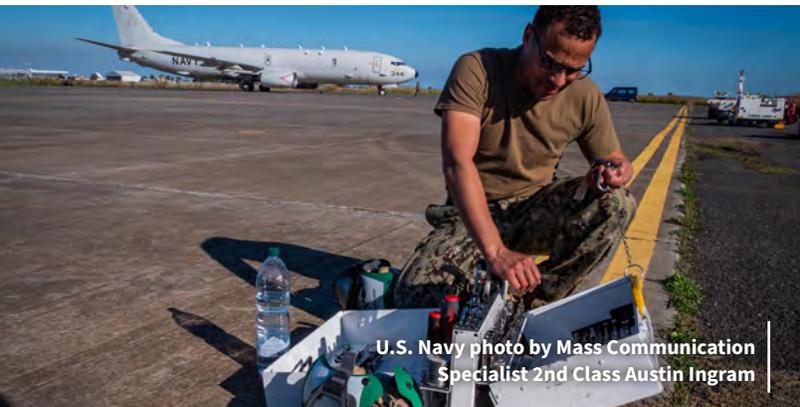
U.S. Navy photo by Chief Warrant Officer Brian Baker

Tools & Tricks of the Trade

By Senior Chief Aircrew Survival Equipmentman William S. Morgan

All aviation maintenance personnel must use tools to service, inspect, troubleshoot and repair aircraft and support equipment. For some technicians, this may be the first time having encountered such a wide range of tools and learning their uses. Others may be quite experienced with these gadgets and can hit the ground running. Whether you are the former or the latter, likely you have never encountered a tool control program (TCP) such as the Navy and Marine Corps' aviation communities maintain.

A TCP can appear overwhelming and confusing if not introduced to it and trained by a veteran of the program. Admittedly, there are several components of the TCP, but they all work collectively to serve an overarching purpose: to ensure we have the right tools for the job while maintaining accountability of each to minimize the chance of introducing foreign object damage (FOD) to an aircraft.



Adhering to the TCP requires purposeful, meticulous and consistent attention to detail. There must also be a certain level of pride taken in a work center's adherence to the TCP. Without these characteristics, there is room for error or neglect that may result in a mishap. Additionally, one may view certain areas of the TCP as a grey area and feel there is room to implement their own innovative concepts. At the Naval Safety Command, we have the opportunity to travel around and observe some TCP best practices and areas for improvement. To raise awareness of poor trends and allow for improvements fleet-wide, I will share some of the more common examples of issues found on 80 of our last unit assessments.

Unauthorized toolbox modifications - A tool that will not stay in place can be quite a headache. No one wants to continuously disassemble toolboxes to retrieve these pesky items. A simple solution might be to tape or safety wire the toolbox so the tool stays in its designated home. No! This is not authorized and may introduce FOD. Instead, submit a deviation request to reconfigure the toolbox by attaching a clip, Velcro, or aluminum to keep the tool in place.

Incorrect tool containers annotated on Maintenance Action Forms (MAFs) - This is especially simple but a common inconsistency. Take your time and check each other. Take the time to document the correct tools on the MAF to ensure accountability. Remember, the TCP works collectively!

Toolbox documentation is inaccurate - Tool container shortage lists and inventory lists are misused or neglected. Again, this contributes to the inability to properly account for each item. Items unsuitable for etching and multi-piece tools must be identified on the inventory lists. Shortage lists are a continuous work in progress. The shortage lists must be updated as inventories change due to worn or broken tools. Correspondingly, shortage lists must be updated as tools are replaced. Ensure this happens with each "all tools accounted for."

Consumables are not accounted for - Just because they are consumables does not mean items such as safety wire, electrical tape, razor blades and acid brushes do not necessarily present the same FOD hazard as other tools. These items must be accounted for by the issuing and receiving custodian.

Multi-piece tools are not peened, welded or locked into place - This makes accounting for multi-piece tools more difficult and adds to the potential for FOD. Similarly, when tools are broken, the missing pieces must be treated as missing tools. Everyone should be aware of the multiple parts that make up each multi-piece tool.

Use the right tools for the job - If you do not have the right tools with you, you are more apt to use another item outside of its intended use. This contributes to added wear and tear of the tools and FOD. If you are unsure, ask. If there is a correct tool that your work center does not have but needs, submit a TCP change request to get the correct tool added to your work center's TCP.

These are a few observations as Naval Safety Command assessors makes their rounds. Each inconsistency is a simple fix but requires purposeful, meticulous and consistent pride in ownership of tools and their containers. Adhering to the TCP is one of the most commonly inspected line items on multiple inspections for a good reason. A work center that adheres to the TCP and takes pride in it is easily observable. Aviation maintenance production is not only the application of tools to materials but logic and accountability put to work. Let's continue to check each other and maintain focus on the basics. The Naval Safety Command is a resource intended to help; reach out with any questions or concerns.



Air Systems Electromagnetic Interference Corrective Action Program

By Gunnery Sgt. Louis R. Tiberio

As an avionics safety analyst, I travel to different military installations and perform assessments. During an assessment, I had the pleasure of sitting in an electrostatic discharge/electromagnetic interference (ESD/EMI) class with an Air Systems Electromagnetic Interference Corrective Action Program (ASEMICAP) instructor. I have been an avionics technician for over 17 years, and I've never had a class with a fleet support specialist (FSS) from ASEMICAP. It was one of the most informative classes on ESD/EMI that I had ever attended. The experience got me thinking, outside of our ESD program managers, what do maintainers know about ASEMICAP and the training and resources it can provide us?

What is ASEMICAP and what do they do?

Per the ASEMICAP website, "ASEMICAP is a Naval Air Systems Command (NAVAIR) program within the Electromagnetic Environmental Effects (E3) Division (E3 Engineering), focused on reducing EMI effects on Navy and Marine Corps assets while elevating the overall level of fleet E3 awareness through one-on-one deck plate interactions. The ASEMICAP provides E3 support to the fleet and NAVAIR team to ensure in-service naval aviation mission capability is not degraded from operating in the electromagnetic environment of today's battle field. Our emphasis continues to be immediate response to the fleet in the engineering of solutions to EMI in operational aircraft systems

and equipment and increasing the awareness of Sailors and Marines to the effects of EMI on aviation operations."

The ASEMICAP provides training through their *CAC-enabled website*. One example of material that the ASEMICAP offers is training presentations that you can download while performing annual ESD training within your squadron. The ASEMICAP also has a FSS who travels to units throughout the fleet and provides ESD/EMI training along with technical support.

The *COMNAVAIRFORCES Instruction 4790.2D* recently brought EMI into the ESD program. The ASEMICAP allows the fleet to report EMI problems and maintains a database where the fleet can view current and resolved EMI problems. What's even nicer, EMI/ESD program managers can pull recent reports on EMI problems specific to the type/model/series aircraft they work on.

The ASEMICAP is a robust program whose members are here to support the fleet. Their value to Sailors and Marines is under-realized and used and the program is still scratching the surface. As an avionics community member, I implore you to reach out to one of the ASEMICAP FSS' to provide training to your avionics technicians. Knowledge is power and the ASEMICAP's team of highly trained and experienced professionals are the leading experts on ESD/EMI, so use them to expand your understanding of ESD and EMI.

ASEMICAP
CAC-Secured
Website



U.S. Marines Sgt. Chase Schmidt (left) and Cpl. Jacob Worshan set up an antenna during a long distance, high-frequency communications training event held on Camp Schwab, Okinawa, Japan. This training between 1st and 3rd Marine Division allowed both units to train in HF communications over the Pacific Ocean. The training helps the units maintain a low electromagnetic signature that is virtually impervious to meaconing, jamming and interference, which allows for distributed operations without detection in the operating environment.
U.S. Marine Corps photo by Lance Cpl. Christian Ayers

Communication is Key to Success

By Staff Sgt. Michael Kelly

How often have we heard the phrase “I was not told that” or “nobody knows what is going on?” We hear these types of phrases often, which can cause a maintenance department to fail, lead to delays and most importantly, cause safety concerns because risks were not communicated. In many situations within a maintenance department, we become busy or distracted. In certain situations, we feel it is unnecessary to relay every piece of information we have up or down the chain of command. Thorough communication is imperative both horizontally as well as vertically. As information is passed, it is vital that it is shared across all supervisors and amongst the ranks, so a situation doesn’t arise where someone can say they were not aware. As a unit, we tend to create bonds within the ranks and between divisions or shops. These bonds can be positive and negative. These bonds are a great way to expand the communication routes amongst Sailors and Marines, but sometimes these groups know things that everyone should know. Still, the groups hold the information closely or assume everyone else knows.

When checking into a new unit or even just visiting a unit, you can usually tell within the first few days as to how well communication is throughout the unit. Much of this reality can be gathered by talking with junior personnel within the command. During my time visiting various units, communication was one of the most significant topics discussed. One of the first questions asked is, “Do you have a clear understanding of everything

going on and do you know the plan and priorities of the day?” For the most part, they do. However, if you dig deeper into what is happening, they tend only to know what’s on the surface. Many of them lack understanding of “why” certain things are done or “why certain things are done a certain way,” like aircraft maintenance. This is where assessors, new personnel and anyone asking the question typically hear the famous phrase, “This is how it has always been done.” When I hear that phrase, it gives me the impression that communication

in the unit. One of the issues I have seen is that even before the meeting is over, maintainers are already lining up for the FOD walk-down. I understand a lot needs to be done before the flight schedule, and using time efficiently is crucial to success. However, with the delay and the maintenance department already ready to work, how much information is being passed once the FOD walk-down is over? From my experience, not much other than what pertains to the “known” maintenance that day. Even then, if the flight schedule is about to begin, it then

becomes a running pass-down from the meeting. The lack of clarity and this running pass-down is where delays come into play. You then start to have maintenance control call the shops to get the status of certain jobs, but with all the rush and different tasks going on, supervisors may forget to assign

a maintainer to complete this task. It’s usually the smallest of tasks can create the most extensive delays, such as sending out a wing walker to move an aircraft or having someone sign for parts to begin a job that was meant to take half a shift but now won’t be done until the end of shift. All these delays can create a backup where those aircraft may be needed for night flights. These communication lapses start building up, putting units behind and adding risks such as rushing, stress and lack of awareness, which can easily lead to a mishap.

An open line of communication within the unit helps achieve a healthy, safe and productive workplace. We strive



U.S. Navy photo by Mass Communication Specialist 3rd Class Caylen McCutcheon | U.S. Navy Sailors direct an F/A-18E Super Hornet from the “Kestrels” of Strike Fighter Squadron (VFA) 137.

amongst the ranks is at the bare minimum and don’t ask questions about why something is done a certain way. When managers, supervisors and quality assurance representatives within a unit answer questions in this manner, they begin to create a climate for failure and lack of trust within the command.

Each morning, units hold daily maintenance meetings where the plan of the day is discussed. Then at the end of the meeting, any information that needs to be passed, not regarding maintenance, is relayed. This meeting is an excellent opportunity for everyone to be on the same page and allow the flow of communication to come from the leadership to the most junior person

to achieve safety daily by continuously practicing and improving different methodologies that help achieve that daily goal. Good communication is one of the critical pillars that creates a solid foundation for success within any unit. When an organization keeps a good line of communication open, it provides a better means to identify risks and develop an approach to implement methods to prevent injuries and accidents. One of our greatest assets to a successful squadron is the junior Marine or Sailor; they are at the ground level of mission execution daily, and they are a vital element of the mission being executed successfully. If these junior personnel do not feel comfortable coming forward with specific issues, those units fail at optimal safety and mission execution. There are many situations where the junior ranks are not included or heard in the conversation to make a squadron better and safer. Often, it shows when we converse with the junior ranks in units where communication is poor. By creating open and good lines of communication throughout an entire organization, those open lines of communication can accelerate a unit to become safer, more efficient and more effective, and the quality of the culture in that unit will increase.

We often overlook the importance of communication and how it can truly make the workplace a better place. I also believe that we can overcomplicate the art of communication. For some people, it can be that they don't want to let specific individuals have too much information and just let out the bare minimum. This is understandable since our world is constantly changing, especially regarding military operations. Sometimes we truly don't understand the plan until right up to the minute it needs to be executed. There are many techniques to enhance our communication. Ultimately, it starts with trust throughout the unit and understanding that no matter if you are the highest or the lowest rank, the line of communication will always be open and without repercussion.

Another day executing the flight schedule, another pre-flight. Theoretically, a pilot shouldn't even have to pre-flight the aircraft. That is if we can assume maintenance is done by the book, adheres to strict procedural compliance and all tools and material are accounted for. However, we're all human, mistakes are made and it's always good to have an extra set of eyes on the aircraft. In naval aviation and HSM-35, we don't preach a zero-defect mentality because we know it's unrealistic. Still, we do preach maintenance by the book, with the book open, sound risk management (RM) and procedural compliance. One can assume the maintenance being conducted before this particular flight was done by the book, with the book open and completed correctly. Another flight schedule, another pre-flight, right? Well, it doesn't always happen that way.

When I was informed the crew was walking to the aircraft to pre-flight, I grabbed my tools and headed to the flight line to stand by for any gripes. If there are gripes, which usually are mostly minor, they're typically corrected on the spot, communicated to the aircrew and we all move on. While the pre-flight was commencing, I was informed the aircrew wanted me to look at something on the head of the aircraft to make sure everything was fine on top and then, I noticed a blue blade. The blade weights on the blue blade were improperly installed. The pilots didn't mention it, so they even saw it. Properly installed blade weights are crucial to keeping the main rotor track and balance within limits and improperly installed blade weights risk excessive vibration levels and potential damage to the aircraft.

Good Vibes Only

Since I started maintaining aircraft and especially at my squadron, examples of maintenance malpractice are always talked about and striven to be learned from; this blue blade was no different, and we are constantly trained to use proper RM procedures and ask ourselves, "What's different today?" Unfortunately, there have been far too many mishaps, close calls and safety articles written about what happens when main rotor blades aren't correctly balanced, so I had to act naturally.

After discovery, I immediately notified maintenance control, corrected the weights and the flight that day turned into a functional check flight. Another day flying? Another pre-flight? Well, this incident shows you that every maintenance day in naval aviation is different and we're not perfect. Lessons were learned that day and our responsibility to conduct proper maintenance on aircraft was highlighted. During my time here in San Diego, California, I've seen a lot of shirts that say, "Good vibes only." I think we can add a new meaning to the phrase.



Aviation Machinist's Mate 2nd Class Trevor Jackson, reads maintenance instructions for a low pressure turbine for an F/A-18 in the jet shop aboard USS Harry S. Truman (CVN 75). U.S. Navy photo by Mass Communication Specialist Seaman Jibreel Uddin

METROLOGY & CALIBRATION

By Senior Chief Aviation Electronics Technician Cristie O. Link

Many of us working on avionics have been responsible for a collateral duty or two, but one of the most vital programs is the Calibration Program. As E-3, E-4 and E-6 calibration petty officers (Cal PO) while attached to our work centers, we were only responsible for our small piece of the bigger pie, especially aboard an aircraft carrier. Each aircraft carrier has its own calibration laboratory in the aircraft intermediate maintenance department (AIMD), which is responsible for almost every gauge on the ship from the flight deck to the reactors. This variation requires nearly all the carriers' departments to have a Cal PO from air department to engineering and even combat systems. Additionally, the calibration technicians are a highly trained group of Sailors responsible for the overall readiness percentage of the ships' calibrated items along with the deployed air wing and other ships within the battlegroup. The AIMD Cal Lab never gets a break. Even when the ship is performing its Docking Planned Incremental Availability (DPIA) period, also known as the "Shipyard," they are expected to track and maintain the thousands of items across the ship that may be in a layup or preserved status. When the DPIA nears conclusion, everything must be ready for workups and deployment to ensure the readiness and safety of the ship, Sailors and Marines. I had the privilege of assessing George H.W. Bush (CVN-77) to observe their daily operations before the ship, air wing and crew left on deployment. Their metrology CAL (METCAL) program manager, Aviation Electronics Technician 1st Class Kiley Edwards, walked me through their programs and tracking processes and we discussed some of the different challenges they face day-to-day.

What were your biggest "head hurters" and challenges regarding the ship's calibration program when the shipyard availability came to an end and you were gearing up for normal underway periods?

Our first and greatest challenge was putting the lab back together. We had to move all of our standards from our temporary lab at Fleet Readiness Center Oceana back to the ship, which involved a lot of long days and liaising with multiple departments to make it a smooth process. Next was receiving all of the calibration standards we needed coming out of the yards. A lot of our standards were transferred to operational and deployed ships during DPIA since we were not fully operational. The last challenge was getting not only the aircraft intermediate maintenance department back in compliance with the METCAL program, but the entire ship! This included training all 121 calibration petty officers and 10 departmental calibration coordinators on all aspects of the calibration program and its significance for compliance.

What issues were identified during the Maintenance Program Assessment (MPA) and how did you correct them?

Some of the issues that were identified during MPA were the work centers were not updating their 350 Reports correctly. To correct this, we provided training to all work center supervisors, calibration petty officers and leading petty officers. Additionally, we implemented a 350 Report verification checklist which shows the work center how to verify their 350 Report properly. This

document is now routed with 350 Reports monthly. Suspected test, measurement and diagnostic equipment (TMDE) not being turned in for retest. To rectify this issue METCAL program manager provided training to all calibration representatives, leading petty officers and work center supervisors on how to verify assets are ready for use (RFU) and what to look for when performing operational tests on their calibrated items. Additionally, after MPA, the METCAL program manager and another senior calibration technician performed 100% hands-on inventory of all calibrated items in the AIMD department to prepare for the upcoming aviation maintenance inspection (AMI).

What are the biggest challenges you have now while on deployment and how have you been dealing with them?

Our biggest challenge during this deployment has been shipping. It is difficult to get things shipped at times due to the limited number of carrier onboard deliveries (COD) or our current operational requirements. Also, we have run into some issues with tracking all of the incoming and outgoing shipments. To mitigate our shipping concerns, we have been working closely with our supply department to ensure we are able to ship as many assets as possible per COD. In addition, we closely track all inbound and outbound assets to ensure they reach their intended destination along with constant communication with shore labs across the United States.

What is the normal monthly throughput while on deployment?

Our current monthly throughput is 190 items totaling 821 man hours on average.

How is your working relationship with the onboard deployed squadrons and the rest of the commands in the strike group? How much has their presence impacted your backlog?

Our working relationship with the squadrons in the air wing is a mutually supportive one. The addition of their assets has increased our backlog; however, we continue to liaise with the squadrons' calibration representatives to ensure their assets fit into our current workload. We have been working with all the calibration representatives for each squadron and their respective METCAL manager to fix any issues that have come up.

Overall, being proactive and having a passion for excellence have been what makes the work center successful and the METCAL program so successful. Learning from mistakes and making the necessary changes are key to ensuring the ship's and air wing's readiness is high and the equipment is working exactly as it is meant to. This is necessary to ensure aircraft, reactors, catapults, arresting gear, support equipment and many other items are working properly and safely to avoid injury to Sailors and Marines or damage to equipment.

BRAVO ZULU

★ SAILORS AND MARINES PREVENTING MISHAPS ★



**Aviation Structural Mechanic - Safety Equipment
2nd Class Alexander Matthews**



**Aviation Structural Mechanic - Safety Equipment
2nd Class Jeremy St. Andre**

While performing a pre-operational inspection of a VP-30 oxygen cart, Aviation Structural Mechanic - Safety Equipment 2nd Class Alexander Matthews and Aviation Structural Mechanic - Safety Equipment 2nd Class Jeremy St. Andre noticed two other oxygen carts were not chocked nor brakes set in the oxygen storage area on the flight line. They notified the support equipment division to contact the respective command responsible for the O2 carts to ensure chocks were installed. It is imperative that chocks are installed and brakes set due to the highly explosive gaseous and liquid oxygen that is housed in its storage facility. Had the two Sailors not taken action, the un-chocked carts could have caused catastrophic damage.

Bravo Zulu is a naval signal originally sent by semaphore flags and in English, simply means "Well done."

FAME! What's all the Fuss About?

By Master Chief Aviation Maintenance Administrationman Arlene Williams

United States Naval aviation is the envy of all militaries around the world. Some may say it's because of the highly skilled and trained personnel dedicated to protecting and serving on land and at sea. Others may say because of the most technologically advanced aircraft. I believe it's a combination of both. Many of our newer aircraft operated in the Navy and Marine Corps have automated maintenance environment (AME) and integrated health management or monitoring systems. These systems help maintenance managers and personnel oversee and maintain our Navy and Marine Corps aircraft more efficiently and effectively to provide more highly reliable aircraft. One of these systems is the F/A-18 Automated Maintenance Environment (FAME).

The FAME supports only organizations operating F/A-18 and E/A-18 aircraft throughout the fleet. It provides an automated trending and analysis tool to improve aircraft maintenance with an onboard health monitoring system (HMS). The HMS provides built-in test (BIT) capability monitoring, including maintenance analysis and planning aid (MAPA) and flight summary reports. What makes FAME so special is its capabilities. Operating properly saves maintenance and aircrew personnel valuable time and resources. Some of the capabilities the FAME system provides users are:

- Aircraft data stripping and analysis tools
- Expert diagnostics
 - Rapidly evaluates aircraft fault data and determines the appropriate corrective action.
 - Flags maintenance actions that contain Maintenance Status Panel (MSPs) on the Critical MSP List.
 - Large permanent buildings (stay away from running water faucets, electrical outlets, and land phone lines due to electricity from the lightning that can travel through these conductors).

- Data Analytics
 - Enables ready access to the maintenance data for analysis and reports.
 - Provides squadron trending analysis to identify critical MSP applicability.
 - Imports monthly structural appraisals of fatigue effects (SAFE) reports and supports the planning of upcoming maintenance.
- Integrates with the U.S. Navy's Maintenance Management System (MMS) Optimized Organizational Maintenance Activity (OOMA)
 - Automated work order creation.
 - Automated component life usage indices calculation and update for airframe and engine life cycle management.
 - Shared aircraft configuration management.

While all these capabilities are excellent and can help reduce maintenance turnaround time and troubleshooting, some problems come from squadrons not using the FAME process from start to finish and not having all their designated FAME ports activated.

The F/A-18 Super Hornet and E/A-18 Growler are SMART aircraft, meaning they, for the most part, will tell you what's wrong with the aircraft if FAME is used correctly. The F/A-18 and E/A-18 rely on the aircraft's in-flight performance monitoring system to collect data stored on a removable maintenance memory unit (MMU). The data from this removable MMU is downloaded to an OOMA-configured maintenance control computer. That download is fed into the FAME software application, which then pushes the codes



(discrepancies) through to the OOMA Naval Aviation Logistics Command Management Information System (NALCOMIS) for maintenance control approval. As per *COMNAVAIRFOR Instruction 4790.23A*, F/A-18 AME for F/A-18 and E/A-18 Aircraft, maintenance control approves all FAME discrepancies. All OOMA-approved discrepancies are then downloaded to work center FAME-configured Portable Electronic Maintenance Aids (FAME PEMA), which provide technicians direct links to the specific repair manual section that covers troubleshooting and repair of each specific discrepancy. This process was designed to make maintenance technicians more efficient by eliminating the maintainer beginning from step one and enabling them to start at step 10 and eliminating the need for test sets or tools that may or may not be available.

The Flight Summary Tool within the system allows maintainers to see exactly how the aircraft was performing during flight in flight replay. This process reduces hours of wasted man hours trying to figure out the problem with the aircraft or aircraft weapon system. Additionally, the automated system helps in applying engine usage data to the aircraft components after every flight to ensure the life of the engine is always updated and not consistently being penalized. FAME is the only way to apply engine usage data. That data is used to update SAFE reports and calculate Fatigue Life Expenditure (FLE) values.

An essential element of the FAME system is to provide Naval Air Systems Command engineering and logistics teams with a feedback mechanism to correct deficiencies and improve aircraft and FAME software toolsets. For feedback to be effective, discrepancies must be uploaded to OOMA with feedback responses. FAME is an essential tool enabling the maintainer to support the F/A-18 Hornet, Super Hornet and E/A-18 Growler. Naval Safety Command assessment teams often see squadrons needing to use FAME's full capabilities. For FAME to improve utility for the end user, its full features must be used. Maintenance technicians and managers alike should understand why it is essential to always use the full functionality of FAME whether on detachment or at home.

U.S. Navy photo by Jessica Nilsson

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Short story: 800-1,500 words

Feature story: 2,500-3,000 words

News briefs: 500 words

Fact-checking

We ask that writers research reference materials, such as manuals and books used in their articles. Please verify your sources before attributing quotes to them. If you need us to conduct additional fact-checking, please make a note of it when submitting your article.

Photos

All photos must be high resolution (a minimum of 300 dpi) in JPEG or JPG format. Please ensure the photographer (include first and last name) or source is credited in your article submission.

When you email your article, use the author's last name and first initial as the file name. For example: Lastname-F.doc.

We look forward to receiving your submissions!

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U.S. Navy photo by Mass Communication Specialist
3rd Class Thaddeus Berry
dvidshub.net - 7164938

Our cover features a hidden wrench.
Can you find it?

