

Summer 2023

# GROUND WARRIOR



THE MARINE CORPS GROUND AND NAVAL EXPEDITIONARY WARFARE SAFETY MAGAZINE



**The  
Hawthorne  
Mortar  
Mishap**

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**A NEW APPROACH  
TO SAFETY ASSESSMENTS**

High-Risk Training

**Underwater  
Egress  
Training**

**+ MORE  
SAFETY  
INFORMATION  
INSIDE**

# A Letter from the Assistant Commandant of the Marine Corps



Marines, Sailors, families and civilian teammates,

It's summer, and most of you are expecting "the safety lecture" from me or from your command team. Stand by to be disappointed ...

I've personally received hundreds of safety lectures in my 36 years in the Corps, and I don't think I can remember any one of them.

I've seen dozens of Marines, Sailors, family members and civilian teammates killed due to accidents, and I can remember every single one of them, vividly.

We are all about to head out for some much-deserved time off. We plan to execute a PCS move, take a family trip, or hit the beach — and not in the assault way, but the kind where you take the cooler and umbrella!. These are things you need to and should do. All I ask is that you take your safety culture with you. The CULTURE of safety just means that even when we are "off duty" (a

misnomer by the way), we keep a weather eye out for danger. I do it when I'm in the car with my wife or children, I do it when I'm on the water fishing, or when I'm headed out for a run on the busy streets of Washington, D.C. Our CULTURE makes me ask "What's that driver about to do?" or "Should I be headed out to fish when there is a small craft advisory?" (Hint: The answer is no ...)

Sadly, while most of us are celebrating our summer holidays, some families will be burying those they love. That is a tragedy. We all signed up to defend the nation, and many of us have fought in Iraq, Afghanistan or Syria to ensure our nation's safety. For more than 15 years, we had large numbers of forces in Iraq and Afghanistan, fighting against insurgents or the Taliban each day. During that time frame, we lost more to noncombat-related mishaps than to enemy action. That cannot be our standard. That cannot be something we accept.

The next fight is coming, and we need all hands ready to deploy. The loss of one of us to an accident is a tragedy that we cannot accept. Just be alert, and if you see an unsafe act ABOUT TO TAKE PLACE, say something or do something to change the trajectory of the situation. It's not hard to do; it only takes a second; and it will allow a young Marine or Sailor to grow up to be an old Marine or Sailor. Please just keep your eyes moving, plan before you move out, and take care of each other.

When the fall comes, and we're all still here, you can thank me for not giving you a safety lecture. I just want you to know that you are needed for the fight, and a few simple precautions will ensure your "101 days of summer" are not the last ones you have on this earth. Please don't be the statistic; be the reason we didn't have a statistic ...

Enjoy the summer, and take your culture of safety with you.

Semper Fidelis,

A handwritten signature in black ink, appearing to read "E M Smith".

General Eric M. Smith,  
Assistant Commandant of the Marine Corps

# Commander, Naval Safety Command



Team,

As you read through this edition of Ground Warrior, look at it through the lens of your fighting position. The articles within these pages should give you pause and reaffirm your risk mindset as our Marines, Sailors and civilian employees adopt a pattern of self-assessment, self-correction and risk communication. Along those lines, I urge you to read the article on Naval Safety Command's new assessment process. It's a roadmap that outlines our objectives and desired outcomes. Ultimately, we want to see each command instilling behaviors to ensure they are managing and mitigating risk effectively. We owe you no less.

This issue covers areas that are important and deserve your attention. Topics include studying traumatic brain injuries during training cycles, fall protection, range operations and summertime activities. You will also find firsthand accounts, lessons learned, current guidance, information covering underwater egress training and more. In your day-to-day tasks, I urge you to be an advocate for risk identification, mitigation and accountability.

Risk is borne by every Marine, Sailor and civilian, and how you manage risk and mitigate risk is ultimately up to you. Be disciplined. Be informed. Understand your intent and role in the mission. Improve your fighting position by engaging with your chain of command and with your fellow Marines and Sailors to continually self-assess and self-correct. We need your help to ensure our day-to-day efforts, directly and indirectly, are conducted with a propensity toward risk mitigation and risk communication across all levels of command. Our goal at Naval Safety Command remains zero preventable mishaps. We need your help to achieve that goal.

Rear Admiral C.M. Engdahl,  
Commander, Naval Safety Command

# Director, Marine Corps Safety Division



Marines, Sailors, civilians and family members,

Safety is not the job of the individual who works in the safety office. Rather, an effective safety program is tied closely to the culture of any unit or organization. Strong safety cultures are those where everyone is committed to being safe and everyone feels comfortable speaking up about safety concerns. Do you feel this way about your unit? If the answer is yes, continue to do your part! If the answer is no, what are you doing to change it?

June is National Safety Month, the beginning of the 101 Days of Summer, and a great time to recommit ourselves to being aware of the risks we face – both on and off duty, every day. We can all remember the first time we were called Marine, Sailor, Shipmate or Devil Dog. We knew right then that we were forever changed, willing to give our lives because the Marines and Sailors to our left and right were willing to give theirs for us. That's our ethos and our culture, and that's safety!

The things you see, the words you say and the actions you take could make the difference between life and death! These things matter, and it will take every one of us remaining vigilant to keep our Navy and Marine Corps safe. We all share the responsibility to ensure that we don't lose a single Marine, Sailor, civilian or loved one to a preventable mishap.

As we enter the summer season, I want to remind you of the most important thing you can do to be safe: **If you see something, say something!** Is there a tactical vehicle backing up without a ground guide? Say something! Is work being done on the ship without the proper personal protective equipment? Say something! Do the tires on your neighbor's car look low? Say something! Does your fellow motorcycle rider take unnecessary risks? Say something!

Join me, and let's rededicate ourselves to looking out for each other and making 2023 the safest year possible!

Semper Fidelis,

Colonel Mark Bortnem,  
Director, Marine Corps Safety Division

# FEATURES

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**Front Cover:** U.S. Marine Corps Lance Cpl. Kody Morgan, left, swims ashore as Cpl. Salahudeen Rammouz, right, both scout swimmers with Battalion Landing Team 2/5, 31st Marine Expeditionary Unit, relays instructions off the coast of Naval Education, Training, and Doctrine Command, Zambales, Philippines, Oct. 6, 2022, during a rehearsal. (U.S. Marine Corps photo by Sgt. Danny Gonzalez)

**Back Cover:** A U.S. Marine with India Company, 3rd Battalion, 5th Marine Regiment, 1st Marine Division, launches a RQ-20B Puma Small Unmanned Aircraft System during exercise Intrepid Maven 22.4 in the United Arab Emirates, Sept. 22, 2022. (U.S. Marine Corps photo by Sgt. Jacob Yost)

Ground Warrior Magazine is a forum where Marines and Sailors can share safety-related experiences, thereby providing valuable lessons learned to others within the community. Input from the fleet is crucial in improving safety culture, conducting safe operations, and thus, maintaining readiness. Ground Warrior is published jointly between the Commandant of the Marine Corps Safety Division and the Naval Safety Command. Content within Ground Warrior does not necessarily represent the official views of, nor is it endorsed by, the U.S. government, Department of Defense, U.S. Navy or U.S. Marine Corps. Photos and artwork may be representative and not necessarily show the people or equipment discussed. The Ground Warrior editorial staff reserves the right to edit articles for readability. Reference to commercial products does not imply endorsement. Unless otherwise stated, content may be reprinted without permission by giving proper credit to the magazine, author and photographer when applicable.

[www.safety.marines.mil](http://www.safety.marines.mil)

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# NAVSAFECOM EXPLAINS NEW APPROACH TO SAFETY ASSESSMENTS

*By Cmdr. Gary M. Shelley, Naval Safety Command*

I'd like to take this opportunity to discuss the Naval Safety Command's (NAVSAFECOM) new approach to safety assessments, some of the changes you may see and our goal outcomes.

Since its redesignation in February 2022, NAVSAFECOM developed a new assessment process with a new focus on risk management as it relates to the updated Safety Management System (SMS). The Navy Safety and Occupational Health Manual, OPNAV-M 5100.23 CH-2, signed by the Chief of Naval Operations (CNO) Sept. 5, 2022, outlines and establishes the framework and requirements for instituting an SMS or Safety Management Plan (SMP) for Echelon II or III organizations and their subordinate commands.

The Navy SMS is the system-of-systems for risk management and assessing the effectiveness of risk controls. A critical part of the SMS framework is that it requires each level of command to consistently perform self-assessment and implement corrections and improvements, communicate risk up and down the chain of command, and account for risk at the appropriate level. It includes systematic procedures, practices and policies for risk management with assurance and regulatory processes built into it.

Safety assurance involves the routine and formal assessment processes necessary to ensure safety requirements and standards are met. The NAVSAFECOM assessment process is the assurance function under the Navy's SMS.

NAVSAFECOM's assessment process will determine whether an assessed command has effectively instilled behaviors of self-awareness, self-assessment, self-correction and continual learning to enable a defense-in-depth that ensures the command is **safe to operate** and **operating safely** through proper risk identification, communication, and accountability at the appropriate level.

The safe-to-operate envelope includes all operating limits, procedures, training, and operating conditions for all activities including routine, day-to-day operations; high hazard or special operations, or crisis and emergency event operations. To operate safely is to operate within established boundaries of the safe-to-operate envelope, also known as the "safety envelope."

Organizations that develop assurance processes to identify and address risks when they are operating outside of the safe-to-operate envelope are executing an effective SMS.

As a key proponent of the CNO's "Get Real, Get Better" initiative, NAVSAFECOM has a significant impact because we now send assessment reports to the CNO, ensuring transparent communication of risk at the highest levels of Navy leadership.

Historically, NAVSAFECOM's mandate included regular assessments at the Echelon IV and V levels. To conduct

Our assessments adhere to the following principles:

- **Risk Identification** focuses on risk awareness throughout an organization or unit, as well as the organization's awareness of normalized risk.
- **Risk Communication** looks at effectiveness of tracking and communicating risk up and down the chain of command.
- **Risk Accountability** evaluates how risk is assigned and if it is assigned at the correct level (normally the correct level is the level of the chain of command that can correct the risk – normally through policy or resourcing changes). Although risk accountability may be held above the unit level, the unit is still responsible to mitigate the risk to the best of their ability.

the additional level of assessments (Echelon II and III), NAVSAFECOM formed the Assurance Directorate, comprised of senior military and civilian employees tasked with assessing the overall effectiveness of risk and safety management practices across the naval enterprise.

One area of focus is conducting local area assessments at the unit level (squadrons, ships and submarines), similar to what we have done in the past; but we are now also looking at facilities and infrastructure from a base-operating-services standpoint.

Again, we are looking at a command's ability to be self-aware, self-assess and self-correct to better measure if that command is safe to operate and operating safely.

Additionally, assessment teams are evaluating the commands' ability to instill behaviors that facilitate these principles and ensure the command is managing, mitigating, and communicating risk effectively. This includes accurately identifying risk, communicating risk and taking accountability of risk at the right level.

The best units build on an exceptional self-assessment competency with “Get Better” self-correcting behavior: fixing small problems before they become larger issues; addressing root causes, not symptoms of problems; applying world-class problem-solving tools and best practices; setting clear cadences for accountability; and working collaboratively and quickly, elevating barriers to progress that cannot be resolved at the unit level. Simply put, this is what NAVSAFECOM is evaluating as our assessment teams make their way around the fleet.

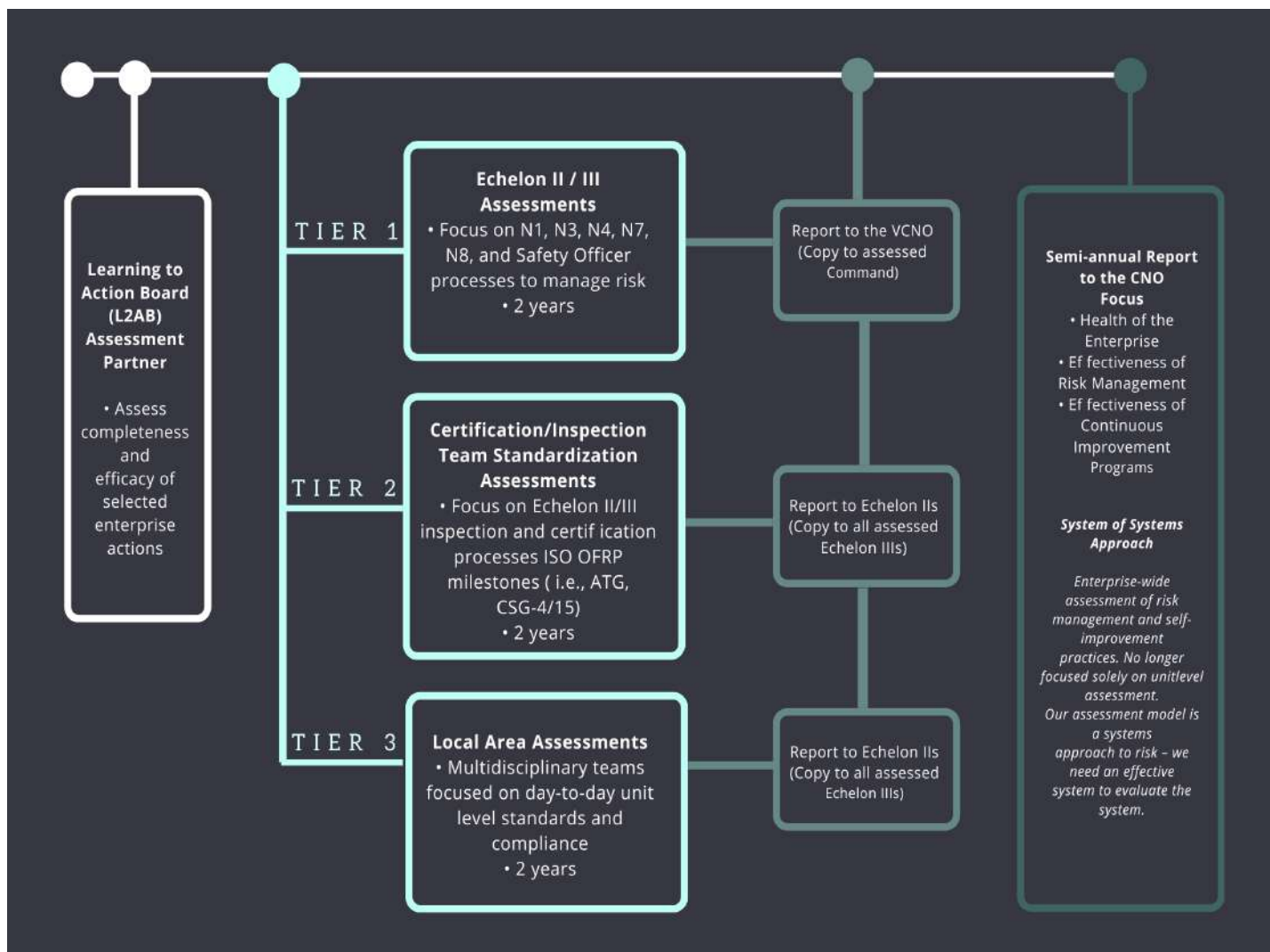
The NAVSAFECOM mandate includes unannounced visits to 18 major fleet concentration areas annually to assess risk management behavior and compliance with established policy. Noncompliance inherently introduces risk of materiel failure and personnel injury.

The end goal is to ensure unit-level commands have proper risk identification measures, good communication and appropriate risk accountability at the appropriate level within the chain of command.

While this new assessment process is a departure from how we conducted business in the past where only unit-level commands were assessed, the fact that higher echelon levels in the chain of command are also assessed will only further strengthen our Navy while fully supporting the CNO’s “Get Real, Get Better” initiative.

Our assessment teams look forward to seeing you around the fleet. Strive to ensure you are self-assessing, self-correcting, identifying and communicating your risk effectively to ensure accountability is held at the appropriate level.

## NAVAL SAFETY COMMAND ASSESSMENT MODEL



For more information on the assessment process, scan the QR code.



# TRAUMATIC BRAIN INJURIES:



U.S. Marines with 1st Marine Division fire the M3E1 multipurpose, anti-armor, anti-personnel weapon system on Marine Corps Base Camp Pendleton, California, March 9, 2023. The MAAWS, also known as the Carl Gustaf, is a man-portable, reusable, breech-loading, 84 mm recoilless weapon system capable of destroying armored targets. (U.S. Marine Corps photo by Lance Cpl. Juan Torres)

## **Article courtesy of Expeditionary Warfare Directorate, Naval Safety Command**

**S**pecial operators (SO) and specific attached personnel are repeatedly experiencing mild traumatic brain injuries (TBI) during normal training cycles. The Centers for Disease Control and Prevention defines a TBI as “a disruption in the normal function of the brain that can be caused by a bump, blow, or jolt to the head, or penetrating head injury.”

Conditions and symptoms linked to TBIs include headaches, irritability, sleep disorders, depression, slower thinking and memory problems. As these conditions can affect life in and out of the military, it is important to study their effects and determine potential causal factors.

The Investigating Training Associated Blast Pathology (INVICTA) study, conducted by Dr. Michael J. Roy, professor of medicine at the Uniformed Services University (USU) and director of operational research for USU’s Center for Neuroscience and Regenerative Medicine, is looking into the short- and long-term effects of repeated subconcussive blast exposures on special operators and related personnel.

The INVICTA study includes wearing three sensors spaced on the operator’s body to determine the amount of pressure they are exposed to throughout a work-up cycle. The effects of these exposures are still being studied to determine potential long-term effects. There is growing concern that the result of multiple concussive events over a lifetime is cumulative.

INVICTA is looking at SEALs during the heavy weapons phase of training and studying instructors who conduct the training six times per year. They are evaluating the cumulative effect of smaller subconcussive events over the course of three to 18 months to see the immediate aftermath and long-term effects of repeated exposure on the brain. To do this, the researchers will use the sensors and how this training affects memory, attention span, reaction time, and neuroimaging.

While firing standoff weapons like rocket launchers and the Carl-Gustaf recoilless rifle, operators are repeatedly exposed to relatively large amounts of force. Early in my career, we were told we could only fire or serve as the loader for five rounds per day because any more exposure would begin to tear the aorta off your heart. Now our limit is three per day because that overpressure is enough to give you a mild TBI.

Several other weapon systems also have a potential impact. For example, the 50-caliber sniper platform with a muzzle brake can create a large amount of overpressure felt by the operator and spotter. Anything above 4 pounds per square inch (psi) is considered unsafe and can contribute to TBI.

While training with 50-caliber sniper rifles shooters and spotters are routinely exposed to 3.8–4.5 psi. As the shooter is directly behind the gun they do not receive the same exposure. When we take turns as the spotter, it always felt like a mild slap in the face



# UNDERSTANDING SUBCONCUSSIVE BLAST EXPOSURE IMPACTS

that cleared the sinuses. To mitigate these effects, we tried to line up as close to the shooter as possible.

As we are exposed to blast pressure when we are working with explosives to breach (gain entry to a room or compound), when demolishing enemy equipment, or while initiating an ambush, we use an equation that accounts for the net weight of all explosives being used and provides the minimum safe distance needed for standoff.

To mitigate some of our exposure but still get the repetitions, we rotate through individuals who stand in the front of the line. Also, when possible, we use smaller charges on door simulations to practice the repetitions without the effects of a full-size charge.

One method being tested to evaluate overpressure blast exposure is measuring levels of various proteins in blood

samples. For example, levels of amyloid beta peptides in the serum have been shown to increase within 45 minutes of blast exposure. More studies need to be completed to determine how this could be helpful in evaluating TBIs.

Studies are ongoing considering the potential hazards of TBI for current weapons training. Operators should continue to mitigate risk. For example, range safety officers should stand as far back as possible while still effectively evaluating a shooter's performance. When shooting 50-caliber weapons, the spotter should line up as directly behind the shooter as possible while also increasing the space between the shooter and spotter.

Evaluations should be done to assess the amount of overpressure an operator in certain rates and military occupational specialties could potentially experience in their career. >>>

The Military Acute Concussion Evaluation Two (MACE 2) is one tool that can be used at the time of subconcussive blast exposure. Download the MACE 2 using the QR code.



Scan the QR code to read more on the INVICTA TBI study.



U.S. Naval Special Warfare operators conduct training using explosive devices at Fort Chaffee, Arkansas, Dec. 12, 2022. (U.S. Navy photo by Mass Communication Specialist 1st Class Trey Hutcheson)

# Protecting Marines Through Fall Protection

By Shawn Curtis, Marine Corps Base Camp Butler

Historically, fall protection — or the lack thereof, is listed as one of the top 10 annual workplace citations, according to the Occupational Safety and Health Administration. For the 11th consecutive year, fall protection was cited as the No. 1 hazard in 2021.

The Department of the Navy (DON) Fall Protection Guide provides information on standards, regulations, formal criteria and requirements for the protection of personnel working at heights and exposed to fall hazards.

Unsurprisingly, Marines are equally imperilled by this hazard while working at heights as noted by the Naval Safety Command (NAVSAFECOM), which continues to report a number of serious fall-related mishaps each year. Reduced operational readiness and lost productivity notwithstanding, the primary concern is the significant medical and compensation costs associated with these incidents as well as the enduring suffering of the injured and their loved ones.

But there's good news! Work-related falls from heights are 100% preventable when the work is planned properly, known or potential hazards are identified and effective hazard controls implemented.

Contrary to popular belief, most mission-related work can be performed at ground level with proper planning. When I witness or hear that a communications Marine, scout sniper or combat photographer is on a roof because mission dictates such, I have to ask myself, does it really?

It may take a little ingenuity and extra effort to obtain the best ground-level vantage point from which to establish clear communications, effectively engage a target or snap an award-winning photo, but the benefits of doing so outweigh the costs of needlessly exposing a Marine to a fall hazard.

If accessing a rooftop or working at heights is an absolute mission necessity, federal and DON policies mandate the employment of a compliant fall protection program for anyone exposed to fall hazards, whether in field or in garrison.

The threshold for providing fall protection is 4 feet for general work tasks and 6 feet for construction. Understanding the basic



A new U.S. Marine with Golf Company, 2nd Recruit Training Battalion, rappels down the tower at Marine Corps Recruit Depot San Diego, California, April 7, 2023. (U.S. Marine Corps photo by Lance Cpl. Francisco Angel)

fall protection requirements for Marines working at heights can mean the difference between returning to their loved ones at the end of the workday or to an unplanned hospital visit — or worse.

I've learned over the years that it's often the inexperienced Marine who is directed to access a rooftop; and usually an individual who never received fall protection training, was never provided with a basic understanding of how to eliminate a fall hazard using engineering controls, or provided with compliant personal protective equipment and training that might prevent an unintended, life-altering fall.

Further exacerbating this hazard, not all supervisors have attended fall protection awareness training, do not understand the regulations governing this program, cannot readily identify a potential fall hazard, and have not been provided with sufficient resources to ensure work performed at heights is done safely.

Fall protection is addressed in numerous safety references, but the two best sources of information are the **DON Fall-**

**Protection Guide** (July 2, 2020) and the host installation's safety requirements, which are available from the installation safety office. The Fall Protection Guide is applicable to all Navy and Marine Corps activities when there is a need for developing a fall protection program to ensure the safety of personnel exposed to falls while working from heights.

Additionally, Marine Corps activities are responsible for assigning responsibilities, surveying and assessing fall hazards, providing prevention and control measures, training personnel in the proper installation and use of fall protection systems and equipment, ensuring the availability of rescue equipment and accompanying rescue procedures, inspecting the equipment, and auditing/evaluating the program.

The latest version is available on the Marine Corps Safety Division website at <https://www.safety.marines.mil/>.

The Marine Corps' commitment to providing high-impact, real-world training to hone warfighting skills and capabilities is renowned. Fall protection training should be viewed no differently since it serves to safeguard the very thing that sets the Marine Corps apart from other services—the individual Marine.

The Marine Corps outlines military occupational specialties (MOS) where there is a requirement to work at elevated heights, therefore, initial fall protection training should be implemented in the MOS's school house curricula and recurring training at the parent command.

Leaders are morally and legally obligated to protect personnel under their charge in garrison no differently than on the battlefield. Moving beyond the deep-seated "get 'er done" mentality nested in Marine Corps ethos to a culture that proactively embraces safety and risk mitigation not only

## Key Takeaways

**Before making the decision to send a Marine to a rooftop or any other walking or working surface, consider the following requirements:**

- **Protecting Marines working at heights is a moral and legal obligation.**
- **A written fall protection program shall be developed and employed.**
- **A fall protection program manager will be appointed by the commanding officer or civilian equivalent to administer the unit and activity fall protection program.**
- **Supervisors and Marines exposed to working at heights shall receive appropriate fall protection training.**
- **Marines shall be provided appropriate resources; engineering controls, administrative controls, and personal protective equipment to minimize the potential of a fall-related mishap.**
- **When in garrison, attain approval from the installation Facility Maintenance Officer and the installation safety office to perform work at heights on structures.**

protects the force, but directly contributes to operational excellence and mission readiness.

For additional information on fall protection and training availability, consult your unit ground safety officer or the local installation safety office. >>>

## SAFETY SPOTLIGHT

### Sean Thorp

Regional Weight Handling Equipment (WHE)  
Program Manager,  
Marine Corps Installations Pacific (MCIPAC)



Sean Thorp leads the Marine Corps Installations Command's (MCICOM) transition to comply with Naval Facilities Engineering Systems Command's (NAVFAC) P-307 weight handling program. Thorp's expert knowledge and experience in WHE led to the identification of a persistent high-risk potential in the preventive maintenance process of over 200 cranes onboard Marine Corps Base Camp Butler and Marine Corps Air Station Futenma, Okinawa. He pioneered an initiative to reduce risk to workers and equipment by developing controls endorsed by the commanding general.

Thorp is currently enrolled in the Executive Leadership Program, which included an eight-week developmental assignment at MCICOM, where he performed a gap analysis of the Marine Corps' compliance with NAVFAC P-307. He is assisting with authoring a new Marine Corps order to address the unique operation, inspection and maintenance of the commercial WHE program.



# SAFE PLANNING AND EXECUTION OF OVER-THE-ROAD LINE-HAUL OPERATIONS

Seabees assigned to Naval Mobile Construction Battalion 1 Convoy Security Element stand guard during a route reconnaissance exercise during Operation Turning Point, also known as their field training exercise. Operation Turning Point is an around-the-clock exercise that focuses on constructing advanced bases while maintaining proficiency in tactics and survivability. (U.S. Navy photo by Mass Communication Specialist 1st Class Sean P. Rinner)

**By Senior Chief Constructionman John Watters, Naval Safety Command**

**O**ver-the-road line-haul operations (noncombat convoys) conducted by the Navy are inherently dangerous and require a combination of operator skill and experience to conduct safely. Not understanding safe following distances and proper spacing between vehicles is a common hazard associated with these operations.

The purpose of this article is to raise awareness of these issues and provide options for remediation. By doing so, we hope to raise awareness and educate the Navy Expeditionary Combat Command, Naval Special Warfare and U.S. Fleet Forces units on these common hazards and mishaps.

## **Deliberate Risk Assessments**

Deliberate risk assessments (DRAs) must be detailed to the point that everyone involved in the movement understands each risk associated and the controls that need to be implemented to mitigate those risks. This will ensure risk decisions are made at the appropriate level.

One of the risks associated with line-haul operations is the potential for mishaps based on the improper following and stopping distance between vehicles.

The National Highway Traffic Safety Administration explains how reaction time, speed, vehicle and road conditions all combine to determine braking distance:

“Your reaction time (how quickly you perceive a threat and then decide what action to take) takes place before you put your foot on the brake.”

This reaction time, combined with the vehicle’s weight and mechanical actions, tire conditions, and even road conditions all contribute to the time it takes to stop the vehicle. Additionally, the speed of the vehicle will determine the amount of ground covered during the reaction time and the time it takes to brake, i.e., vehicles traveling at higher speeds cover more distance before stopping.

“A typical reaction time to perceive a threat such as a deer or a child running into the road is about 3/4 second, and then you add another 3/4 second to decide to act and move your foot to the brake pedal – that’s 1.5 seconds so far. At 55 mph, the distance traveled is 121 feet. Only then does the car begin to slow. On dry pavement that takes 4 1/2 seconds, traveling another 144 feet, but if it’s wet, you’ll travel 183 feet,” according to the NHTSA.

Many rear-end collisions are caused by drivers following too closely. Combine close intervals with speed and an inattentive driver, and it's just a matter of time before an accident occurs.

According to the Federal Motor Carrier Safety Administration and the Commercial Driver License Manual, the following guide is recommended for estimating proper distances:

"One good rule says you need at least one second for each 10 feet of vehicle length at speeds below 40 mph. At greater speeds, you must add 1 second for safety. For example, if you are driving a 40-foot vehicle, you should leave 4 seconds between you and the vehicle ahead. In a 60-foot rig, you'll need 6 seconds. Over 40 mph, you'd need 5 seconds for a 40-foot vehicle and 7 seconds for a 60-foot vehicle."

#### **Line-Haul DRAs**

Line-Haul DRAs should be tailored to each mission, incorporating safe following and braking distance recommendations in addition to information specific to the equipment and routes being used. Mission-specific DRAs should be reviewed before each mission

by the approving authority and made readily available to the team assigned to the mission.

Before stepping off, the mission commander must use the DRA to conduct a detailed hood brief to the team, identifying the hazards and controls outlined in the DRA. Proper use of detailed DRAs will greatly reduce risks associated with line-haul operations and ensure risk decisions are made at the appropriate level.

**Line-haul operations conducted by Navy and Marine Corps forces should be considered high risk regardless of the conditions associated with each movement. Every Marine and Sailor involved in each movement must have a thorough understanding of all risks associated and the controls put in place to reduce these risks.**

Proper knowledge of safe following and braking distances in developing and briefing DRAs will ensure the necessary controls are implemented and understood. Knowledge of these driving techniques will greatly reduce the potential for line-haul mishaps in the future. >>>

## **SAFETY SPOTLIGHT**

Jeremy Jensen's contributions not only improved the safety aboard the air station but also its tenant's operational effectiveness. Jensen developed a departmentwide standard operating procedure (SOP) for safety and occupational health (SOH) inspections, providing guidance on inspection procedures to ensure consistency, thoroughness and fairness for all MCAS Miramar departments and tenant organizations. The SOH Inspection SOP provides guidance on more program-focused inspections with references required to be based on OSHA requirements or applicable military orders. Jensen also created safety program-focused audit sheets for use by program managers in all SOH inspections. These audit sheets allows for a team-oriented focus on Safety Management System (SMS) reviews while ensuring department directors receive one report, resulting in reduced time and message traffic.

This reduced timeframes for annual program reviews and overall installation SMS self-assessments by 30%, affording program managers greater availability to assist supervisors and department program managers with one-on-one training and support. He created a letter of instruction (LOI) to provide guidance and deadline for completing annual SMS reviews to include safety programs reviews. Jensen took initiative and created an Excel tracking system to identify gaps and ensure personnel received training in line with MCSMS requirements.

Jensen ensured standardized onboarding was in place for new personnel, which included department SOPs and LOIs to aid newcomers and offer guidance for current personnel. He developed and implemented a Safety Services Support Request Form, which enables all commands on the installation to request core safety services not identified during their annual Needs Assessment. He ensured safety staff employed every source of available information and incorporated effective best practices, aggressively tracked mishaps, analyzed trends and implemented successful abatement solutions — ultimately enhancing the overall safety onboard MCAS Miramar.

**Jeremy Jensen**  
Safety Department  
Marine Corps Air Station,  
Miramar, California





# Ground Truth

## DEVELOPING A SAFETY MANAGEMENT SYSTEM

*Article courtesy of Commandant of the Marine Corps Safety Division*

**T**he greatest resource found within our services is not the \$75 million F-35 Joint Strike Fighter or the \$355,000 all-terrain Joint Light Tactical Vehicle. It's our personnel; the individual Marines, Sailors and civilian employees—they are indeed our greatest resource.

While the Marine Corps and the Navy continue to make great strides in advancing our equipment and technology, it is meaningless without our service members and civilians.

But is the safety of our most valuable resource being squandered by organizations when they develop their Safety Management System (SMS) or Safety Management Plan (SMP)? When units are developing their SMS or SMP just to pass an inspection, the answer is a resounding "Yes!"

Instead, units should — at a minimum, develop their SMS/SMP program to the standard of passing a stringent mishap

investigation. An inspection aims to provide commanders a compliance assessment in functional areas deemed a priority by the Commandant of the Marine Corps and to promote the foundational readiness that contributes to mission success by inspecting and training to compliance. A compliance assessment is completed by using inspection checklists developed by functional area subject matter experts.

As such, when trying to properly assess the health of the safety and risk culture within a unit, an inspection checklist may not be the answer. Developing an individual unit SMS or SMP just to pass inspection will not properly protect our personnel.

When a mishap occurs, an investigation is conducted to identify factors for the mishap, determine findings from the mishap and develop mishap recommendations. Overall, it examines whether unit leadership did everything

possible to prevent the mishap and ensure the safety of its personnel.

When reviewing a unit's SMS or SMP, investigators may look to see if the plan was tailored for the risks associated with that specific organization, if the information in the order is understandable to personnel at all levels, and if the order is executable by the whole organization.

If done correctly, the unit's SMS or SMP will help shape a good safety culture within the organization, help lower the chances of a mishap, and not be a factor during a mishap investigation.

To protect our greatest resource, we must change the mindset on developing the unit SMS or SMP. A unit's safety management system or plan must take into account the mission and associated risks, mitigate those risks in training to the maximum extent possible, and protect personnel and equipment from risks and mishaps that lead to the need for an investigation. >>>

## SAFETY SPOTLIGHT

### Pat Tsutomu Yamashiro

Training Technician

Marine Corps Installations Pacific (MCIPAC)

Camp Butler Safety Office



Training Technician Pat Tsutomu Yamashiro is with the Marine Corps Base-Camp Butler Safety Office. He is responsible for motorcycle and recreational off-highway vehicle training and licensing endorsement for the entire military population on Okinawa, Japan. Yamashiro was born and raised in Okinawa and has years of motorcycle riding experience in Japan and the United States. He possesses the following certifications: Motorcycle Safety Foundation Rider Coach Trainer, California Superbike School Level 3 Rider Coach, Recreational Off-Highway Vehicle Driver Coach and ATV Instructor and American Automobile Association Lead Driver Improvement Program Instructor.

# RANGE OPERATIONS PROFESSIONAL DEVELOPMENT

*Article courtesy of Range and Training Area Management Branch, Training and Education Command*

The Range Operations Professional Development Program (ROPD) assists installation range staffs and uniformed service members in applying the fundamentals of range safety policy. Blending the art and science of range safety, the Range Safety and Design section within Range and Training Area Management Branch at Training and Education Command provides full-spectrum support to Marine Corps installations.

This support directly contributes to the combat readiness of the Marine Corps by assisting in the incorporation of new weapons and tactics into planning of exercises, coordinating support between various DoD, civilian and foreign entities, as well as providing a robust set of computer tools that provide a visual representation of the policy contained in the range safety orders.

Ensuring safety while enhancing combat effectiveness and readiness is the bedrock framework in which we operate.

To accomplish this, we have a curriculum of resident training hosted at Army and Marine Corps installations and distance learning courses hosted on MarineNet at <https://marinet.usmc.mil>. These courses are designed to ensure range staff are educated and qualified in

accordance with the policy set forth in MCO 3570.1C (Range Safety), MCO 3550.9A (Operational Training Range Certification/Recertification Program), MCO 3550.10 (Range and Training Area Management Program) and MCO 3550.12A (Operational Range Clearance). The training offered by the ROPD curriculum maintains compliance with range safety orders and ensures Marines receive the best training available.

The ROPD resident courses consist of Interservice Range Safety course (Intermediate), Range Managers Toolkit, Weapon Danger Zone tool, Laser Range Management Tool, Range Airspace Managers course and the Range Facility Management Support System course. To support distance learning, Range Safety and Laser Range Safety Officer are hosted on MarineNet, seeing approximately 11,000 completions per year.


The mobile training team instructor staff is located within Training and Education Command, Range Safety and Design, aboard Marine Corps Base Quantico, Virginia. Not only do they travel domestically and internationally to provide instruction in these courses, they are responsible for drafting, reviewing and promulgating service-level policy on all aspects of range safety. This holistic approach to range safety allows direct

communication of Marine Corps policy to installation staff and shortens the cycle of policy development and promulgation to implementation.

The Range Safety and Laser RSO courses on MarineNet are the first step toward qualification as a range safety officer or officer-in-charge. These courses impart a fundamental understanding of range safety and MCO 3570.1.

Furthering education in range safety, the Interservice Range Safety Course (IRSC), Range Managers Toolkit (RMTK) course, and Weapon Danger Zone course are offered in a two-week block to maximize training time. Laser Range Management Tool, Range Airspace Management and Range Facility Management Support System are all offered between three and five times per year.

For information on course dates and locations, visit the Marine Corps Range and Training Area Management (MCRTAMS) CAC-required website at <https://rtam.tecom.usmc.mil>. Here you can view ranges and training areas offered at Marine Corps installations, view current Safety of Use Memorandums, learn about our range safety partnership with the Army and allied brethren, and find points of contact at Marine Corps range facilities. >>>



U.S. Marine Corps Lance Cpl. Michael Canalesgonzalez, a machine gunner with the Battalion Landing Team 1/6, 26th Marine Expeditionary Unit, fires a M240B machine gun during a raid on Marine Corps Base Camp Lejeune, North Carolina, Feb. 2, 2023. (U.S. Marine Corps photo by Cpl. Nayelly Nieves-Nieves)

# 101 Critical Days of Summer

## Article courtesy of Naval Safety Command

The beginning of summer typically means it's time to play ball, go fishing, hiking, camping or simply relax and have a backyard barbecue with family and friends. Whatever you're into, apply risk management strategies when planning summertime activities. However, many things that often go wrong in off-duty activities are easy to anticipate and avoid.

The leading causes of summer injuries and deaths in the Navy and Marine Corps include:

- Motor vehicles
- Team sports
- Activities around the home
- Outdoor recreation

Over the 2022 101 Critical Days of Summer safety awareness timeframe between Memorial Day and Labor Day, 29 Marines and Sailors were killed in off-duty vehicle crashes and off-duty recreational activities. Of those, 16 service members died in auto crashes, eight members died in motorcycle crashes and another five in recreational mishaps.

In fiscal year 2022, the Marine Corps lost 30 Marines in off-duty, private motor vehicle mishaps (18 auto-related crashes and 10 motorcycle-related crashes). In FY23, 13 Marines died in motor vehicle crashes as of April 19, 2023. Of those, 11 were killed in auto-related crashes and two were killed in motorcycle mishaps. There was also one pedestrian fatality. Situational awareness, speed and improper vehicle maintenance are all key components to the loss of our Marines in these mishaps.

Smart decisions go a long way toward maintaining our Marine Corps combat readiness. Remember, our forces are affected just

as drastically by an off-duty mishap as by one occurring at work or in combat.

The summertime season, from Memorial Day to Labor Day, is a period when many Marines are on the road traveling from one duty station to the next, riding or buying motorcycles with little to no recent experience, visiting family, attending beach parties, cookouts and other summer events. The potential for mishaps rises during this timeframe.

Combining summer fun with alcohol consumption, hot weather, not enough rest and high-risk activities is a recipe for disaster. As a Marine, you have the responsibility to prepare for and go into combat at any time. At home, you have a mission on a personal level to be there for your family, friends, fellow Marines and to prevent tragedies that occur when people don't manage risk and make poor decisions.

One tool commanders use to assist in summertime mishap prevention is the Ground Climate Assessment Survey System (GCASS).

Surveys are available at <https://SemperFiSurveys.org>, to include PMV, Recreation/Off Duty, Drinking and Driving, and other surveys commanders can use for anonymous feedback from their unit or command. Surveys are specifically designed and tailored to help spot deficiencies and plan for pre-summer safety events and operational pauses. SemperFiSurveys.org also provides issue papers, which highlight and provide analysis of current problems identified in recent anonymous survey answers.

*Check out the SemperFiSurveys site here or use the link above!*







U.S. Marines with the 22nd Marine Expeditionary Unit play basketball in the well deck of USS Fort McHenry (LSD-43). (U.S. Marine Corps photo by Lance Cpl. Antonio Garcia)

# UNDERWATER EGRESS TRAINING

*By Navy Lt. Valentino Bailey, MSC,  
Aviation Survival Training Center, Whidbey Island*



**U**nderwater Egress Training (UET) is a challenging training event that gives amphibious Marines and Sailors initial proficiency in critical, lifesaving skills. UET delivers classroom instruction and hands-on experience to Marines and Sailors, giving them the knowledge and skill to safely egress from a submerged vehicle or aircraft.

Marines and Sailors are required to successfully complete this training prior to amphibious operations to gain proficiency in lifesaving procedures, gain confidence in their ability to successfully egress from a sinking vehicle, and to gain confidence in their floatation equipment and emergency breathing equipment.

**The practical, hands-on portion of UET takes place in the pool and has three distinct events based on the crawl, walk, run approach, and each even builds on the previous events:**

**1) How to safely use the Supplemental Emergency Breathing Device (SEBD)**

**2) How to release your seat harness, find, and open an escape hatch while underwater without getting disoriented**  
**3) Evacuation and egress from a sinking or submerged vehicle.**  
**Each event builds on the previous events.**

During SEBD training, you will be in the shallow end of the pool to learn how to breathe using the SEBD bottle while underwater and surface in a safe manner. Instructors will make sure you can do this proficiently and safely.

During **Shallow Water Egress Training (SWET)**, also in the shallow end, you will practice getting out of your seat underwater and egressing out an escape hatch. You will be flipped upside down underwater, then have to open your exit, release yourself from your harness, and escape through your exit. Instructors will teach you how to do this properly so you can successfully repeat the process in the dunker during the next and final phase of UET.

The dunker is the culminating event and the most challenging phase of UET. You will build on what you have done with the

U.S. Marines assigned to the 15th Marine Expeditionary Unit and to 1st Light Armored Reconnaissance Battalion, 1st Marine Division, prepare to enter the Modular Amphibious Egress Trainer during underwater egress training at Marine Corps Base Camp Pendleton, California, Jan. 9, 2023. (U.S. Marine Corps photo by Lance Cpl. Garrett Kiger)



SEBD bottles and in the SWET chairs to apply what you learned on a larger scale. You will practice under a variety of conditions, including under simulated night conditions. This training will give you confidence yourself and your lifesaving equipment, which will help you survive a sinking vehicle.

Investigations following the Assault Amphibious Vehicle (AAV) mishap in July 2020 indicated several areas where training related to UET could be improved, especially areas related to survival swimming and comfort in the water. Some of these improvements have already been made and others soon will be.

One of the most noticeable changes that some Marines may have seen is the delivery of SWET chairs to several schoolhouses (including Schools of Infantry, The Basic School, etc.). The purpose of these SWET chairs is to increase familiarity with the skills you will practice at UET, to enable a more successful UET experience.

Changes to how Marines are being trained to swim, as well as required swimming proficiencies they will need to meet, are evolving as well. Improving swimming proficiency will lead to greater confidence and comfort in the water, which will lead to greater success in UET and real-world amphibious operations.

The July 2022 capsizing of an Amphibious Combat Vehicle (ACV) during training on Camp Pendleton, California, emphasized the benefit of this increased focus on basic water survival, swimming skills and UET procedures. All Marines in that incident were able to evacuate their ACVs under challenging surf conditions with at most minor injury. These skills were developed through the new swim standards and honed both in UET and in unit practice.

This should give Marines confidence that their swim training and UET will help them survive incidents or mishaps during amphibious operations, as well as emphasizing the need to maintain skill currency through guided practice and repetition.

*Continued on next page*



U.S. Marines are submerged into water in the Modular Amphibious Egress Trainer during underwater egress training at Marine Corps Base Camp Pendleton, California, Jan. 9, 2023. (U.S. Marine Corps photo by Lance Cpl. Garrett Kiger)

## SUPPLEMENTAL EMERGENCY BREATHING DEVICE (SEBD):

The SEBD provides a small amount of compressed air to assist in escaping from a submerged vehicle. Proper employment of this equipment is an important safety margin during underwater egress. When the SEBD bottle has been used during real-world underwater egress scenarios, it was reported that the SEBD bottle helped them focus, work through their procedures, and escape the vehicle in an efficient manner.

### **Conduct pre-mission checks**

**Using a SEBD requires you to perform the correct pre-mission checks. Before use, the SEBD needs to be prepared by first examining it for any damage and making sure the regulator appears to be in good repair.**

- Turn the knob until the bottle is “on” and check the charge on the gauge. The needle should be well into the green section on the gauge.
- Listen for any leaks in the hose or the regulator. If you observe any damage or leaks, or the bottle is not properly charged, turn it in and draw a new one.
- Once you turn the bottle on, stow it and leave it in the “on” position so it is ready to use if you need it during water operations.

## TIPS FOR SUCCESS DURING UET:

**Practice swimming the basic strokes in a pool, in a bathing suit or in your uniform, whichever feels more comfortable.** Being able to swim the basic strokes without gear will make you more comfortable in the water. Comfort in the water leads to confidence in the water, which will help you to succeed when you start adding uniforms/gear and ultimately while attending UET. If you need help with swim instruction, start with your Marine Corps Instructors of Water Survival (MCIWS).

**Listen during the classroom portion and to the instructors on the pool deck while at UET.** Do not be afraid to ask questions if you need clarification. The UET instructors are highly qualified, dedicated and motivated to help you learn the material and succeed, not just while at UET, but in a real-world scenario. If you are struggling with a skill, the instructors will give you as much remediation on the spot as they can.

**If it is your first visit to UET training, talk to people in your unit who have been through it.** Additionally, there are videos on YouTube and Marines.mil that can show you the training and help mentally prepare you. UET is challenging, and it can be frightening, but by preparing well, listening to the instructors, and perseverance, you can succeed. You may even enjoy the training.

**If you have been to UET, help those who haven't by giving them an honest, straightforward explanation of what to expect.** Help them prepare in the pool to improve their swimming abilities and increase their comfort and confidence in the water.

# High-Risk Training

By George Arici, Naval Safety Command

**N**avy High-Risk Training (HRT), since its inception, has always had roots deep within risk management.

The guiding policy for HRT is OPNAVINST 1500.75D, which has had four revisions since its inception. Naval Safety Command (NAVSAFECOM) assessment teams identified multiple instances where the instructions were misinterpreted during assurance and assessment visits.

One of the most contested requirements is that HRT is based on the initial Risk Assessment Code (RAC) and not the residual RAC. This has always been a sticking point with many commands, but as we mentioned earlier, HRT has deep roots within risk management, and a complete and thorough understanding of the risk management process would alleviate this confusion.

In the military, our goal is to complete the mission. Everything leading up to the execution of the mission is a series of training evolutions or events developed over the years through lessons learned and best practices to ensure the success of the operation. Anything that jeopardizes this ultimately jeopardizes the success of the mission. To ensure mission success, we need to identify all hazards associated with the training. If we don't identify all hazards in the training, we miss the opportunity to identify all potential hazards that keep us from successful mission execution.

One of the things that helps us during this process is the development of a Deliberate Risk Assessment (DRA). When developing a DRA, it is imperative that it be completed by a subject matter expert, as they have a thorough understanding of all the mechanics of the evolution. If the hazards are correctly identified and assessed, this will lay the groundwork to create lessons learned from the event. If process improvement is implemented for the DRA, it will produce an enhanced and comprehensive risk management product and ultimately, a better training product.

The reason we use the initial RAC instead of the residual RAC in HRT is because of the controls. Controls are implemented prior to reassessing the hazards that would produce the residual RAC. The implementation of controls is critical and can make or break the success of the DRA. Properly implemented controls require personnel, resources and a properly implemented mechanism that evaluates the effectiveness and success of the control.

Often we identify that a control or multiple controls are not being implemented because of a human decision. For example, there may be a need for an extra body on the pool deck or additional resources from outside the command that are not being obtained because someone made the decision not to.

The concern is that if it's possible to complete the mission without the required or recommended controls, commands may normalize getting the job done at any cost without realizing they're putting the entire evolution at risk. This mindset ultimately jeopardizes the command, personnel and mission. If a potential hazard that had an initial RAC of Extremely High (EH) or High (H), and the implementation of the control reduced the potential hazard to Medium (M) or Low (L), then the moment the implemented control is removed, the probability and severity for a mishap to occur increases exponentially to that of the initial RAC assessment. There is no room "to do without" when the safety of Marines and Sailors is at stake.

Military operations are inherently dangerous, so it is not uncommon that our training similarly reflects the dangerous environment that we operate in. During the training process, we need to take a step back, slow things down, and take the time to create processes that increase the success of the training, which ultimately makes us better warfighters. If we don't treat and manage the EH and H hazards, we are creating an opportunity for a mishap to occur. >>>



U.S. Marine Corps Sgt. Blake Bowen, assigned to the 31st Marine Expeditionary Unit, participates in a fast rope training evolution aboard USS Tripoli (LHA 7) Sept. 9, 2022. (U.S. Navy photo by Mass Communication Specialist 1st Class Peter Burghart)



# HAWTHORNE

# MORTAR MISHAP

**By Mike Del Favero, Naval Safety Command**

**O**ne of the most important things we must do as military leaders is learn from our mistakes and the mistakes of others. However, human nature can lead us to focus on current issues and put the past behind us, which can result in compacency toward those same past problems.

A 2018 study by the Naval Safety Command (NAVSAFECOM) found it takes roughly six months for an organization to forget the lessons gleaned from a mishap, and to stop being vigilant against making the same mistakes.

*Note: A summary of the study, [The Half-life of Scared](#), LL 19-13, is available on the NAVSAFECOM website under Safety Awareness Dispatches.*

U.S. Marine Corps Pfc. Christopher Fennel, a mortarman with Weapons Company, 3rd Battalion, 1st Marine Regiment, 1st Marine Division, carries an M224 60mm mortar system to a range during a Tactical Small Unit Leaders Course at Marine Corps Base Camp Pendleton, California, Jan. 31, 2022. (U.S. Marine Corps photo by Lance Cpl. Brayden Daniel)

With this in mind, we are long overdue in revisiting one of the most catastrophic ground mishaps in Marine Corps history, the 2013 Hawthorne mortar mishap. During this event, a 60mm mortar detonated in the tube, killing seven Marines and injuring seven other Marines and one Sailor during a night Live Fire and Maneuver (LFAM) event, held in conjunction with a Mountain Warfare Training Exercise (MTX), at the Hawthorne Army Depot (HWAD).

#### **BACKGROUND: TRAINING BEFORE MTX**

A battalion was slated to participate in an MTX in March 2013, and was also tasked to support a Request for Forces (RFF 1200), requiring a company to deploy for security force operations in Kuwait from September 2012 to January 2013. Company A received the RFF 1200 tasking, reorganized in June 2012 and conducted training independently from the battalion until their deployment in September. As a result, Company A did not participate in the June 2012 through January 2013 pre-

deployment training with the rest of the battalion. The missed training included train-the-trainer refresher events and crew-served weapons live-fire shoots to sustain individual, team and squad/section weapons proficiency. The unit also missed the live-fire, company-supported attacks and the crew-served weapons shoots the rest of the battalion executed in December.

Instead, Company A's training focused primarily on security force training. Specifically, they did not conduct any live-fire mortar training before deploying and did not deploy with their mortars. They conducted a limited call for fire and Fire Direction Center (FDC) while in Kuwait, but this was the extent of the mortar section's ability to train to their military occupational specialty until January.

Upon returning from their deployment in January 2013, Company A conducted fire team, squad and platoon-level fire and movement training. The mortar

section completed conventional mortar training, but none of it was live fire. Subsequently, the day and night live-fire attacks on March 18 (the day of the mishap), were the first times the mortar section had fired their weapons systems since June 2012.

In addition to the deviated training and deployment schedule, Company A faced the friction of a heavy leadership turnover in the months before the MTX. Upon returning from Kuwait, the company commander, executive officer, weapons platoon commander and weapons platoon sergeant rotated out of the company. The mortar section leader, a sergeant, was moved into the vacant weapons platoon sergeant billet. A corporal from the assault section was undergoing cross-training for the mortar section leader role but had no substantial experience with mortars.

There were personnel rotations at the junior Marine levels as well.

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U.S. Marine Corps Lance Cpl. Nathaniel Wesley, left, and Lance Cpl. Victor Pinto, mortarmen assigned to Charlie Company, Battalion Landing Team 1/1, 11th Marine Expeditionary Unit, fire an M252A2 81mm mortar system during a night live-fire exercise, Oct. 3, 2021. (U.S. Marine Corps photo by Sgt. Jennessa Davey)



Before the assignment to RFF 1200, half of Company A's 60mm mortar section was filled by Marines transferred from the 81mm mortar platoon. Four Marines were also assigned directly from the School of Infantry just after returning from Kuwait.

When they attended MTX, five of the mortar men in the section had participated in the SOI Advanced Infantry Training Battalion Mortar Leaders Course the previous summer, but the rest of the section had little experience as a unit with the 60mm mortar system.

Additionally, the section did not have a training cycle to gain experience before attending MTX. Despite this factor, battalion leadership shared a view that the Company A mortar section was "highly trained" because their mortar section leader, who had been elevated to platoon sergeant, was regarded as the best mortar man in the battalion. With this mindset, the battalion leadership

was confident Company A could safely execute R500.

## LFAM PLANNING AND PREPARATION

The battalion infantry weapons officer (Gunner) was tasked to plan, coordinate and oversee the R500 training evolution. The battalion operations officer checked into the battalion after the planning conference was complete and did not involve himself with this oversight.

The R500 portion of the MTX was planned to occur after the approximately monthlong mountain training evolution. During the event, each company would conduct a full company attack supported by their 60mm mortars and medium machine guns. They each prepared separate plans approved by battalion leadership and HWAD Range Operations. Company A's scheme of maneuver called for a sequence of platoon attacks versus simultaneous attacks.

The company planned to place their mortar section directly in line with the assault section on their left and the machine gun support by fire position to their right to alleviate the geometry of fire concerns.

Each company had 48 hours to finalize and rehearse its plans before the live-fire evolution. Company A was deliberately placed last in the company rotation to maximize their time to plan and prepare while on the range since they only recently returned from Kuwait.

While waiting for their turn in the rotation, Company A's leadership conducted range walks and identified the specific position for their mortars. The day before the live fire, Company A's leadership finalized and briefed the operations order. The company conducted a Rehearsal of Concept walk on a Terrain Model Rehearsal, followed by a company range walk without combat equipment, so everyone could see the maneuvering ground. Then, they conducted a full daytime and nighttime dry run with complete combat equipment.

During planning and rehearsals, the mortar sections recognized the position was a "little tight" because the position was smaller than what was needed to provide the conventional 20 to 30 meters between gun positions.

The section thus decided to set up in a "lazy V," with each gun approximately 5 feet apart. They also planned to use their mortars in the handheld method to support the attack.



A U.S. Marine with 3d Littoral Combat Team, 3d Marine Littoral Regiment, 3d Marine Division, fires a 60mm mortar at a live-fire range at Marine Corps Base Hawaii, Oct. 3, 2022. (U.S. Marine Corps photo by Sgt. Israel Chincio)





U.S. Marines with 2d Battalion, 6th Marine Regiment, 2d Marine Division, fire 81mm mortars during a live-fire training exercise at Camp Lejeune, North Carolina, Aug. 25, 2020. The Marines with V26 are training to expand their knowledge and abilities with mortars. (U.S. Marine Corps photo by Lance Cpl. Sarah Hediger)

## LIVE-FIRE ATTACK EXECUTION

Company A's plan for the day and night attacks was identical, except for using the mortar section to fire illumination rounds and the high-explosion (HE) rounds for suppression at night. The day attack went according to plan, but the firing mechanism on mortar 3 malfunctioned and was deemed inoperable. After the attack was completed, the mortar section determined they would not take mortar 3 on the night attack. They would use one of the two remaining mortars to fire the illumination rounds and the other to fire the HE rounds during the night attack.

To accommodate this setup and maximize section participation, the

mortar section leader and weapons platoon sergeant decided to reorganize the assigned positions. This reorganization placed some Marines in positions not previously held during the R500 planning or execution and with personnel they had not previously worked with on a gun team. Specifically, the Marine assigned to the mishap mortar as the gunner previously worked as part of the section FDC. The Marine assigned as the assistant gunner (loader) came from the 81mm weapons platoon and had limited experience on a 60mm mortar gun line. Leadership above the weapons platoon level was not made aware of the malfunction with mortar 3 or the decision to reorganize the assigned positions and use only

two mortar systems in the night attacks.

In preparation for the nighttime attack, the mortar section improvised a method for coordinating firing illumination with HE by using a stopwatch and firing tables to determine when to fire rounds. Coordinated illumination missions doctrinally require an FDC giving commands. Illumination is also doctrinally fired in conventional mode, not handheld.

The mortar firing position was in the same place for the night attack as the day, with the only difference being they had one less mortar.

*Continued on next page*

## THE MISHAP

Due to the terrain, the tubes were still placed approximately 5 feet apart. When the night attack began, the mortar section occupied their position and began their fire missions.

Each gun controlled its fires, with mortar 1 firing HE in a fire-for-effect mission and mortar 2 firing the illumination mission. Once on target, the section began to fire for effect, during which company standard operating procedures (SOP) dictated the half-load step was eliminated. Instead, the mortar squads loaded rounds as safely but as quickly as possible.

After either two or three rounds were observed downrange, a Marine in the assault section closest to the mortar position heard someone in the mortar section shout, "Misfire!" Immediately afterward, an explosion occurred in the mortar firing position.

A U.S. Marine with 3d Battalion, 4th Marines uses a rangefinder before firing an M224 60mm mortar system during Fuji Viper 23.2 at Combined Arms Training Center, Camp Fuji, Japan, Jan. 26, 2023. (U.S. Marine Corps photo by Sgt. Levi J. Guerra)

## POST-MISHAP ANALYSIS

Following the mishap, an explosive ordnance disposal team conducted a post-blast analysis of the mishap site, the debris from the mortar system and the mortar rounds' components. From the damage to the mortar tube and the locations of the various components of the rounds, the team determined a round detonated inside the mortar tube that was the direct result of a dual-feed explosion. They assessed that the assistant gunner began loading a round before the gunner fired the previous round. The second round was in the half-load position when the first was fired. The force of the first round striking the second at the top of the mortar system compromised the integrity of the fuse enough to cause a premature detonation in the tube.

# CAUSAL FACTORS

**Inadequate training and preparation for the complexity of the exercise.** The mortar section's tasking and training over the nine months before the mishap did not allow them to gain the necessary experience with their weapon system. They were also denied the ability to maintain section and individual proficiency as defined by the Infantry Training and Readiness (T&R) Manual, which requires sustainment interval training at least every six months to support company operations.

**Improper mortar gunnery commands/firing procedures combined with a perceived sense of urgency.** Firing in the handheld mode combined with the complex scheme of maneuver significantly increased the potential for a double feed. Delegation of fire control to the squad level further increased the potential for a double feed.

The gunner and assistant gunner did not follow proper loading and firing procedures as they attempted to fire as rapidly as possible while firing for effect. Doctrinally, load and fire commands must be used throughout execution of fire for effect missions.

Had verbal commands been used, the assistant gunner would not have loaded the second round until the gunner had fired the previously loaded round and was given the order to load. Proper firing procedures also dictate the gunner looks

over the top of the mortar tube while squeezing the trigger when firing in handheld mode. If the gunner had done this effectively, he would have observed the assistant gunner beginning to load a second round.

**Ineffective supervision of the mortar section during the R500 evolution and in the months prior.** Battalion leadership overestimated the capabilities of the Company A mortar section because of the proficiency of the previous mortar section leader as a mortar man and the number of advanced mortar leader course graduates. This assumption led to relaxed supervision and oversight resulting in an inadequate assessment of their training experience in the months before MTX and failure to recognize their lapse in proficiency mandated by the Infantry T&R Manual.

**Ineffective risk analysis on the mortar firing position.** The section reorganization between the day and night evolutions disrupted gun team cohesion, reduced value of the rehearsals and increased potential for gun line error. The close positioning of mortars 1 and 2 and crowding of personnel on the mortar firing position increased friction on the gun line and contributed to the number of casualties. It is possible the confusion caused by two mortars firing closely together resulted in mortar 1's assistant gunner mistaking mortar 2 firing for his mortar, leading to his decision to begin loading another round.

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## RECOMMENDATIONS

The causal factors above led to the following recommendations:

- To include guidelines on the minimum safe distance between weapon systems for the 81mm and 60mm mortar during live-fire training in the DA PAM 385-63 Range Safety / Marine Corps Order 3570.1C.
- To provide additional guidance on the purpose of employing mortars in the handheld mode, methods of engagement, and firing command doctrinal publications.
- For units to implement procedures to prevent individuals from being placed in positions they have not previously rehearsed during live-fire training exercises.
- For units to implement a training and certification process for position safety officers to ensure currency and qualification on the weapons and units they will supervise during live-fire maneuver training.

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# KEY TAKEAWAYS

Historically, the Marine Corps prides itself on doing more with less; less equipment, fewer people and less time. It's not in our nature to say something can't be done, but it's this mindset that may lead us into accepting and taking on excessive risk. There were numerous points where the Company A mortar section's ability to conduct this range exercise safely should have been scrutinized.

The unit knew they would be participating in an MTX, and it would have been prudent for the battalion to evaluate Company A's training and proficiency compared to the rest of the battalion when the company returned from deployment.

With nearly all of the company and weapons platoon leadership changing over, their replacements should have performed a realistic assessment of the capability of the unit they were now tasked to lead. When performing the risk assessment on the high-risk event planned for R500, battalion leadership should have identified the lapse in the proficiency of the mortar men.

That ingrained belief that our Marines can always get the job done likely clouded the leadership's judgment and ended in catastrophe. We must always find ways

to do more with less to figure out how to accomplish the mission. However, we must also be wary of overconfidence and committing to a task without considering if it can be done correctly and safely.

**Consider the following points as you lead and plan with your teams.**

**1. Make an honest assessment of your unit's capabilities.**

This assessment should be done when new leadership first checks in, after a significant change, before a major evolution and especially if these events coincide.

**2. Each level of supervision should provide checks and balances.**

From junior Marines to senior leadership, these checks go up the chain as well as down. The leadership chain should assess its subordinate units, but the subordinate units should also speak up if they haven't been given the tools to do the job.

**3. Don't just press the "I believe" button.** Don't be afraid to say your unit isn't prepared or you haven't been given the time or resources needed to accomplish the mission.

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**Speaking up takes courage, but it's the right thing to do, and it's the only way to adequately and safely train.**

**Your life and those of your fellow Marines could depend on it.**

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## SAFETY SPOTLIGHT



**Staff Sgt. Anthony Broncatello**

Ground Safety Officer

6th Marine Regiment, 2D Marine Division

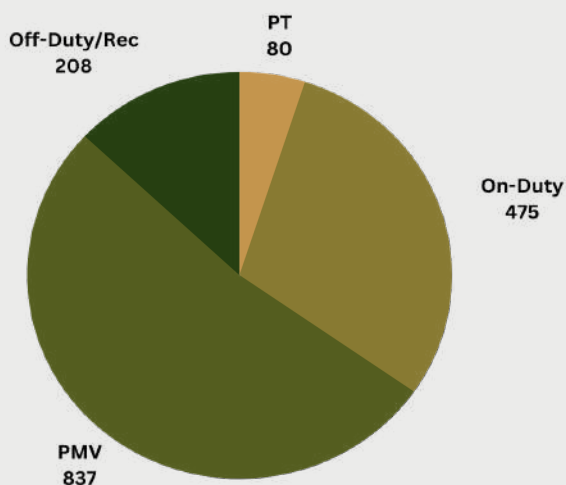
Staff Sgt. Anthony Broncatello has elevated the unit's program from the ground up, receiving recognition during a recent commanding general readiness inspection (CGRI). Broncatello also assisted subordinate battalions with their CGRI, all while serving in his primary billet as the regimental ammunition chief, where he coordinates all things ammo for the four battalions within the regiment. Broncatello calls, emails and coordinates questions, reports and training to ensure proper safety compliance. He is not afraid to use his executive officer for added support to ensure the program is on course.

# GARRISON VERSUS COMBAT FATALITIES

Since 2001, the Marine Corps has lost 1,600 Marines to motor vehicle accidents, off-duty or recreational accidents, physical training, and non-combat related on-duty incidents.

The Marine Corps lost 1,248 Marines over the last 20-plus years of combat operations. These charts show the number of fatalities by each operation or activity. Remember, even though our job potentially puts us in harm's way, the most harmful activities are the things we do every day.

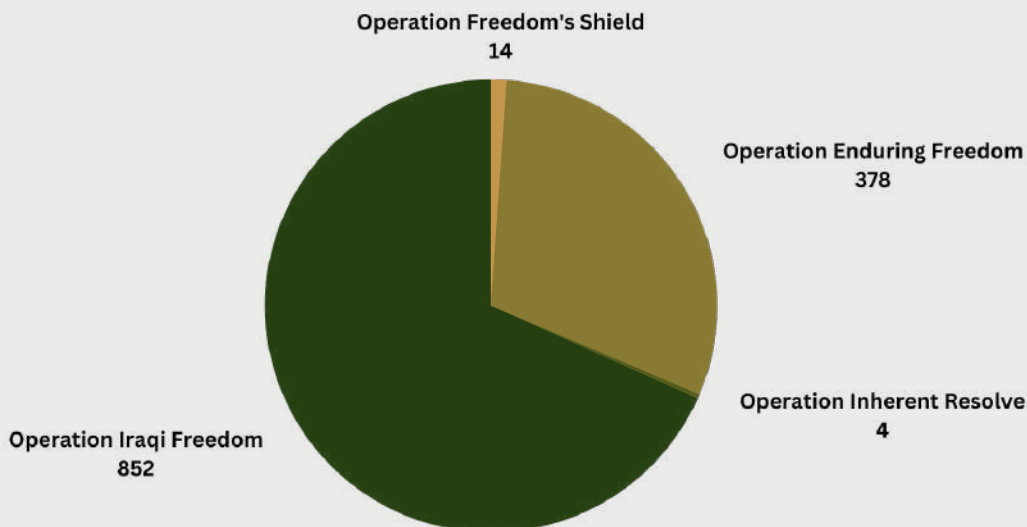
## OFF-DUTY FATALITIES 2001-2021



During 15 of the last 20 years of sustained combat operations, the Marine Corps lost more personnel to off-duty and training mishaps than combat operations.

We must ask ourselves: Why does it seem we are better at bringing our members home safely from combat but not the weekend?

## COMBAT FATALITIES 2001-2021



\*Operations Inherent Resolve and New Dawn had four and zero fatalities, respectively.

# ENERGY DRINKS: WHAT'S THE CONCERN?

Article courtesy of  
Operation Supplement Safety Program Office

**E**nergy drinks and energy shots are promoted as energy boosters or as “body fuel” to improve physical and cognitive performance. Service members report using these products to give them “the edge” for increased alertness, energy and decreased mental fatigue; to provide that physical boost in order to complete the mission. We know that caffeine — a main ingredient in energy drinks — can be beneficial when used in appropriate amounts and times, for physical and cognitive performance. So what’s the concern with energy drinks?

## Caffeine content in energy drinks

Most energy drinks and energy shots contain 100–300 milligrams of caffeine per serving — as much as the caffeine in 3 cups of coffee — with amounts that vary depending on the product. Depending on the size, they might contain anywhere from 50 to 500 mg of caffeine in any one product.

For example, energy shots contain more caffeine in a very small serving and are consumed quicker than an energy drink. Some products may not have the amount of caffeine listed on the label, and there may be other sources of caffeine from other ingredients. As such, the total amount of caffeine may be unknown.

## Other ingredients in energy drinks

In addition to caffeine, energy drinks and energy shots usually contain various combinations of other ingredients. Examples include taurine, B vitamins, various herbal extracts such as Panax ginseng, yohimbe, or other stimulants beyond caffeine, amino acids, sugar or other sweeteners. Some ingredients may be contained in a proprietary blend, also known as a “complex,” “matrix,” or “proprietary formulation.”

The specific amount of each individual ingredient in a proprietary blend does not have to be listed; only the total combined amount in the blend must be given. That is important when other stimulants in addition to caffeine are included.

**ENERGY DRINKS**

REVVING YOU **UP** OR BRINGING YOU **DOWN**?

Feeling jittery, can't seem to focus, or having trouble sleeping? It could be your energy drink!

**THINK BEFORE YOU DRINK**

**Limit your consumption**  
Don't mix with alcohol

**Don't consume before bedtime**  
Don't consume if you're pregnant

**Should not be consumed by children**

**CHAMP**  
Uniformed Services University

**OPERATION SUPPLEMENT SAFETY | OPSS.ORG**

Use caution with energy drinks and energy shots.  
Learn more at [OPSS.org](http://OPSS.org).

## What's considered an appropriate amount and timing for caffeine intake?

- Caffeine intake should be limited to 400 milligrams per day unless it is being used to sustain performance during extended wakefulness.
- In general, up to 200 mg of caffeine — about the amount in 2 cups of 8-12 ounces of brewed coffee — at any one time is appropriate.
- Caffeine takes about an hour to reach peak blood levels. Consuming caffeine about 30-60 minutes before a workout, training session, work shift or mission will likely get you the best results.
- Another dose of caffeine might be needed after 3-4 hours to help you stay alert or active for a long period of time.
- However, you should not exceed 600 mg of caffeine per day, or 800 mg for sustained operations.

### **It's important for Marines and Sailors to know what they are consuming.**

- Claims made for energy drinks and energy shots, such as giving you that "extra edge" or "high performance," have not necessarily been confirmed by scientific evidence to show they will work as intended.
- There is absolutely no way to know how the combinations of ingredients in energy drinks and energy shots might interact in the body. In addition, there is no way to know whether they might contain ingredients that will NOT provide additional benefit for physical and mental performance compared to caffeine alone.
- Consuming energy drinks and energy shots may interact with prescription medications or other dietary supplements and could negatively affect health and performance.

More and more products are emerging onto the market, touting not only to boost energy, but to help with focus and mood. Marines and Sailors need to know what they are consuming.

### **Energy drinks might have a negative effect on performance.**

Ample research shows the benefits of caffeine on performance. For example, we know caffeine can enhance cognitive performance in sleep-deprived populations in terms of attention, vigilance, reaction time and problem-solving, as well as physical endurance. But when caffeine isn't taken at the right times in appropriate amounts, it can have adverse consequences on cognitive and physical performance.

According to the Food and Drug Administration, 400 mg of caffeine per day is "not generally associated with dangerous, negative effects" for healthy adults. Too much caffeine, however, can lead to headaches, insomnia, nervousness, irritability, fast heartbeat, muscle tremors and frequent urination.

Intake substantially over 400 mg, or excessive caffeine use, could lead to more serious concerns. And this just refers to caffeine. Most single ingredients on these products labels have not been researched in terms of their effects on health and performance, nor in combination with each other or caffeine.

Common adverse effects reported by military personnel after consuming an energy drink or energy shot include nervousness or jitters, feeling drained 4–5 hours afterward and rapid heartbeat.

Service members report increased use of energy drinks and energy shots, especially during deployment. Adverse effects seem to be related to the frequency of use. That is, the more the drinks are consumed, the greater the likelihood for adverse effects, which can affect the ability to perform, stay mission-ready and maintain optimal health.

### **Did you know energy drinks could put you in the emergency room?**

- Energy drinks have been linked to an increase in emergency room visits.
- Published case reports have linked energy drink consumption to physiological effects such as chest pain, kidney

injury, serious arrhythmia, myocardial ischemia, seizures and even death.

### **Did you know energy drinks can make you crash and burn — rather than combat fatigue?**

- Although an energy drink might help combat fatigue, consuming two or more energy drinks per day, 24 ounces or more, could do just the opposite by causing fatigue or even leading to sleep problems such as insomnia. Studies have shown consumption frequency to be related to poor sleep quality and other such sleep disturbances.

### **Did you know energy drinks can negatively affect your mental performance — rather than help you focus?**

- Mental health problems associated with energy drink use in the military have been reported, such as depression, anxiety, PTSD, suicide ideation, aggressive behaviors and alcohol misuse.

The bottom line is service members are consuming energy drinks and energy shots, and it is important to know how to use wisely. Adverse effects are commonly reported, some of which can seriously interfere with the ability to perform. We also know that more is NOT necessarily better.

Marines and Sailors can access educational resources and tools on OPSS.org to help make informed decisions about energy drink use. In addition, users can access the Ask the Expert portal to ask questions about dietary supplements and receive evidence-based answers. All inquiries are confidential. Marines and Sailors can also access human performances resources through HPRC-online.org for information about ways to maximize performance, fitness, wellness and nutrition.

Below are some key tips to consider when reaching for an energy drink — based on what we know — to help keep you informed, safe and mission-ready.

### **Tips when considering an energy drink product:**

- Keep a mental tally of how much caffeine you consume in a 24-hour period.
- Read the Nutrition Facts or Supplement Facts label to determine how many servings and the amounts of caffeine and other ingredients per serving are in the product.
- Look for products that contain 200 mg of caffeine or less.
- Avoid energy drinks and shots before, during and after strenuous physical activity.
- Stop using at least 6 hours before bedtime.
- Do not use energy drinks for hydration; they are not sports drinks.
- Do not mix energy drinks or shots with alcohol.

**Disclaimer:** The opinions and assertions expressed herein are those of the author(s) and do not reflect the official policy or position of the Uniformed Services University or the Department of Defense. The contents of this publication are the sole responsibility of the author(s) and do not necessarily reflect the views, opinions or policies of the Henry M. Jackson Foundation for the Advancement of Military Medicine. Mention of trade names, commercial products or organizations does not imply endorsement by the U.S. government.

# INCREASING YOUR COMFORT LEVEL IN THE WATER, PT. 1

*By Navy Lt. Valentino Bailey, MSC, Aviation Survival Training Center, Whidbey Island*





**A**s a former U.S. Army Soldier, I spent the majority of my military career supporting land combat operations as a contingency contracting officer. After graduate school in 2020, I decided to transition to the U.S. Navy and become an aerospace and operational physiologist. In my transition from the Army to the Navy, one thing that kept coming up in conversations was how comfortable and competent I would need to be in the water.

Until this point, the entirety of my 18 years of military service had been land-based with the occasional water survival lab thrown in. In these water survival labs, I would push through the evolution each time without putting much effort into getting better in between. I considered myself fair at best in the water, and I was by no means an accomplished swimmer, but I did have one thing going for me. I was able to maintain my composure and not overreact in challenging situations. I credit this to my Army training and multiple combat deployments.

Becoming an aerospace and operational physiologist did not just mean working with the flying aspects of aviation, it also meant dealing with water survival. My transition to the Navy would hinge on the ability to adapt well to a water environment under arduous conditions. I would be required to not only pass a second class swim qualification, which is similar to intermediate Marine Corps Water Survival, but also be capable of teaching all the water evolutions at an Aviation Survival Training Center. With just over a year of lead-time, I had to get to work to be successful as my future position at the Aviation Survival Training Center demanded it. With that in mind I focused on three things;

- 1. Exposure**
- 2. Composure**
- 3. Visualization**

My plan was to get in the water at least two out of every three days or 220-plus days over the next year. This exposure was critical because it provided the foundation necessary to attain the competence and comfort required for success. Comfort in the environment is vitally important and reduces the probability of panicking or acting irrationally. This comfort can only come from deliberate exposure to the environment.

Learning to be composed in water events became an asset. Composure is the prerequisite skill to all the other skills. Composure is self-control in action, which is necessary in stressful situations. I continued to expose myself to increasingly more uncomfortable situations. The upside to this exercise was the ability to control my emotions and actions in extremely uncomfortable situations. Exercising composure helped unlock how capable my body could be.

The third area I focused on was positive visualization. Visualization taught me how to respond to a situation before it happened. Visualization works by conditioning the brain to see, hear, and feel the success. Visualization also provided the opportunity to set my mind and body up for success in a safe environment. When you imagine every step of an event or activity going well, you prepare your mind and body to take those steps, leveraging this powerful tool.

In the end, these steps helped me successfully complete three swimming evolutions along my path to becoming a physiologist. I am currently providing water survival training to military members across five services at Aviation Survival Training Center, Whidbey Island. >>>



# INCREASING YOUR COMFORT LEVEL IN THE WATER, PT. 2

*By Navy Lt. Matthew Carnal, MSC, Aviation Survival Training Center, Whidbey Island*


A U.S. Marine participating in the Water Survival Advanced course conducts an endurance swim on Marine Corps Air Station Futenma, Okinawa, Japan, July 21, 2022. (U.S. Marine Corps photo by Lance Cpl. Thomas Sheng)

**G**en. Alfred M. Gray once said, “Every Marine is, first and foremost, a rifleman. All other conditions are secondary.” This is true, and considering the earth’s surface is composed of 71% water, there is a high probability that a rifle will be carried while crossing a body of water during one’s Marine Corps service.

Within the Marine Corps, the term “amphibious” indicates Marines will be operating in, around or over water. Comfort in the water environment for Marines has been a major concern for safety since the first World War and that concern continues today, per the Marine Corps Water Survival Training Program (MCWSTP) as outlined in Marine Corps Order 1500.52D (2010).

Following the July 2020 assault amphibious vehicle mishap where eight Marines and one Sailor perished at sea, the Marine Corps responded with several actions to improve safety during waterborne operations to include reviewing curriculum, underwater egress training, and safety practices and procedures, among others.

Resulting changes to standards over the last two years to improve Marine comfort and proficiency in the water proved successful in the recent amphibious combat vehicle capsizing events.



So what does it mean to be comfortable in the water? Comfort in the water is the ability to counter fear that can occur when dealing with the constantly changing maritime environment. If one can stay focused on the moment and keep fear at bay, the probability of survival increases.

To develop comfort in the water, one needs to get in the water frequently, not just during a training evolution to collect a certification. Currency and proficiency go hand in hand and should never be taken for granted. Similar to range training to maintain marksmanship, a Marine should hone water survival skills in the pool and open water to maintain proficiency in the skills needed to reduce fear, increase self-confidence and increase survivability.

Getting in the water is the first step to getting comfortable in the water, even if someone is fearful at first. The second step is to be comfortable with holding your breath while your face is submerged. This is often the moment when inexperienced swimmers are most fearful due to the unfamiliar environment. Most people

can hold their breath comfortably for 25–30 seconds or more, however, it is easy to forget this when uncomfortable, and panic can result.

The third step is to master the aquatic survival skills needed in survival situations. Becoming comfortable in water is not an easy challenge, but it is necessary to perform the duties of a Marine. Spending time working on a Marine's lack of confidence in aquatic environments will help them overcome fear or discomfort, prevent panic and increase the range of aquatic conditions in which they can operate effectively. Once comfortable in the water, the next step is to focus on survival swimming skill sets without gear to ensure increased confidence in the marine environment, adding gear as comfort level and proficiency increases.

**Marines should master the following survival swimming skills:** The survival float, survival breaststroke, survival side stroke, survival backstroke, survival freestyle and treading water.

### **Survival Float**

The survival float, i.e., drownproofing, is a maneuver used to help a Marine survive in a body of water for a long period of time. The swimmer is bent at the waist with hands out to allow the body to float face down. The individual takes a deep breath of air, completely filling the lungs, which serves as a flotation aid and buoyancy. The individual leaves their body face down in the water until they need to take another breath. The face-down position ensures no waves crash over the face, flooding the mouth and nose with water. This also puts the body in a position to see the direction one is floating. Transitions to a swimming stroke are quicker with this face-down approach than floating on the back. Individuals use their hands in a sculling motion to help raise the head up out of the water for another breath.

The **sculling motion** is performed with hands out in front, pushing the hands away laterally and then pulling them back to the middle of the body. During the sculling motion, the hands should be cupped and at a 45-degree angle to the

surface of the water. Then the hands are pulled back to the midline of the body at a 45-degree angle, which allows downward pressure on the water to keep the head at the surface of the water line. The entire sculling motion should be done on a five-second count to ensure the body stays in a relaxed state. No kick should be needed when doing the maneuver correctly, but if an individual finds themselves sinking below the surface of the water line, i.e., Marines with lean body compositions, using a modified frog kick can help propel the head up out of the water to refill the lungs and assist in getting the mouth above the water line. However, minimal kicking should be used to minimize energy expenditure.

**Things to avoid:** penciling, kicking and moving the arms too quickly. Penciling is defined as switching the body from the bent position to a straight position vertically in the water, if this occurs the body will sink, not allowing the head and face to stay at the water line. If one kicks or moves their arms quickly, they are not conserving energy, which could induce panic. The survival float is all about

remaining calm and conserving energy in the water. The challenge comes when transitioning to wearing gear, which is more difficult and can induce panic. However, if you can float in swimming trunks, you can float while wearing gear.

**Treading water** is a skill used to keep the mouth and nose above the water line for continuation of breathing. A Marine should be able to tread water for a minimum of five to seven minutes, with or without gear. This allows for tasks such as inflating a flotation device, scanning the horizon for enemies, or scouting for a safe place to swim. Treading water is when the swimmer moves their hands in a sculling motion, while simultaneously using a modified frog kick to keep their head above the surface of the water. Many think treading water will come naturally, but it's a skill that needs to be practiced to ensure proper form, as timing the simultaneous sculling motion and the modified frog kick is a learned skill set.

*Continued on next page*

# SURVIVAL STROKES

## Survival Breaststroke

The survival breaststroke is the primary stroke used in a survival situation because it puts the swimmer in a position to transition to survival floating if necessary. It allows the swimmer to see which direction they are headed, helps keep them calm and comfortable in the water and also optimizes and conserves vital energy needed during a survival scenario. The survival breaststroke differs from the regular breaststroke in that the survival stroke is slower and less continuous than the regular breaststroke.

Starting in a glide position, the swimmer kicks off the side of a pool and glides as if they are lying face down in the water. From this glide position the swimmer should be able to count to three before coming to a stop. The next stroke should only be performed when the swimmer has lost all momentum from the last stroke and is beginning to come to a stop in the water. This pause in strokes allows for energy conservation and reduction of panic responses that can be triggered when one does not feel in control.

Once the swimmer has come to a stop, they pull their hands back in the sculling motion and do a full frog kick, propelling themselves forward. The kick should be done the same time the hands are moving forward back into a glide position. The same should be done in an open water situation; however, no walls are present in open water, therefore it should be stressed in training to make the needed transition from vertical, to semivertical, to a horizontal position in the water when starting this stroke.

**Remember, the survival breaststroke is done slowly and is not a race.** During certification, many people will just want to complete the evolution, but in a survival situation, you may need to do this survival stroke for hours without a flotation device. In a survival situation or any high-risk situation, desperation or panic may get the best of you. At this time, remaining calm will ensure you can use the skills you have honed and increase your chance of survival.

## Survival Sidestroke

The survival sidestroke is an alternative to the survival breaststroke and should only be used to offset the survival breaststroke when needed for energy conservation and comfort in the water. The survival stroke is different from the combat side stroke due to the fact that the face is out of water the entire time. Many Marines and Sailors like this stroke the best because their face is out of the water, but this is not the most efficient stroke in a survival situation.

This stroke is done on either side of the body and is broken into two parts: hand motions and kicking. One should picture themselves lying on their side with the bottom hand reaching out to grab a handful of water. At the same time, the top hand is reaching across the body and meets in the torso, creating a movement of water between the hands.

Simultaneously, the legs are creating a scissor-like motion with the top leg reaching out in front and the bottom leg sweeping in the opposite direction. As arms are getting back into the superman position, the legs come together, creating a forceful kick that propels the body forward. The face is looking straight up



U.S. Marine Corps Recruit Emilygrace Seaman with Charlie Company, 1st Recruit Training Battalion, executes swimming techniques during a physical training event at Marine Corps Recruit Depot San Diego, California, March 24, 2023. Marines are expected to sustain proficiency in the water to maintain combat and survival readiness. (U.S. Marine Corps photo by Lance Cpl. Jacob B. Hutchinson)

the entire time, which keeps the eyes and mouth out of the water. Downfalls of this stroke are due to the mouth and nose being subject to waves crashing over them and the upward position of the face so that the individual is unable to navigate in a straight line.

### Survival Backstroke

The survival backstroke may be of use when the swimmer knows what is behind them and they have a life preserver that makes the other strokes difficult to use. As with the survival breaststroke, the survival backstroke is not like a regular backstroke, as the hands sweep up alongside the body and reach out as if one is making a snow angel. The water is then forced toward the feet with hands, all while simultaneously using the frog kick to propel the body forward in the water.

This stroke is often the easiest stroke to master. Many people think floating on your back is the best position to put oneself in during a survival situation; however, it is not. You cannot see where you are going, and having your mouth exposed to waves is unsafe. This can be dangerous if there is floating debris in the water that one needs to maneuver. Be extremely careful using this stroke. It has its uses but is not the most preferred.

### Survival Freestyle

The survival freestyle is very similar to the front crawl stroke or freestyle stroke seen in the Olympics, however, it is one of the most difficult strokes to master in swimming. The front crawl involves kicking from the hip with the legs while rotating on the side. The swimmer reaches out in front to pull water toward the feet, using both the legs and arms to propel themselves forward.

This stroke should only be used to move from one location to another quickly. It rapidly consumes energy, which negates the entire purpose of survival swimming. The stroke should be practiced to round out one's ability in the water, but it is unlikely

to be used in a survival situation due to interference from a Marine's gear.

### Survival Toolbox

There is a lot more to survival swimming than just a certification. It is critical for a Marine to add survival swimming skills to their toolbox when going into training and battle. Spending time focusing on the details is important, as moving quickly through training simply for a qualification is not something that will translate to a real-world survival situation. Earlier in 2022, a water survival mishap ensued where all the Marines who were capsized during the event egressed and swam to safety with only minor injuries. Each surviving Marine had their standard qualification, was underwater egress training-qualified, and had additional swim requirements per their unit. Though they all had the necessary certifications, it was their mastery of water survival skills behind these certifications that allowed them to safely evacuate.

Ask yourself if you have the skill set to egress a transport vehicle, swim to the surface to gain a breath and swim to safety or tread water for hours before emergency pickup. If the answer is no, then more time needs to be devoted to improving your skills. Many are concerned about showing weakness in front of their peers; however, training is not for showing off. It is for learning, growing and gaining the necessary knowledge to ensure you can survive the worst of conditions when an unforeseen situation arises. It is better to let your weakness be known so you can turn that weakness into a strength before you depart on your mission! >>>>



For an introduction to the Marine Corps Water Survival School, check out this video!

## SAFETY SPOTLIGHT

### Hospital Corpsman 2nd Class Evan Knisley

Ground Safety Noncommissioned Officer,  
3d Marine Logistics Group



As the 3d Marine Logistics Group Safety NCO, HM2 Evan Knisley created and managed a safety representative qualification program and established monthly training opportunities for subordinate command safety representatives. This training incorporated a pre- and post-course test to determine training effectiveness, classroom instruction and a capstone featuring a real-world practical application workplace safety inspection that integrated the concepts taught in the classroom.

The project allowed trainees to develop their hazard identification and mitigation skills under the guidance of knowledgeable safety staff. The final element of the capstone event was an outbrief on the inspection results, which ultimately improved trainee confidence in contributing to the safety program as compared to slide-based training alone. The training received substantial positive feedback and led to the certification of 127 Marines and Sailors from 10 commands. This creatively designed curriculum improved safety knowledge by 23% as determined by exit tests when compared to classroom instruction alone, created additional safety-trained personnel to support ground safety officers and managers and increased combat readiness.

# COMMUNITY LIFESAVER AWARD

Marine Corps Installations – Pacific (MCIPAC), Camp Butler, Okinawa, Japan



The National Drowning Prevention Alliance (NDPA) presents the Community Lifesaver Award every year to individuals and organizations in recognition of exceptional work in drowning prevention, education and water safety at the community level. Recipients of this award are nominated to the NDPA, selected by the executive committee, and confirmed by the board of directors for their significant contributions in drowning prevention and education.

**Marine Corps Installations – Pacific (MCIPAC), Camp Butler in, Okinawa, Japan**

was selected as a recipient of a 2023 National Drowning Prevention Alliance (NDPA) Community Lifesaver Award for their advocacy and outstanding contributions to water safety and drowning prevention.



Their ocean safety program and accompanying measures have significantly reduced the number of water-related mishaps in the Pacific theater for the Marine Corps, earning recognition for their contributions to force protection.

MCIPAC is the first Department of Defense organization to be recognized for the award, a significant achievement for the installation and the naval service. MCIPAC received the award at the 2023 National Water Safety Conference in Colorado Springs, Colorado, held in February 2023.

## SAFETY SPOTLIGHT

**Joey Masato Arakaki**  
Training Technician  
Marine Corps Installations Pacific,  
Camp Butler Safety Office



Joey Masato Arakaki is a training technician with the Marine Corps Installations Pacific, Camp Butler Safety Office and is responsible for delivery of motorcycle and recreational off-highway vehicle training and licensing endorsement for the entire military population on Okinawa, Japan. Arakaki was born and raised in Okinawa and has years of motorcycle riding experience in Japan and the United States.

He possesses certifications as Motorcycle Safety Foundation Rider Coach Trainer, California Superbike School Level 3 Rider Coach, Recreational Off-Highway Vehicle Driver Coach and ATV Instructor and American Automobile Association Lead Driver Improvement Program Instructor.

# AUTOMATIC FIRE EXTINGUISHING SYSTEM BOTTLE SAFETY CONSIDERATIONS

## BACKGROUND:

- The Automatic Fire Extinguishing System (AFES) was installed in tactical vehicles as a safety mitigation factor for vehicle fires.
- The bottles are removed by unit personnel for required maintenance purposes or as part of the Defense Reutilization Marketing Office (DRMO) turn-in process.
- Handling mishaps occurred when the AFES bottles became uncontrolled projectiles, leading to a civilian death and multiple service members being significantly injured.
- Units may have a stockpile of these bottles in workspaces awaiting preparation for DRMO turn-in.



## HAZARD:

- AFES bottles are pressurized to 900 pounds per square inch and contain a mixture of compressed gas and a fire-retardant substance.
- Bottles can become very volatile if proper safety equipment is not attached and installed accordingly.
- The fire-retardant substance contained within the AFES bottle could violate local and state environmental protection agency regulations, halting the ability to relieve the internal pressure.

## SAFETY GUIDANCE:

- Treat all AFES bottles as if they are fully charged, regardless of the reading on the gauge.
- Ensure expansion plug (anti-recoil), safety shield, electrical cap and safety pin (if equipped) are always installed on AFES bottles while bottles are not restrained or being removed from the vehicle mounting bracket.
- Use extreme caution when handling and storing AFES bottles.

# FLASH-BANG FAIL: TSA PAT-DOWNS FOR LIFE

Article courtesy of Expeditionary Warfare Directorate, Naval Safety Command

**F**lash-bangs are a useful tool in urban warfare. Commonly called crashes, flash-bangs, are used as diversionary devices before an assault team enters through a door, temporarily causing an enemy to lose focus. They are a nonlethal tool that can be helpful in clearing a building, dispersing a crowd or in a variety of other situations.

In general, the crashes have a bright blinding flash of light and loud concussive bang – thus the descriptive name “flash-bang.” These effects are especially magnified in small spaces. When conducting training on the use of crashes, a training aid is used instead of a “live” crash.

The training aid is called a blue body crash because of its blue aluminum casing, which indicates its use for training. The blue body crash looks, weighs and acts like a live crash, but it is painted blue, has a less potent effect and can be reused multiple times.

Because blue crashes are used multiple times, they begin to degrade and show signs of wear over time such as bulging at the bottom. After many uses, the bottom will blow out and turn into shrapnel.

The bottom of the crash is a flat disk with many holes to relieve the blast pressure. When the crash blows out, the bottom sheers off and can produce several large pieces — or the entire bottom may turn into a single projectile with many sharp edges. The picture below shows three crash bottoms from a single day of training.

Crashes have a short fuse and will go off less than one second from the time they are deployed. So when they are used, the operator will be in close proximity to the device when it goes off.

## BLUE BODY CRASH FAILURE: A REAL-WORLD EXAMPLE

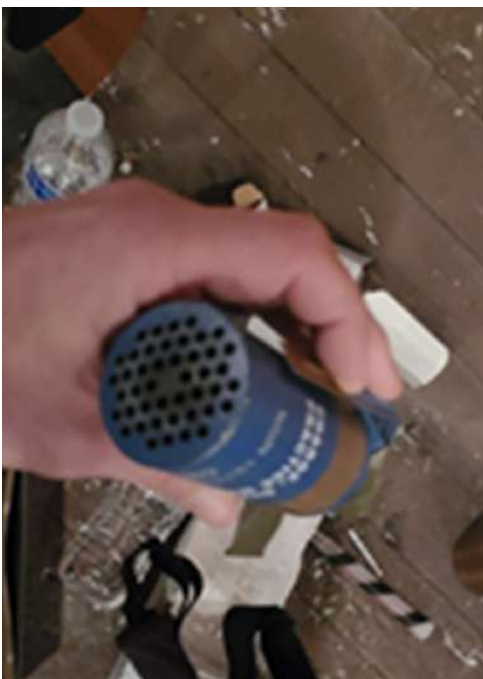
A few years ago during a training event, a blue body crash failed when a platoon deployed it while breaching a space. The bottom blew off into several pieces. One of the operators caught a piece of fragmentation in his calf muscle.

After the event was over and the platoon had completed training for the day, an attempt was made to remove the metal fragment from the operator’s leg, but it was lodged too deep for on-scene medical personnel to see it. The operator was taken to the local hospital to have the fragment surgically removed with the help of X-ray. However, the fragment was lodged too close to a tendon

for the surgeon to remove, so the operator returned to the platoon with the fragment in his leg.

The platoon had their explosive ordnance disposal technician use a metal detector to see if it would set off the detector, and the technician easily located the fragment. The technician said the fragment would be permanently embedded in the operator’s calf, and he would always set off airport metal detectors.

The next day, the operator went back to the hospital to request removal a second time, but was again told it was not possible without risking worse injury. The hospital gave him a laminated card to show to Transportation Security Administration officials when traveling through





airports to make it easier to go through security checkpoints in the future.

Since the fragment is made of metal, it will not decompose over time, and the operator will always need to show that card to pass through metal detectors.

In training, operators use live role players in various scenarios to provide the most realistic training available. Blue body crashes are preferred over live crashes because they significantly reduce the chances of developing traumatic brain injuries as well as minimize exposure to smoke screens and blinding light.

Currently, each training crash is used until either a defect is noted or it blows apart. A system should be in place to better monitor the condition and length of time each crash has been used. Crashes should be analyzed and evaluated to determine if more frequent replacement is necessary to prevent hazard to training personnel and operators.

At a minimum, take a look at the bottom of each crash before conducting the next training exercise. If the telltale bulge is present, don't use the crash, and report it to the appropriate personnel for documentation and correction. This could prevent another life-changing mishap from occurring. >>>



U.S. Marines with 1st Platoon, Force Reconnaissance Company, III Marine Expeditionary Force, set off a flash-bang before entering and clearing a room during Close Quarters Tactics training at Camp Hansen, Okinawa, Japan. (U.S. Marine Corps photo by Lance Cpl. Francesca Landis)

## SAFETY SPOTLIGHT

Staff Sgt. Craig Holland is the epitome of an outstanding ground safety manager. Upon his arrival at Combat Logistics Regiment 17 (CLR-17), he undertook the task of rebuilding the safety program for a high-operation tempo unit composed of over 1,500 Marines. A thorough and creative problem solver, Holland implemented and supervised multiple lines of effort, addressing a variety of safety issues and areas of concern. For example, he implemented a useful application called SafeSite that assists safety representatives with the ability to conduct timely, monthly safety inspections

and report mishaps within the work environment. Furthermore, he focused on training and educating Marines about safety throughout his regiment, providing supervisory safety training to more than 100 staff noncommissioned officers and officers. Holland's efforts have created and sustained a positive safety culture within the command. His skillful synchronization of personnel and resources enabled CLR-17 to exceed the Marine Corps Safety Management System's prescribed 85% standard.

**Staff Sgt. Craig S. Holland Jr.**  
Ground Safety Manager  
Combat Logistics Regiment 17 (CLR-17)  
1st Marine Logistics Group



# SAFETY SPOTLIGHT

## Capt. Colin Bishop

Ground Tactical Mishap Investigator  
Naval Safety Command

As one of the prominent ground safety investigators for the Naval Safety Command, Capt. Colin Bishop provides professional assistance and expert advice to safety investigation boards for Class A training mishaps across the globe.

His responsibilities include, but are not limited to, ensuring the effective and efficient conduct of the mishap investigations and ensuring the board follows recognized investigative techniques to arrive at sound conclusions and immediately actionable recommendations to the force. He often provides keen insight and guidance to multiple senior officers during the investigation process and liaises with vested agencies such as Systems Command and Range Training and Management to identify mishap causal factors. From these various safety mishaps, Bishop collects and compiles pertinent information and develops lessons-learned products for dissemination throughout the service to help decrease the chances of similar future mishaps.



Because of his experience, he is one of the few individuals entrusted with teaching the Ground Mishap Investigator Course to unit ground safety officers and managers. Between his investigative and teaching duties, Bishop found the time to spearhead the task of developing the Fall 2022 edition of Ground Warrior Magazine, which provides relevant and timely information on a variety of Marine Corps Ground and Naval Expeditionary Warfare topics.

Would you like to recognize a safety professional in the  
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Email [GroundWarriorMagazine@usmc.mil](mailto:GroundWarriorMagazine@usmc.mil) or call **703-604-4172** for more information!



# SAFETY SPOTLIGHT

Hospital Corpsman 1st Class Jorge Belmudez expertly and vigilantly coordinated the safety team's missions downrange to conduct site visits and safety recommendations for 15 subordinate commands with 8,557 assigned personnel. Interested in harboring partnerships and rapport with the safety officers and managers across the group, he developed and scheduled a comprehensive safety program technical assist visit for all subordinate commands within the group. This opens the door for total and complete transparency on both ends — from headquarters safety staff through subordinate command. Finally, he created 1st MLG's commandwide safety assessment document and Ground Safety Officer and

Manager Tool Kit. A checklist in a sense, it promotes procedural compliance. The document allows commands a much easier examination of all potential hazards in the workplace. Organizational experience and training supported the transformation of the existing safety program into a proactive, innovative groupwide effort that has resulted in zero on-duty fatalities in fiscal year 2022, an achievement that is indicative of 1st MLG's dedication and commitment to our force preservation. Belmudez's forward-thinking innovation led to the development of a safety program that combines nonbattle injury prevention, ground safety and motorcycle safety programs into an effective program across the 1st MLG enterprise.

Hospital Corpsman 1st Class  
**Jorge F. Belmudez**  
Ground Safety Manager  
1st Marine Logistics Group (MLG)





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## RESOURCES

Learn more about the Department of the Navy's Safety Management System, Assessment Process, and our Data and Analytics Products on our "Who We Are; What We Do" webpage at:

<https://navalsafetycommand.navy.mil/Who-We-Are/What-We-Do/>

Access CMC SD Safety Promotions products at: [www.safety.marines.mil/Safety-Promotions/](http://www.safety.marines.mil/Safety-Promotions/)

Access the library of Safety Awareness (SA) Dispatches and sanitized reports on our CAC-enabled website at:

<https://intelshare.intelink.gov/sites/nsc>

You can also check out the SA Dispatches, formerly Lessons Learned, on the Naval Safety Command website:

[www.navalsafetycommand.navy.mil/Safety-Promotions/Safety-Awareness/](http://www.navalsafetycommand.navy.mil/Safety-Promotions/Safety-Awareness/)

## Share your stories and photos with Ground Warrior!

Safety is everyone's responsibility, and we welcome your contributions and input.

Send your submissions to [GroundWarriorMagazine@usmc.mil](mailto:GroundWarriorMagazine@usmc.mil). Don't forget to include a good point of contact!

Submission guidelines:

- Articles should be in Microsoft Word, between 500-1,500 words, with proposed headline. Include full name, rank, title and organization for author(s) and contributors.
- Provide full name, rank and title on first reference for people mentioned in the article. Spell out organizations and units, and include city and state or country, as applicable.
- Imagery must be 300 dpi minimum and approved for release. Include full caption, photographer's full name and rank. Indicate source — DVIDS, Marine Corps News, etc.
- Call 703-604-4172 or email [GroundWarriorMagazine@usmc.mil](mailto:GroundWarriorMagazine@usmc.mil) for more information.

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