

Navy Diving Community Safety Stand-Down

Safety Stand-Down Brief

This brief was constructed for use across the Navy Diving Community. This brief provides a few safety related areas to discuss during a safety-stand down and is not all encompassing. Safety stand-down is a voluntary event for leaders to talk directly to Sailors and the command about safety related issues of concern. Additionally, it provides an opportunity for Sailors and DOD civilians to talk about hazards, protective methods, and the command's safety policies, goals and expectations.

Normalization of Deviation

“Normalization of deviance is a phenomenon by which individuals, groups, or organizations accept a lower standard of performance until that lower standard becomes the norm for them.”

Background:

Prior to the Challenger disaster, evidence of O-ring malfunctioning was found following several shuttle flights, but the malfunction was basically ignored. Despite the O-ring malfunction, previous shuttle flights occurred without incident, leading to acceptance (normalization) of the O-ring issue, which ultimately contributed to the Challenger demise. Seventeen years later, normalization of deviance contributed to the Columbia Space Shuttle mishap (2003), when a piece of foam from the external fuel tank broke off and hit the shuttle's wing. In both cases, a known defect that had not previously caused serious consequences was ignored. Acceptance of deviation had become the norm.

Factors:

At the organizational level, several factors can lead to deviation from norms, to include:

- insufficient personnel
- inadequate materiel resources
- fiscal constraints
- time pressures

Cutting corners is an early step in the normalization of deviance process. Even a small shift in established procedures leads to accepting deviation. Over time, the shortcut can become the norm. After an extended period, this can turn into “that’s the way we have always done it.”

Examples:

Examples of areas that can result in normalization of deviance include:

- Signing off qualifications without completing prerequisite training
- Towing aircraft without the requisite number of personnel
- Rushing maintenance procedures due to time constraints
- Not wearing appropriate PPE or wearing PPE incorrectly
- Continual operation in the gray areas of regulations

Conclusion:

People must believe they have full support from all levels of leadership to do what is right, or the culture will not change and acceptance of deviation will be normalized. Remediation requires that every level of leadership be intolerant of deviation. At times individuals, groups, or organizations may perceive backlash (negative repercussions) if tasks are not completed on time. Unsafe practices can become the norm if shortcuts do not result in an immediate adverse occurrence. Exacerbating this issue, cutting corners may be implicitly or explicitly sanctioned by leadership.

Personal Limitations and Crew Fatigue

- When planning a diving operation, all phases of the operation should be accounted for to prevent crew fatigue.
 - Pre and post-dives, on/off-loads, transits to/from, briefs and debriefs can account for the majority of a diving day.
- Mental fatigue is a psychobiological condition caused by a prolonged duration of cognitive activity that is characterized by feelings of “tiredness” and “lack of energy”.
- Research suggests that the effects of fatigue on the brain are as harmful as drunk driving.
- Fatigue affects memory, concentration, decision-making, and motor skills.
- For more guidance on crew fatigue and management refer to:
COMNAVSURFPAC/COMNAVSURFLANT Instruction 3120.2A
Comprehensive Crew Endurance Management Policy

'As Written' Procedural Compliance

- Following approved procedures as they are written cannot be overemphasized.
 - This applies to Diver's Life Support Systems (DLSS), maintenance, supervisor checks, in-water checks, and in-water Emergency Procedures (EPs).
- In one month alone, two in-water diving incidents occurred due to a failure to follow written procedures.
 - Three divers lost air due to someone following the wrong Operating Procedure (OP) during charging. Two of the divers used EGS, one diver removed the Mk20 and ascended while exhaling.
 - A Mk16 dive was aborted due to a loose exhalation hose. The loose hose was not identified by the maintenance technician conducting pre-dives, nor the diving supervisor.
- Dive systems are aligned, secured, or modified in a step by step fashion IAW the OP and two person integrity. One person reads the steps and the other performs the action. EPs are memorized and immediate actions are executed when required. The emergency procedure is then verified from the written procedures after the immediate action to resolve the emergency is complete. - USN Dive Manual, Chapter 4.
- The average diving work center contains over 100 maintenance requirement cards encompassing thousands of individual maintenance steps. A maintenance person cannot and should not memorize any maintenance procedures on any diving equipment.

Diver Tagouts and Communication with Ship's Force Personnel

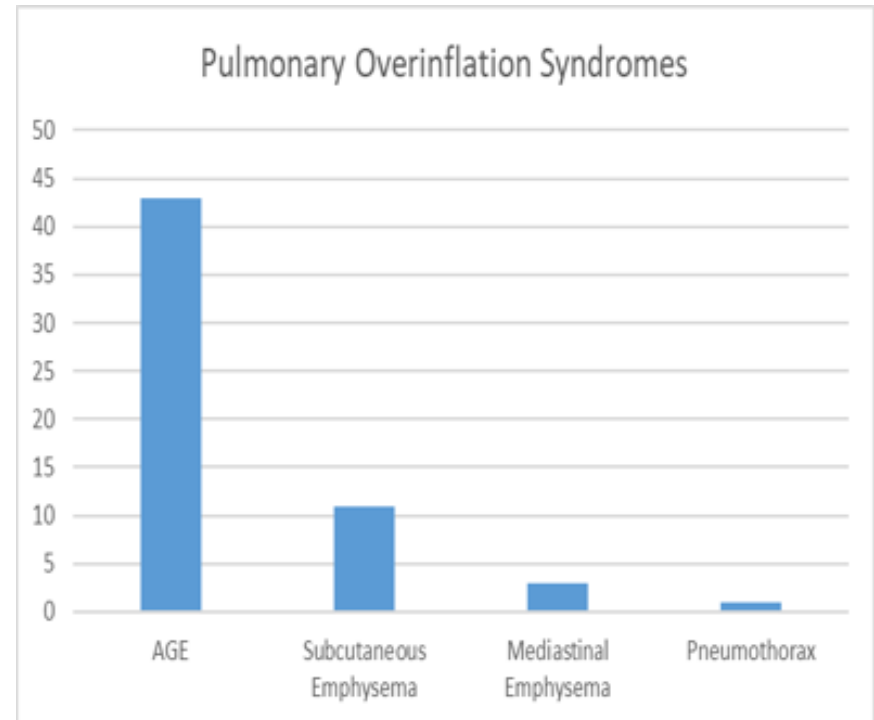
- Due to the inherent danger of UWSH diving, Appendix E of the Tagout Users Manual was created solely to amplify diver tagout procedures for Ship's Force personnel.
- Increasing the danger of working on large machinery and electronics in the water, it is common to have several layers (i.e., delays) of communication between the actual component tagged out onboard the ship and the diver working on the equipment in the water.
- All personnel involved in the operation of any equipment divers are working on must be fully aware of how their equipment reacts to the shipboard controls they are using.
- Shipboard personnel, the onboard safety technician, and all dive team members must be briefed and have a clear understanding of the entire evolution and the hazards present.

Ship's Force Tagout Incident examples

- Two divers reported electrical shock while working on a limit switch on a submarine. Upon inspection, it was identified that an incorrect circuit breaker was tagged out and the system remained energized.
- After installing cofferdams and securing for the day, but prior to clearing tags, the Diving Supervisor noted a large plume of water (peaking at approximately 5 feet) in the vicinity of what was part of the designated safe dive path for the dive. It was determined that the source of the plume was from steam plant pipe drying air exiting the ship through a sea chest. The WAF that authorized the diving evolution was opened with inadequate isolation for the work area and transit route.
- During a cofferdam installation, the onboard safety technician and the in-water divers noticed a pump operating within the 50' safe diving boundary. The diving supervisor immediately initiated dive abort procedures. The root cause was the ship did not tag out a pump associated with a common suction sea chest. Additionally, the ship did not properly notify the diving supervisor prior to changing the plant status (activating a pump within divers boundaries).
- Divers were conducting a Secondary Propulsion Unit (SPU) troubleshooting procedure. All involved personnel were present for the brief and understood that the SPU would be moving while divers were in the water. Divers were instructed to remain free and clear until SPU movement was completed. When Ship's Force applied hydraulic pressure to the SPU to move to the first set point, the SPU door closed abruptly and without warning. Diving Supervisor called all personnel involved to re-brief safety concerns. Discussing what happened with Ship's Force personnel, it was identified when the SPU becomes activated for movement the access door closes automatically into its default position. This was not known or understood by the Dive Team.

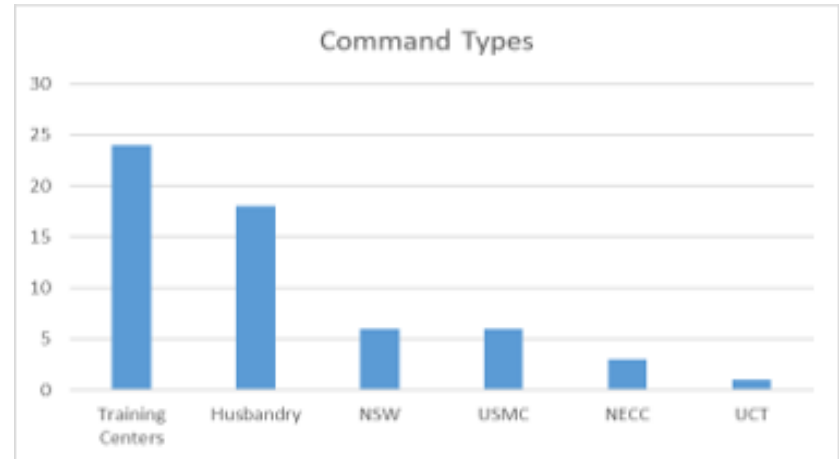
Pulmonary Overinflation Syndromes

- In the last 10 years, 17% of all on-duty diving incidents reported resulted in a diver suffering from a Pulmonary Overinflation Syndromes (POIS).
 - 340 incidents reported, 58 total POIS (CY 2012-2022)
- Arterial Gas Embolism (AGE) accounted for 74% of all POIS reported.



Pulmonary Overinflation Syndromes cont.

- Training Centers and Ship's Husbandry Commands account for the majority of the total number of dives completed by USN and USMC divers. As expected, they also accounted for the majority of the POIS reported.



Pulmonary Overinflation Syndromes cont.

- A diver experiencing any POIS is of great concern. An embolism is obviously the highest concern because obstruction of the arteries of the brain and heart can lead to death if not promptly relieved.
- In AGE incidents reported where the diver's ascent was normal, the likely cause of an embolism is due to an interruption of breathing during ascent, however small it may have been.
- Any interruption in breathing during a normal ascent increases the chance for an embolism to occur but this is magnified at shallower depths. Involuntarily holding your breath from 10 feet of sea water (fsw) to 7 fsw is similar to holding your breath from 100 fsw to 70 fsw.
- Ascending divers should be especially focused on their ascent rate and exhalation during the final 10 fsw of their ascent. The volume change of all gases associated with the dive (lungs, buoyancy compensator, dry suit, etc.) is at its greatest ratio at this point in the water column and a controlled ascent can quickly become 'uncontrolled.'

Questions?