



Naval Safety Center

LESSONS LEARNED



LL 20-17

FALLING OBJECT HAZARDS

When the term military mishap is uttered, the first images to come to mind might be high-tech weapons malfunctioning or expensive vehicles and aircraft crashing. In reality, our service members are more likely to be plagued by commonplace incidents, like being struck by falling objects.

Being struck by a falling object is a hazard all warfare specialties are subject to. Any overhead item or piece of equipment can become a hazard if not adequately secured in place. Falling objects can also be introduced to the work environment by others working nearby. As a protective measure, personnel must maintain safe work practices, which includes avoiding and preventing worker exposure to overhead hazards, whenever possible. The Navy Safety and Occupational Health Program Manual, OPNAV M-5100.23, and the Navy Safety and Occupational Health Program Manual for Forces Afloat, OPNAVINST 5100.19F, provide guidance on preventing falling object hazards and the personal protective equipment (PPE) to use in areas where exposure to falling objects is higher. Despite this guidance, there continue to be instances where personnel don't comply with, and supervisors don't enforce standards.

Falling objects can cause both injury and damage to equipment. Minor injuries from falling objects can include sprains, cuts, abrasions, and bruises. More severe injuries can include broken bones, loss of a toe or finger, loss of an eye, concussion, and death. Objects that can quickly become a falling hazard include tools, boxes, suspended loads, loads being transported, pieces of damaged structures, and really, anything else that is overhead. As Isaac Newton taught us, gravity imposes its will on all objects. Any overhead object can become a hazard and must be controlled. Control methods include:

- Safely storing or securing objects against falling (this is especially vital in the afloat world where shifting seas will toss gear that is not properly secured)
- Avoiding walking or working under hazards
- Avoiding performing work above others that creates a risk of falling objects
- Blocking or cordoning off access to areas where overhead work occurs
- Preventing objects from falling to a lower level (use of screens, toeboards, nets, partitions, etc.)

Mishap Examples

Mishap records show that Navy and Marine Corps personnel conducting all types of operations have repeatedly sustained injuries from objects that have fallen during routine evolutions.

- Shore Event - In an incident that proves weapons can be dangerous even when not loaded, a Sailor was conducting a small arms inventory at an armory. During the inventory, a MK43 machine gun fell off the top gun rack and struck the member's head. The Sailor was taken to the hospital and awarded two staples behind the right ear.

 **DANGER**



**FALLING OBJECT
RISK**

**Watch overhead at
all times.**

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- Submarine Event - Four service members were pulling cables inside a submarine ballast tank. One of the members laid a pair of tin snips on a nearby support beam. A second member inadvertently bumped the tin snips and knocked them off the beam. The tool fell four feet and hit the third member on the left ear. The member was transported to a local hospital and required five stitches.
- Aviation Ground Event- A service member was working on a fixed-wing aircraft parked on the flight line. During the maintenance, a flashlight that was placed in an overhead engine cavity fell, hit the member in the mouth, and broke a tooth in half. Fortunately, the report stated that the broken half of the tooth was found, so there was no FOD. However, it's unclear if the member's tooth was ever repaired.
- Afloat Event - In a luckier, but by far the most calamitous event, an Electronics Technician conducting underway maintenance on a ship's USQ-122 antenna, turned that antenna into a javelin. He had requested permission to go to the top of the forward director deck to swap out its antenna, but the Combat Systems Officer of the Watch (CSOOW) denied the request, because the forward director deck was a rotational hazard area (spinning, radiating antennas). The technician decided to work around this issue by using a step ladder to reach the antenna, therefore not violating the CSOOW's order by not technically climbing onto the director deck. The ship's Navigator then stopped the technician because he didn't have a harness. The technician acquired a harness to meet the criteria of wearing one, but did not deem it necessary to attach it to anything (should be a fixed structure). As he proceeded, he did not consider it essential to secure the antenna before removal. When the technician removed the mount bolts and began to remove the antenna from the stanchion, it struck his head, causing him to lose his balance and drop the antenna. In addition to the questionable workaround of using the step ladder, the decision not to attach the harness nearly turned the technician into a falling object himself, and the decision not to secure the antenna before its removal did make it a falling object that came just feet from impaling crew members five levels below. (See SSIR 20-06 for more details)
- Marine Corps Event - While escorting workers on a camera repair, a Marine was holding a ladder and not wearing appropriate PPE (hard hat). A lightweight metal casing came loose and fell approximately 15 feet, striking the Marine in the head. He was taken to the aid station and received four staples. Marines confess to being hard-headed at times, but that clearly wasn't as sufficient protection in this case as an actual hard hat would have been.



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Key Takeaways

For every mishap described in this lesson there were mitigations that could have either prevented the incident or reduced its impact (*pun intended*). Mishap prevention is a team sport, so personnel at all levels should do their part to prevent them from occurring. Members of all warfare communities should remember the following to reduce falling object mishaps in the future:

1. Don't expose yourself or others to falling object hazards.

Gravity wants to bring all objects crashing down. The only way to prevent this is proper securing (of the objects and the area). Maintain good housekeeping in work areas and don't store items in positions that could lead to them falling on others. Store materials on flat surfaces away from the edge and position heavier objects on the lowest level possible. If items must be stored overhead or up high, take measures to prevent them from falling. When accessing materials on higher levels, be sure other surrounding items are stable and unable to fall. When managing overhead work, block the area underneath the load and never lift, lower, or swing a load over others. When transporting, ensure materials are properly secured. If an issue is identified during transport, immediately stop and re-secure the load before continuing.

2. Properly use and enforce the wear of head and foot protection.

Don't pretend you are immune to hazards. When working in a falling object hazard environment (i.e., in the presence of overhead hazards, performing material handling activities, accessing storage, etc.), personnel must wear an approved hard hat and safety shoes or safety boots. It is the supervisor's job to enforce the proper wear of PPE necessary to protect their personnel.

3. Remember - All PPE has limitations.

Never rely solely on head and foot protection. Avoid exposure to falling objects, as much as possible, and don't overestimate the protection that hard hats and safety shoes are able to provide.

Head protection - Most standard hard hats designed for impact protection only reduce the force of impact from a blow to the top of the head. These hard hats DO NOT protect against impacts that are off-center, on the side of the head, or strike the neck. NOTE: The standard cranial is only designed to limit impact forces when the wearer accidentally makes contact against an object. Standard cranials are not considered hard hats, as they are not designed to protect the wearer from falling or flying objects.

Foot protection - The protection provided by most standard safety footwear is limited to the toe area. This footwear will not protect the whole foot and will not protect the toes from all possible impact forces.

This product is posted on the NAVSAFECEN CAC-enabled website at <https://intelshare.intelink.gov/sites/navsafe>.

Send any feedback to: NAVSAFECEN_CODE522_LESSONS_LEARNED@navy.mil
(aka: safe-lessons-learned@navy.mil)

And remember, let's be careful out there.