



NAVAL SAFETY COMMAND SAFETY AWARENESS DISPATCH



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Explosive Demolition and Breaching Mishaps

Explosive demolition training presents a variety of hazards to our warriors, requiring strict adherence to safety protocols. There are specific guidelines and doctrine to keep this training safe, but as you'll read here, our warriors don't always follow them. Our database has plenty of examples that demonstrate what can happen when the rules to keep us safe are not adhered to. Leaders and operators alike, please read and internalize the missteps of your fellow warriors before your next explosives training evolution.



- **“Keep Your Arms and Legs Inside the Ride at All Times”**. A group of Marines was conducting explosive demolition training led by a combat engineer unit. The group prepared four demolition charges for simultaneous detonation. The Marines then occupied the designated bunker to await the explosion. One Marine apparently needed more “likes” on social media, because he held his hand outside the bunker to video the blast. One of his fellow Marines advised him to bring his hand inside, but he did not heed this warning (*gotta get the insta-worthy video*). When the charges detonated, fragmentation struck the Marine's unprotected hand (*we're guessing the video shot wasn't worth the pain*). — *When the range regulations instruct all personnel to be in a protective bunker before detonating explosives, it means **all** parts of the personnel. We recommend you follow the regs lest you injure or lose a digit.*
- **Proper Plan ... Poor Execution**. During a formal course, Marines were learning a variety of improvised charges. Students were evaluated on Net Explosive Weight (NEW), standoff distances, misfire procedures and other relevant knowledge and deemed prepared. At the range, the Marines constructed the various charges and eventually came to the grapeshot charge (an improvised claymore made by packing various shrapnel-causing debris and C4 explosive into an ammo can). The Marines built and placed their charges in front of a berm on the range. They took positions behind the berm, but one of the Marines must not have been completely behind it. When the explosives detonated, a piece of ammo lodged in his hand requiring stitches. After the mishap, a review of the leadership's plan showed they had the correct standoff calculation for the charges, but the Marines were within this distance behind the berm (*this just in, being within the fragmentation range of charge can cause injury from fragmentation*). The range regulations for this location also specifically dictated personnel must be in the missile proof bunker during live fire. This information was identified in the unit's confirmation brief – so, there were three opportunities to not listen to the rules in their own plan (*sigh*). — *Explosive demolition training is the wrong place to not pay attention to the rules. Some of the rules may seem overkill or redundant, but they are there for a reason, which our Marine so painfully showed.*
- **Poor Plan... Poorer Execution**. In this example, a unit was employing a variety of different charges and ran into trouble when they got to their satchel charge portion (a large explosive used to destroy or breach larger structures). The unit rigged two double satchel charges, each with a NEW of 54 pounds, on two log obstacles and withdrew to a berm approximately 50 feet away. Unit leadership established this distance based off the minimum safe distance (MSD) calculation for the charges' NEW. This distance was incorrect, though, because it only accounted for blast and overpressure. An Explosive Surface Danger Zone (ESDZ) calculation was needed, because it would have accounted for fragmentation (*seems like an important consideration to overlook*). This failure in planning placed the Marines in a position with inadequate overhead protection. When detonated, the charges sent large pieces of timber into the air that fractured one of the Marine's shoulder blades. — *You don't need to be Copernicus to calculate proper standoff distances, but you do need to know which calculations to use. Double-check your work and have it reviewed for correctness before you blast.*

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- Concealment is not the same thing as cover. Marine elements were conducting basic urban breaching operations for training. There were three separate buildings designated for training (*but—spoiler alert—not approved for breaching*), with two Position Safety Officers (PSOs) for each station (*evidently the PSOs didn't know it wasn't approved for breaching either*). Each element was operating as a fireteam (four Marines). One fireteam approached the second station and received their last cover and concealed position. The Marines then performed a “hasty” breacher's brief. The explosive used was a general-purpose charge placed on the locking mechanism. The Marines set security with two Marines

oriented to each side of the building. The breach team placed the charge, and all four Marines proceeded for cover at the rear of the building. After 30 seconds, the charge blew, and the four Marines assaulted through the breach site. Afterward, as leadership started the debrief, one Marine (Victim 1) stated, "I think something bit me." The range officer in charge looked down and Victim 1 had blood coming from his right shin. A second Marine (Victim 2) then noticed bleeding from his back. Fellow Marines placed a tourniquet on Victim 1's leg and applied pressure to Victim 2's back wounds. The injured Marines were placed in the safety vehicle while range control was contacted. They were transported and treated at a local hospital. — *Shrapnel from the breaching charge penetrated the walls of the building (which is why it wasn't rated for breaching) and struck both these Marines. The fireteam did the right things, but the unit leaders allowed them do to it in the wrong place. The unit chose an unapproved building because the range information wasn't clear. Know your range and which structures are approved for your training. If you're not sure, ask. Don't find out the hard way by hurting someone or worse.*

Key Takeaways

While relatively few servicemembers will train with explosives, we can all learn from these mishaps. Most of these incidents occurred because of errors in planning or inadequate oversight, things that cannot happen during high-risk training. Make sure your plans and execution are complete and accurate. Consider the following before laying your next explosive:

1. **Keep your distance (the correct distance).** Many of these mishaps were caused because personnel were either unwittingly within the fragmentation zone or not taking appropriate cover. Respect the boundaries set by the MSD and ESDZ calculations. While certain charges can direct a blast and provide a general assumption of where debris will be cast, variables can cause fragmentation in any direction. These safety calculations account for this and must be heeded.
2. **Know your math, check your math.** Safety distances for explosives are not something you want to get wrong. Make sure you are keeping up with doctrinal and procedural guidelines and double-checking your math. Leadership must not simply trust the calculations of exercise planners. A competent secondary source should verify the calculations. Factor risk management in every step of the operation.
3. **Keep your head (and other body parts) down.** Don't be too eager to watch the explosions. This is somewhat covered by the first takeaway but warrants emphasis. Multiple people knowingly put themselves in danger because they wanted to watch the boom. Don't be that person; there are plenty of videos you can watch online.

And remember, “Let's be careful out there.”