



NAVAL SAFETY COMMAND SAFETY AWARENESS DISPATCH



SA 25-21

Machine Gun Ammo Cook Offs

This dispatch focuses on injuries from machine gun ammunition cook offs. We admit this is a niche subject in a niche community, but fear not, we will tie the lessons from these incidents in with the rest of the fleet. So, whether you are an 0331 (*that's machine gunner in Marine-speak*) or perform some other duty, we hope you find this helpful.

Before we dig into some scenarios, it will help to go over some basic machine gun terminology. We won't get too technical, but learning some of these definitions will help the layperson (*and maybe some machine gunners who have forgotten the basics*) to fully grasp each incident.



Feed Tray/Feed Tray Cover - Component that holds and guides ammunition (*see top right photo*)

Immediate Action - Action taken by the operator to reduce a stoppage, without investigating its cause, and quickly return the weapon to action. Wait five seconds to guard against hang fire, pull and lock the cocking handle to the rear while observing for feeding and ejecting. If this occurs, the operator can attempt to resume firing.

Remedial action - Any action taken to determine the cause of a stoppage and to restore the weapon to an operational condition. This action is taken only after immediate action did not remedy the problem.

Cook Off - Occurs when the heat of the barrel is high enough to cause the propellant powder inside the round to ignite even though the primer has not been struck. Immediate action is completed in a total of 10 seconds to ensure that the round is extracted before the heat of the barrel affects it. If the round fails to extract/eject during immediate action and the barrel is hot, further action is delayed (15 minutes) because the gunner must assume that a round is still in the chamber and could cook off at any time prior to the barrel cooling off.

Hot Barrel – Designation when the barrel becomes hot enough to cause a cook off. For the M240/Mk48 medium machine gun and the M249/Mk46 light machine gun, “this is 200 rounds or more in less than two minutes, a long continuous burst or repeated firing of the weapon even though 200 rounds were not fired, or if the unit leader determines the weapon is hot for any reason.”

More Than a Little Heat. A Marine was engaging targets with an M240 from a support by fire position (SBF) on a range in the desert. The maneuver element he was supporting was taking longer than planned, resulting in the machine gunner putting a significant number of rounds downrange. This led to the buildup of a large pile of brass casings under his weapon. As the Marine continued firing, he experienced a stoppage. He performed his immediate action, which did result in feeding and ejecting, so he continued firing. What the gunner did not realize was the pile of dispelled brass had retained a lot of heat from firing and the ambient desert heat was not helping to cool it (*this is the same pile of brass he just ejected a live round into after the stoppage*). The heat caused the ejected round to cook off resulting in shrapnel embedding in the machine gunner's arm. —*This Marine learned a lesson in clearing one's workspace. He conducted his immediate action correctly and there actually isn't formal guidance about clearing the brass under the weapon, but not all hazards are spelled out in our publications. Be cognizant of the hazards forming around you.*



The Blind Leading the Blind. A non-combat arms unit had a variety of organic crew-served weapons, so logically, they had standing guidance to hold a crew-served weapons range once a quarter to ensure familiarity with the systems (*this is where common sense ends*). An officer-in-charge (OIC) was selected based on availability and rank instead of qualification on the weapons, which he did not have (*Hmm, “bold move Cotton, let's see if it pays off...” Spoiler, it won't*). The OIC developed a scheme of maneuver and assigned a non-commissioned officer (NCO) (*who was equally unqualified*) to provide a course of instruction on the M240 machine gun prior to the range. This NCO “thoroughly” prepared by talking to an armorer

and watching several YouTube videos. What wasn't used or even referenced during instruction were technical manuals or guidance on immediate/remedial actions. The lack of doctrine in the training turned out to not matter

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as much, because there wasn't a mechanism to track attendance at this pre-range training and only a fraction of the 70 planned shooters participated. On the day of the range, hot barrel procedures were never briefed (*Okay, an unqualified cadre, leading unprepared shooters, based on YouTube guidance ... this should go great*). When a misfire inevitably occurred, the shooter waited the appropriate time for the hang fire before conducting an appropriate immediate action drill (*this is the last ounce of credit we can give him or the position safety officer (PSO) monitoring him*). Enough rounds were fired for the barrel to be hot, but lacking awareness of hot-gun procedures, the gunner immediately began remedial action, opened the feed tray cover and observed a round in the chamber. The PSO (*who claimed to be familiar with the M240*) used a knife to attempt to dislodge the round with ungloved hands (*proving his limited proficiency*). The round then cooked off, injuring the gunner's shoulder and the PSO's hand. —*Wanting to train personnel with the weapons available to the unit is great. But if this training is not properly planned and aligned with doctrine – as these Marines can attest – it's bound to do more harm than good.*

Poor PPE. A Sailor employing an Mk46 experienced a stoppage during a range training exercise. Immediate actions did not resolve the stoppage. Enough rounds were fired to designate the barrel hot, but to enforce realism, the Sailor immediately began remedial actions and opened the feed tray cover. The round in the chamber cooked off right after this, peppering the Sailor's face with shrapnel. The mishap report states the Sailor was wearing appropriate eye protection, but it also described the Sailor getting debris from the ammunition casing in his eye that had to be flushed out. —*The debris did not injure the eye, so the eye protection worked to some degree, but the fact any debris entered the eye leaves us to question whether the Sailor was wearing approved eye protection, which would prevent shrapnel or debris from reaching the eye. No unit should accept the risk of a cook off by disregarding hot barrel procedures and they must also ensure the other safety precautions, like eye appropriate eye protection, are enforced.*

More Than a Close Call. A machine gunner was participating in a company-supported attack on R400 in 29 Palms as part of the Marine Corps Integrated Training Exercise (ITX). During the range exercise, the machine gunner experienced a stoppage with his M240. He'd fired enough rounds for the barrel to be deemed hot, so when the immediate action did not result in feeding or ejecting, doctrine mandates he must (*key word here being "must"*) wait 15 minutes for the barrel to cool before attempting remedial actions. However, just after the stoppage occurred, the machine gun team was given the order to displace, and they were reportedly under the belief that exercise controllers would impose a notional casualty if they did not move quickly. With the fear of imposed friction greater than the fear of physical bodily harm, the gunner decided to remove the barrel and clear the stoppage right away (*consider the fates tempted*). The round cooked off as soon as the barrel was removed. Shrapnel from the casing struck the gunner in the neck damaging a jugular vein (*Fortunately, this was not a mortal wound. We have six jugular veins, and you can survive damage to one. However, this is obviously far from desirable and could have been much worse.*) —*Procedures exist for a reason. While the potential injury severity from a cook off may be generally low, it doesn't mean a more serious injury can't happen. Some will argue waiting 15 minutes to conduct remedial action with a hot barrel makes training unrealistic and forms bad habits. A counterargument could be made, though, that proper habits and muscle memory can be made outside of live fire, and mitigating hazards from cook offs during live fire keeps our Marines and Sailors safe so they make it beyond training.*

Key Takeaways

Protecting our machine gunners from cook offs is all about procedure, just like any regularly performed action. We develop procedures to ensure personnel across the fleet know how to do the job properly and safely, whether that's driving a tactical vehicle, operating a forklift, or in these cases, protecting against cook offs. With that in mind we encourage the following:

1. **Know and follow procedure.** This starts with leadership ensuring the proper procedure is taught and understood. Then, Marines, Sailors and small unit leaders need to make sure this procedure is performed correctly.
2. **Wear the right PPE.** This is arguably just a subset of procedure and again starts with leadership. Make sure your personnel know what they need and check them for it.

And remember, "Let's be careful out there."

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