Discrimination through Elimination

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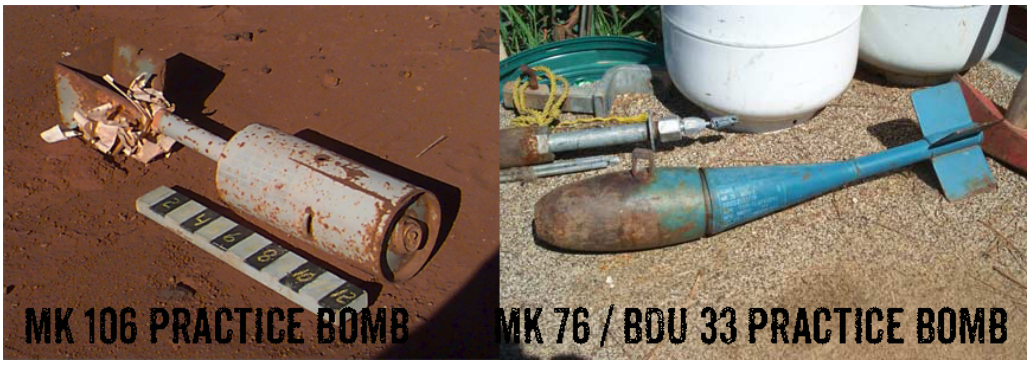
Over the past 2+ decades DoD has spent tens of millions of dollars on target discrimination technologies (i.e., geophysical sensors and algorithms to differentiate buried UXO from non-hazardous debris / scrap metal). The reasoning behind the massive investment in this area has always been to "save money" by focusing digs on targets that are "more likely" to be UXO and leaving non-UXO targets in the ground. Some in the UXO industry argue that this narrowly focused investment has come at the cost or sacrifice of other areas of the UXO problem such as minimal investments / improvements in UXO recovery and disposal technologies.

Well over 100 studies have been done on discrimination. Admittedly I have not reviewed them all, but the ones I have reviewed seem to miss an important fact when it comes to UXO and ranges - that many ordnance items are designed to leave discernible pieces of range scrap left over from the body or carcass of the expended munition when the munition functions as designed. Examples include practice ordnance such as practice air dropped bombs, cluster bomb units (CBUs), illumination rounds, smoke rounds, and CS (tear gas) filled munitions. These are explained in more detail below.

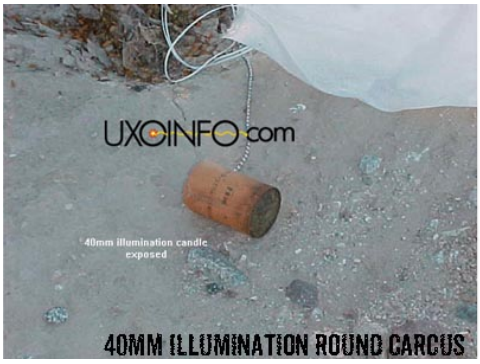
Practice ordnance such as practice air dropped bombs are designed to simulate larger high explosive (HE) filled munitions. They are used for training pilots on delivery or deployment techniques. Pilots drop practice bombs such as the MK 106 and the MK 76 as shown in images below for training. The MK 106 Mod 5 practice bomb (shown on the image to the left) is a 5-lb impact signal generating practice bomb made of sheet steel. The MK 76 (shown on the image to the right) is a 25-lb impact practice bomb with a cast iron body designed to hold a signal cartridge that acts as a spotting charge providing the pilot a visual of target impact location. Both the MK 106 and MK 76 practice bombs shown in the images have fully functioned as they were designed to and are typical of the remaining carcasses "expected" to be on the range after the items have been deployed.

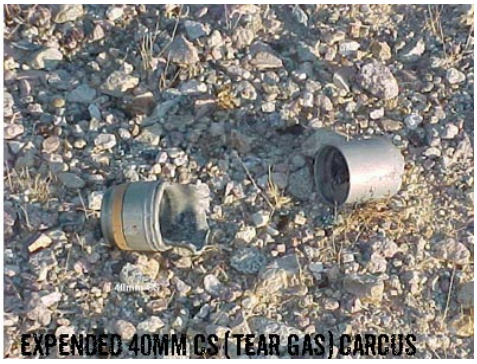


CBUs are essentially a container with their filler consisting of tens or hundreds of smaller munitions (i.e. submunitions). When the CBU is deployed as designed, the submunitions are projected, thrown, or scattered about which causes an effect often referred to as "raining down" on the target below. The weapons are very effective in large area denial scenarios. The image on the left below shows a CBU in what is commonly referred to as a clamshell design being deployed. After the item is dropped

from the aircraft, the CBU body is designed to break apart or separate, thus causing the submunitions inside to scatter over a large area. Assuming the unit functions as it is designed, one would expect to find fragmentation and shrapnel from the expended submunitions and two clamshell body sections. The clamshell body (two sections in this scenario) typically do not contain any explosives, and by design would simply fall to the ground as range debris or scrap as shown in the image to the right.

Illumination and CS (tear gas) rounds are another prime example. By design, illumination rounds are designed to burn as they fall to the ground to light up the battlefield. Many illumination ordnance include parachute retarded system to slow the decent to the ground. In any case, there is a body or container that is designed to fall to the ground becoming a piece of debris on the range. CS filled ordnance are designed to disperse tear gas in an area. Both illumination and CS munitions leave discernible debris after being expended. An example of the remnants of a 40mm illumination round with parachute attached is shown in the image below (left image) along with the carcass from a 40mm CS round post functioning (right image).





These are just a few examples of the types of discernible scrap / debris that are left over by design. It would seem as though a study or characterization on what was "expected" to be on a range would be beneficial as then you could eliminate these types of targets from your list as they present little to no hazard compared to a high explosive UXO. In essence, sometimes in order to find what you are looking for, you must first understand what you are not looking for.

A characterization effort could also serve as a waste stream analysis used to estimate the types and amounts of range residue (i.e. solid waste) expected to be on the range after non-fragmentation producing military munitions are deployed. This information is valuable in terms of assessing environmental impacts (i.e. metals deposited on ranges) and to range managers for scheduling and managing range maintenance activities.

To continue the discussion, email the author at Email:jsperka@ordnanceholdings.com.