

# Using the Portable X-ray to Acquire Positive Identification

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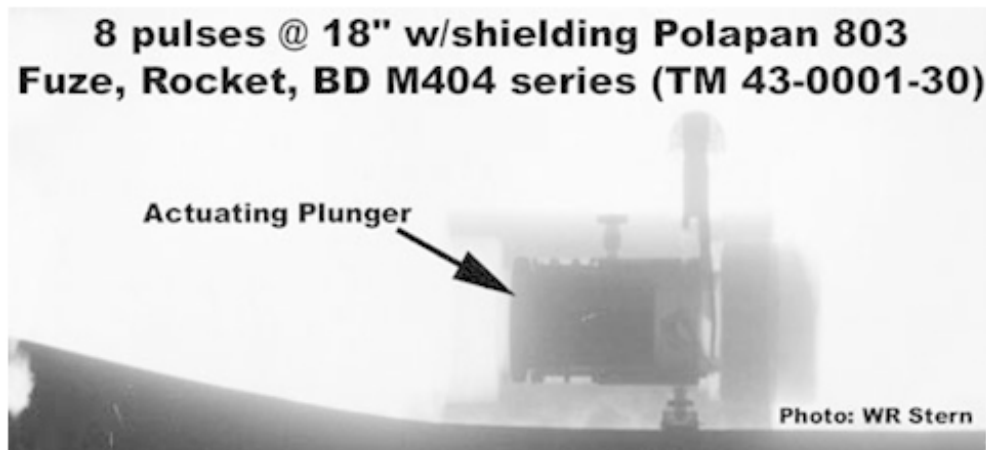
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Environmental elements can obliterate the surface identification (ID) features from ammunition items that are necessary to determine the exact nomenclature. Two examples where this is very apparent are the M28 HE and the M29 Practice versions of the U.S. 3.5-inch rocket. When surface markings (stencils, stamps) have been stripped from the 3.5-inch rocket by the effects of years of exposure to the elements, there are no other identifying external features to positively distinguish between all models of M28 Series High Explosive (HE) Rockets with M404 Series Base Detonating (BD) fuzes and the M29 Series Practice Rockets with M405 Dummy Fuze.

Notwithstanding, unreferenced claims about using a crimped ogive or square bore riding pin holes to ascertain correct ordnance type; using an x-ray is the only positive method I have encountered to distinguish between fuze models of 3.5-inch rockets that have sustained surface deterioration due to sustained exposure to nature's elements.

By no means is it a novel idea to use the x-ray to determine fuze functioning. I have though never encountered this method being used in UXO remediation operations to specifically determine the difference between the M404 Series BD Fuze and the M405 Dummy Fuze.

The x-rays presented below were taken using an older (film) version of the portable x-ray system rather than the digital version which is now commercially available. Using the newer digital version of the portable x-ray system will produce the same results.



## 10 pulses @ 18" w/shielding Polapan 803 Fuze, Rocket, Dummy M405 series



Though having identical external features, x-rays of 3.5-inch rocket fuzes illustrate the distinguishable internal difference between the M404 series fuzes and M405 series fuzes. Matching the x-rays with drawings for the M404 and M405 in the applicable publication removes all doubt which fuze is present.

TM 43-0001-30 states in the differences between models concerning the M28A2 HE and the M29A1 and M29A2 Practice, that, early manufacture of the practice version were assembled with M28A2 rocket warhead metal parts inert loaded with plaster of paris. Using this guidance, a small percentage of practice rockets when x-rayed may yield indications of being service rounds if empty M404 Series BD Fuzes were used in Load Assembly Packaging (LAP) procedures. No service round though, would indicate in an x-ray image that it is a practice round.

Use of the x-ray to identify, and segregate high explosive and practice versions would be of value to reduce unnecessary open detonation incidents of practice 3.5-inch rockets. Aside from the obvious positive project factors experienced by reducing the occurrences of unnecessary open detonations on the worksite (i.e. reduction or elimination of worksite and local population impacting exclusion areas established for intentional detonations, increase of production to area clearance schedules due to additional resources being focused on task, reduction or elimination of employee exposure to live explosive operations); some practice 3.5-inch rockets contain non-energetic fillers such as plaster of paris or wax that potentially contain harmful constituents. Sample collection efforts have been conducted in the past to test practice ordnance fillers for polychlorinated naphthalene (PCN). PCN according to the National Institute for Occupational Safety and Health (NIOSH) can cause various skin and liver disorders. Employing the x-ray as a tool to reduce occurrences of open detonation of practice 3.5-inch rockets during UXO disposal operations would reduce potential exposure of UXO workers to, and dispersal of, PCN constituents if present in non-energetic fillers.

A suitable application of high explosive is not always the safest or preferred method to remove a questionable hazard. The x-ray of suspect 3.5-inch rocket fuzes provides an alternative.

Article submitted by Ward Stern, UXO Technician.