

# Cultural Heritage Management of Unexploded Ammunition

The ethics of cultural heritage management stipulate that heritage places, if deemed culturally or historically significant, should be maintained in place and unchanged lest their significance be impaired.<sup>1</sup> Any conservation management must be respectful to the historic fabric of the site and should contemplate reversible methods of conservation intervention only as the last resort.<sup>2</sup> Usually cultural heritage sites do not pose an unreasonable risk to the heritage manager and/or visitor, recent developments in the public liability field notwithstanding. There are items, however, that had been designed to maim or kill, that survived by circumstance that period of their initial application, and that now pose a serious threat to cultural resource managers, visitors, and the sites alike: unexploded ammunition.

The Pacific War has seen the development of several permanent and temporary military bases on several islands and atolls in the central and western Pacific by both Japanese and Allied forces. Vast quantities of ammunition, ranging from small arms to large coastal defense and naval guns, as well as aerial bombs were moved to the bases and stored in concrete bunkers or open bomb dumps. Small quantities were stored in ammunition-ready magazines at the gun emplacements, where they were needed. Most of this ammunition was either expended during military action or was removed after the war. Some, however, remains. In addition, enemy action brought substantial supplies of

ammunition onto a base. While most of the bombs and shells exploded, some did not. A U.S. intelligence report following the U.S. capture of Kwajalein Atoll, Marshall Islands, indicated that approximately 50% of the naval shells failed to detonate on impact, an observation reinforced by a statement by the commander of the Japanese garrison made after surrender of Taroa.<sup>3</sup> Several of these were buried into the soft sand. Despite initial cleanup and a number of subsequent ordnance removal missions there is still an abundance of ammunition located on the islands. Scrap metal drives of the 1970s as well as utilization of explosives for bombfishing have further scattered the ordnance.<sup>4</sup> Much of the ammunition is found during normal vegetation clearing in the course of agriculture/gardening and during conservation management action.<sup>5</sup>

The archeological World War II heritage of Micronesia is very rich and most of the sites on the island are relatively untouched. Given surface sites of the kinds seen on several of the outer islands in the Marshalls it has to be assumed that—unless proven otherwise—the artifact is still *in situ*, i.e. in the position it was when the site had been abandoned after the U.S. troops had left the island, following the surrender and evacuation of the Japanese garrison and the subsequent bomb removal. Wherever and whenever possible, an artifact should remain in its original location. While this can easily be maintained for the major artifacts, such as aircraft wrecks and guns, the abundance of small artifacts provides a managerial nightmare. An almost unsolvable dilemma is posed by the live ammunition.

## Significance

Archeological surveys of World War II heritage sites in the Pacific frequently encounter unexploded ammunition, both as isolated finds and as elements contributing to a site, such as a coastal defense gun emplacement.<sup>6</sup> While all unexploded ammunition constitutes a moveable cultural resource, the ammunition found within a gun emplacement, either in form of unexpended ammunition for that gun, or in form of unexploded ammunition propelled with the intent to destroy that gun, forms part and parcel of the historical significance of the site. Take a group of 127mm dual

*Unexploded aerial bomb. Note that the tail fins of the bomb (at left) are missing, while the fuse is still undamaged. The bomb, located in the intertidal zone, is subject to extreme environmental decay. (Wotje Island, Wotje Atoll, RMI).*



*The position of unexploded ammunition can pose substantial problems. In this case, a visitor placed a shell partly into the muzzle and left it there. The shell has now corroded and fused with the muzzle. Removal of such ammunition is very complex if damage to the gun barrel shall be avoided. 150mm coastal defense gun overlooking Madelonimwh Harbor, Temwen Island, Pohnpei State, FSM.*



purpose gun shells at Japanese gun emplacement in Micronesia as an example (such as encountered on Mile atoll). The ammunition found at the emplacement has significance as it exemplifies the military function of the gun (or the military action against it in the case of U.S. ammunition at such a site) and complements any evidence of war-inflicted damage the gun or its emplacement may exhibit; its position next to the gun (as opposed to an ammunition dump) is evocative of the haste in which the place was abandoned after surrender; and its state is demonstrative of the post-war scrap metal drives which saw the shell extracted from the copper-alloy casing which could be sold; and its presence is indicative of the complexity of ordnance removal in tropical vegetation, as the ammunition has been missed by three removal missions.

Several of the WWII sites are advertised as tourist attractions by local airlines,<sup>7</sup> dive magazines,<sup>8</sup> and specialist military magazines.<sup>9</sup> As visitation increases, the likelihood of irresponsible visitor behavior will also increase, ranging from handling of ammunition out of curiosity or with the intent of souveniring, to accidentally stepping on it in the undergrowth. Live ammunition not only poses a serious health hazard for both the archeologist recording the sites and the tourist visiting them, but also poses a threat to the sites themselves. Any uncontrolled explosion could lead to the destruction of a site. Such damage to the sites affects not only the archeological and historical value, but also affects the value of the sites as a tourist attraction. In view of the increased volatility

of the ammunition (see below) it is clear that ordnance removal has to be considered—and considered soon.

### *Management Options*

The key ethical principle underpinning all management of unexploded ammunition is that human life and welfare shall not be endangered. Thus any management of unexploded ammunition needs to consider first and foremost the life and property of the people living near these sites and the life and welfare of the ordnance crew and then its impact on the cultural heritage site affected. In the past, this was seen as *carte blanche* to blow up ammunition willy-nilly, thereby unduly damaging or even destroying heritage items and sites.

Which options do exist?

- explosion in place
- removal of the ammunition and explosion at a remote location
- temporary removal of the ammunition, disarming, and return to the site
- no action alternative

In view of the significance of the unexploded ammunition to exemplify the use and history of the gun placements, as well as the historic events, the presence of the ammunition next to the emplacement, at the location where it was found, is important. In situations of no action alternative, if the ammunition is left in place and unchanged, then the environmental forces currently active will continue, among them corrosion and mechanical impact, such as falling branches and coconuts.<sup>10</sup> As the corrosion of the metal components of the shells and casings continues, the ammunition will become more and more volatile, until such time that it can explode in an unpredictable manner, thus endangering visitors and residents. Further, intentionally or accidentally lit brushfires are known to have set off ammunition, albeit so far without serious injury. Therefore, under the principles of ensuring the physical safety of inhabitants and visitors on one hand, and ethical heritage management on the other, the no action alternative is not a practical option.

In view of the above dangers, then, the ideal scenario would see the documentation of the ammunition in place, its subsequent removal and after having been disarmed (“made safe”) off location, it would be returned to its previous position. While this would have been possible without too many complications immediately or soon after the Japanese surrender, the passage of time and the ensuing corrosion of the ammunition has meant that this is no longer a viable alternative for most of the ammunition, especially of Japanese origin. Especially as the war wore on, Japanese ordnance had been manufactured of inferior alloys due to material shortages. Differential corrosion now

poses a major problem. On occasion the position of the ammunition poses even greater problems.

If disarming of the ammunition is not possible, it should be removed from the location and exploded off-site at a place where the explosion will not harm archeological surface or subsurface sites. Instances have been reported where unexploded ammunition had been collected and placed into a WWII pillbox. There it was blown up, destroying the pillbox in the process. Such an act of vandalism is obviously not acceptable and contravenes ethical and legal parameters of CRM in the U.S. and the Freely Associated States of Micronesia.

The worst-case scenario for cultural heritage managers is that the ammunition is not deemed safe to be moved, and that the EOD team requires its disposal in the place it was found. If this disposal is allowed to proceed without every possible effort of damage mitigation to the cultural heritage site, then the ensuing explosion may destroy the site in its entirety, or at the least, will create a situation where new and old damage to the installation will create a new historic context.

To date, explosive ordnance removal teams seem to have been able to conduct the removal with little scrutiny by heritage professionals. In the late 1970s unexploded ammunition was collected on the Japanese base of Taroa (RMI), placed into the bow of the Japanese shipwreck *Toreshima Maru* and detonated, severely damaging a historic shipwreck, incidentally the last supply ship ever to reach that garrison. It was only circumstance that the large number of depth charges located in the stern did not detonate, too. Thus the total destruction of the ship was prevented.

#### *The Road Ahead*

For the lay person it is unclear whether a piece of unexploded ammunition can be made safe, or whether it has to be exploded, and if so, whether it can be moved off location. These decisions can and should only be made by ordnance specialists. Since on the other hand, EOD specialists tend to have little training in cultural heritage issues, it is incumbent that EOD teams are dispatched to locations where the presence of cultural heritage sites are known or suspected, accompanied by a CRM specialist who can assess and document a site if disarming is not possible. Since the EOD actions can impair or destroy cultural heritage sites eligible for inclusion in the National Register (*inter alia* by virtue of the 50-year rule), it is incumbent that a section 106 process be executed.

#### Notes

<sup>1</sup> cf. *Secretary of the Interior's Standards for Rehabilitation and Guidelines for Rehabilitating*

*Historic Buildings*. U.S. Department of the Interior, National Park Service, 1992.; *Guidelines for Evaluating and Registering Historic Archeological Sites and Districts*. National Register Bulletin 36; J.Kerr, *The Conservation Plan. A Guide to the Preparation of Conservation Plans for Places of European Cultural Significance* (Sydney: National Trust, 1995).

<sup>2</sup> *Secretary of the Interior's Standards for Rehabilitation and Guidelines for Rehabilitating Historic Buildings*. U.S. Department of the Interior, National Park Service, 1992.

<sup>3</sup> cf. S. Kamada, Evidence given during interrogation, in: *United States Strategic Bombing Survey, The American Campaign Against Wotje, Maloelap, Mile and Jaluit* (Washington: Naval Analysis Section, United States Strategic Bombing Survey, 1947) pp. 136-141.

<sup>4</sup> cf. F. X. Hezel and C. Graham, *Truk's Underwater Museum. A Report on the Sunken Japanese Ships*. A project sponsored by the Micronesian Endowment for Historic Preservation. Report prepared for the Micronesian Resource Study, Micronesian Endowment for Historic Preservation, 1989.

During a 1969 EOD mission on Mile, 613 "known pieces" (as shown to the team by islanders and Peace Corps volunteers) and 2,594 other pieces of ordnance were destroyed. The cooperation by the locals was not the best, it appears: the EOD team found 11-1/2 55-gallon drums of picric acid, some of which already in a crystallized form. On returning the following day in order to remove and destroy these drums, only 10 drums were present. The missing 1-1/2 drums could not be located and none of the locals would be of assistance. The report mentions that bomb fishing was of great importance to the locals and that they would not volunteer the whereabouts of unexploded ammunition (Message Commander Naval Ordnance Systems Command to headquarters Washington. ORD S-434, COMEOD-GRUPAC/JWI:rc Serial N 159, dated 2 May 1969; Summary Report and letter from Commander Explosive Ordnance Disposal Group Pacific to Commander Hawaiian Sea Frontier COMEODGRUPAC/JWI:rc 800C Serial N 350, dated 4 September 1969. Archives of the TTPI Microfilm Roll N545, Group 0058).

<sup>5</sup> cf. D. Look and D. H. R. Spennemann, *For Future Use: A Management Conservation Plan for the World War II Sites in the Republic of the Marshall Islands*. (San Francisco and Albury: U.S. National Park Service and Johnstone Centre of Parks, Recreation and Heritage, 1993a); D. Look and D.H.R. Spennemann, "Saving WWII Historic Sites. Conservation Course in the Marshall Islands." CRM 16 :5 (1993b), pp. 22-24.

<sup>6</sup> D. H. R. Spennemann, M. Holly, and N. Lajuan, "Report on the Occurrence of Live Ammunition on



Mile Island, Mile Atoll," *Report OTIA-TAG-MAR-42-5/90* (Majuro Atoll, Republic of the Marshall Islands: Alele Museum, 1990); D. Look and D. H. R. Spennemann, *op. cit.*, note 5 (1993a); W. M. Adams, R. E. Ross, and B. L. Krause, *Archaeological Survey of Taroa Island, Maloelap Atoll, Republic of the Marshall Islands*, Report prepared for the Micronesian Endowment for Historic Preservation. March 10, 1990. p. 104.

<sup>7</sup> cf. D. H. R. Spennemann, *Mile, Mile Atoll*, Air Marshall Islands *Sunday Escape*, Folded tour brochure, 2pp, (Majuro: AIR Marshall Islands, 1991); *op. cit.*, *Taroa, Maloelap Atoll*. id. (1992) Wotje, Wotje Atoll.

<sup>8</sup> G. Murphy, "Majuro: Gateway to Coral Paradise," *Skin Diver* 39:3 (March 1990), pp. 128-134.

<sup>9</sup> cf. W. H. Bartsch, "Wreck Discovery: Unknown Maloelap," *After the Battle*, 54 (1986), pp. 28-41.

<sup>10</sup> D. Look and D.H.R. Spennemann *op. cit.*, note 5; D. H. R. Spennemann and David W. Look, "Impact of Tropical Vegetation on Historical Cultural Resources. A Photographic Case Study from the Marshall Islands," The Johnstone Centre for Parks, Recreation and Heritage, Report N 18, (The Johnstone Centre for Parks, Recreation and Heritage, Charles Sturt University, Albury, NSW, 1994).

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*Dirk Spenneman, Ph.D., is senior lecturer in cultural heritage studies at the Johnstone Centre of Parks, Recreation and Heritage, Charles Sturt University, Albury (Australia). From 1989 to 1992 he worked as the chief archeologist for the Republic of the Marshall Islands. He specializes in cultural heritage policy and planning. Email <dspenneman@csu.edu.au>.*

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Jadelyn J. Moniz Nakamura

## Managing Cultural Resources in a Multi-Use Area

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**N**estled in the saddle between the mountain slopes of Mauna Kea, Mauna Loa, and Hualalai on the island of Hawai'i is the U.S.

Army's Pohakuloa Training Area (PTA). This active training area is home to land-based training of the 25th Infantry Division (Light), the U.S. Navy, the U.S. Marine Corps, the National Guard and those Pacific Rim countries allied with the United States.

Besides being an active military training facility, PTA is also rich in cultural resources. PTA encompasses approximately 108,000 acres and contains over 170 formally recorded archeological sites. The number of sites identified at PTA is staggering, considering archeologists have surveyed only 20% of the land.

The Army is responsible for managing and protecting the cultural resources on these lands. Through its Ecosystem Management Program (EMP), the Army has enhanced its role as cultural resource managers that began nearly two decades ago. At PTA, archeologists are attempting to achieve several goals: develop proper management planning; complete the inventory survey of all PTA lands; enhance research opportunities; ensure the protection of archeological sites; and educate the

military and public about the cultural heritage at Pohakuloa.

Located in a marginal region of the island, PTA lies at an elevation between 1,500 m (5,100 feet) and 2,750 m (9,000 feet). The annual average rainfall for this area is approximately 500 mm (20 inches). The average temperature during the day ranges between 50 and 70 degrees Fahrenheit, while at night it may plunge nearly 40 degrees. The vegetation at PTA is a mix of subalpine and montane dry shrublands.

In part, because of its marginal position on the island, it was not until the last decade that archeologists considered this region to be significant for investigating the prehistoric past. Previously, focus on the upland region was on the middle and upper slopes of Mauna Kea, in particular the adze quarry which Hawaiians used for over 700 years.

In response to mandates provided by federal historic preservation laws, archeologists began to investigate the lower slopes and PTA flats. The surveys resulted in the identification of several site types at Pohakuloa. The most frequent site type archeologists find are culturally modified lava tubes which make up 70% of the prehistoric properties. Other sites identified include cairns, lithic quarries and workshops, trails, platforms, walls,