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Scrap-metal Risk Intervention: Technology Supporting Munitions- Risk Education

With scrap-metal collecting and do-it-yourself demining on the rise in many countries, Allan Vosburgh of the Golden West Humanitarian Foundation has suggested a new type of “MRE”: munitions-risk education. If this idea works, munitions-risk education could not only prevent serious injuries but also may potentially help in the fight against unexploded ordnance.

by Allan R. Vosburgh [Golden West Humanitarian Foundation]

In previous articles in the *Journal of Mine Action*,^{1,2} I discussed some ideas about the need to move from mine-risk education to more comprehensive munitions-risk education and suggested a new approach to reducing injuries related to scrap-metal collection. The Golden West Humanitarian Foundation is committed to finding new ways to reduce or eliminate this source of explosive-remnants-of-war deaths and serious injuries.³ This article continues that discussion and suggests adding some new technology and training elements to our overall munitions-risk education program.

During a recent visit to Vietnam, we discovered that our friends at Mines Advisory Group had also been thinking about reducing casualties from scrap-metal collection.⁴ This fact should not be surprising when one considers most of their work is done in Quang Tri province, one of the most ERW-impacted areas in Vietnam.⁵ They inquired about the potential for using our Explosive Harvesting System⁶ as a tool for recovering scrap metal from intact munitions.²

The EHS was developed by Golden West under a contract with the U.S. Department of Defense as a response to a shortage of demining explosives in Cambodia. The system turns excess stockpile munitions into safe and effective disposal charges for use by explosive-ordnance disposal and demining teams in Cambodia.⁶

Although the EHS was not designed to process unexploded ordnance, after considering MAG's inquiry, Roger Hess, Golden West Director of Field Operations, Gary Elmer, Golden West Regional Program Manager (Asia), and Len Austin, Golden West Explosive Ordnance Disposal Manager, determined that some elements of the EHS might effectively be used for UXO demilitarization. Our experience with remote-cutting processes, combined with expertise in munitions identification, could all be brought to bear on the scrap-metal and UXO problems.

New ideas are needed to reduce the rash of accidents involving scrap-metal collectors. In Cambodia, these accidents were one of the fastest-growing causes of injuries and deaths until 2006, when they reduced sharply.^{3,7} Yet, there were still 450 new casualties in 2006.⁷ In a previous article,² I suggested that conventional mine-risk education was failing scrap collectors and that a new term, *munitions-risk education* should replace it. This change does not imply we should stop trying to educate children and their families regarding the risks of interaction with all types of explosives. I wanted to recognize that the traditional exclusive threat from landmines was rapidly changing to one of landmines and UXO. I also concluded that due to a lack of income-generating options,



Explosive Harvesting System operator setting up a projectile for a remote cut.
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scrap-metal collectors were likely to continue collecting as a means to supplement their incomes and that simply telling them not to do it was not working.

I want to create a safer way for people to make money from scrap-metal-collection activities and reduce do-it-yourself demining. All over Quang Tri province, one can see evidence of scrap-metal collectors from the ubiquitous shallow holes dug in many areas. They are looking for small fragments or bits of metal, but they often find submunitions or 40-mm grenades, which can prove fatal. In other areas, people have found munitions during farming or similar activities and would like to sell them. They want the money they can earn from the scrap broker despite the risk that they might be killed or seriously injured in the process.

My original concept for scrap-metal risk reduction involved four elements that had to come together to make the program work. These elements were:

1. A munitions-risk education program, tailored to local threats and local conditions
2. Adequate explosive ordnance disposal resources to respond to reports of munitions or potentially dangerous ERW
3. Scrap-metal brokers, dealers and collectors at all levels to be convinced to call the relevant authorities first and not try home-grown render-safe procedures
4. Technology to convert recovered munitions into safe-to-sell scrap metal

I propose a new approach that rewards people for reporting dangerous objects to the authorities and that will increase clearance of dangerous munitions in a safer way. The concept is simple: A campaign will educate scrap-metal dealers, brokers and collectors to the dangers of interacting with live munitions. The project offices of agencies testing the concept offer to pay to the finder/reporter a premium for UXO that are undisturbed and reported to authorities. EOD teams respond, inspect and, if possible, remove dangerous munitions reported to us and left where they are found. Finally, a demilitarization

facility, equipped to process safe-to-handle UXO collected by the EOD teams and that produces free-from-explosives scrap metal. This scrap metal is subsequently sold and the money is used to subsidize the project. Sale of metal will never pay for itself, but some of the costs will be covered.

Ferrous/Steel—Iron	\$0.20/kg
Brass	\$1.75/kg
Aluminum	\$1.00/kg
Tin	\$0.62/kg
Tungsten/Carbide	price not established

Current scrap metal prices in Cambodia (as of January 2008).

In previous articles I suggested actions the EOD team should take when facing both inert and explosive UXO. The EOD team will destroy extremely hazardous items on the spot. Explosive items that are safe to transport, or those that could be made safe to transport, would be taken to a treatment facility. Unfortunately, there was no model of a treatment facility available. The pieces of UXO collected by the EOD team would simply pile up in storage or be destroyed on a demolition range, losing the scrap-metal components. Developmental work done on the Explosive Harvesting System is providing a partial answer to this shortfall.

In the normal EHS process, we remotely cut and remove the explosive from a variety of unfired, stockpiled landmines and munitions. Depending on the characteristics of the high-explosive filler, operators may cut and process the filler directly. In other cases, operators melt and recast the filler into individual charges, sometimes adding a booster to ensure initiation. In either case, the filler is converted into a number of smaller explosive charges suitable for use against landmines or UXO.

EHS Standard Operating Procedure states that due to safety considerations, the EHS team never processes munitions that cannot be positively identified. Cutting projectiles with unknown fillers can risk equipment, and handling unidentified explosive fillers could be extremely hazardous to personnel. To use the system for demilitarization work, where explosives recovery is not the goal, a more basic system can be employed. Once cut, the sections of munitions are transferred to a burn pit or furnace where they are heated until the explosive filler is consumed. The scrap residue is allowed to cool, washed and sorted for sale to a scrap dealer. Proceeds from the sale of free-from-explosive metal are used to fund the program and go back to the field to pay for more munitions. The example in the adjacent text box may help to make the process clear.

Status (As determined by EOD only)	Action	Reimbursement	Disposition
No Hazard: Metal only and contains no explosive.	None	None	Turn over to finder for direct sale.
Dangerous: No fuze and contains HE. Transportation is not hazardous.	Transport to SHA	Market Price	Treatment facility or destroy on demo range.
Dangerous: Fuzed and contains HE. Transportation is hazardous.	Attempt RSP, when feasible, or low-order detonation	Market Price	Treatment facility or destroy in place.
Extreme Hazard: Fuzed and contains explosive. Do not move.	Blow in place or move remotely and BIP/low-order detonation and burn out	Market Price	Destroy on-site using all available damage-mitigation techniques.

Examples of options for different threats.



Scrap yard safe-holding container for suspected ERW. Developed by Golden West and implemented by The Vietnam Veterans Memorial Fund's Project RENEW, these containers are secured to prevent access by children. Containers are regularly checked by RENEW EOD teams.

To help discourage do-it-yourself EOD, I propose to pay a bit more than market price for munitions recovered through this project. The safe-to-transport explosive munitions will be brought back for processing at our demilitarization facility.⁹ The smoke, illumination or any rounds containing submunitions will be separated and safely destroyed on an approved demolition range. Whenever possible, the smoke, illumination, etc., will be destroyed using low-order techniques¹⁰ and components recovered. The HE rounds will be cut using our proprietary EHS process and packaged for thermal treatment. Any hazardous components (e.g., fuzes, bursters, etc.) remaining will be destroyed using thermal treatment or by detonation.

The project will be integrated into our proposed program by combining munitions-risk education elements, EOD team training and developmental elements, scrap-metal-worker education, safety elements and demilitarization processing elements.

Golden West already has a comprehensive munitions-risk education program available in our popular ERW Indicators booklets series.¹¹ The Indicators programs provide critical identification and safety information tailored for local threats and conditions.

In Cambodia, Golden West is working with the Cambodian Mine Action Centre, MAG and The HALO Trust to help make the scrap-metal trade safer for everyone. HALO EOD teams routinely visit the scrap-metal yards in western Cambodia, separating and removing dangerous munitions. In the Lao People's Democratic Republic and Vietnam, MAG is using specialized tools to attempt low-order detonations of large munitions, allowing the recovery of scrap metal. In the Dong Ha, Vietnam, area, Golden West and the Vietnam Veterans Memorial Fund's Project RENEW™ are partnering to educate scrap-metal workers and to provide secure, safe holding areas for suspect munitions.

The missing element, the demilitarization processing capability, is now within reach. By adapting components of our Explosive Harvesting System, Golden West can supply a relatively simple system that will safely cut UXO into sections. The cut sections can then be transferred to a heat-treatment process, resulting in free-from-explosive scrap metal. The process will be safe, as all cuts will be done remotely, and the need for training of experienced EOD personnel as operators will

How It Might Work

Mr. Hung lives in the countryside outside Dong Ha, Vietnam. While clearing land behind his house, he discovered several large artillery projectiles partially protruding from the ground. They have been there many years, but Mr. Hung has always been careful to work around them and not disturb them. He suspects they may be worth something, and since he is a poor farmer, he wishes he could find a way to sell them. His friend, Mr. Thu, tells him he can sell the metal to the scrap dealer, but he must first get rid of the explosive. Mr. Hung wants the money, but is afraid of what might happen.

One day, Mr. Hung is visiting his sister in Dong Ha and he sees a sign that says the authorities are willing to help him get rid of the dangerous munitions and will pay him for what they are worth. He is worried, but decides he should get rid of the projectiles for the safety of his family and his animals. He calls the local People's Committee Representative and makes a simple report.

A few days later, Mr. Hung is working in his garden when an EOD team arrives. He shows them to the projectiles and they search the area around them. They find two more large projectiles in the same area. Two are broken, one with the fuze missing, one has a smashed fuze and one is intact. All have been fired. The EOD team identifies them as U.S. 155-mm high-explosive projectiles, left over from fighting that occurred in this area in 1975. The team decides one must be destroyed where it was found, two can be safely transported, and one is just metal.

The EOD team carefully piles sandbags over the projectile and, with a loud boom, completely destroys it. They move the two projectiles deemed safe to transport to their trucks, where the projectiles are carefully placed between sandbags in the bed of the truck. The broken parts of the projectile are given to Mr. Hung to sell. The EOD Team Chief refers to a chart and pays Mr. Hung VND240,000 (about \$15.00). The EOD Team waves as they drive away.

Following processing, the team recovers US\$14.62 from clean scrap metal they later sell to a dealer.⁸

be minimal. Equipment is not prohibitively expensive and is cheap and easy to maintain with local skills.

This concept is just that—an idea and not a sure thing. Many things can go wrong or not work out the way we hope. The key to this process is integrity and strict accounting by field teams. Team leaders will be empowered to make on-the-spot deals with civilians and will be carrying cash to pay them. Success will be measured by the number of reports, responses and resolutions. Costs for the reimbursement program will never be totally

recovered by our resale of clean scrap, but must be kept under control and not tainted by individual or programmatic corruption.

The elements seem to be in place and what remains is to implement a pilot program to test the concept. By partnering with our friends at MAG-Vietnam, Project RENEW™ or CMAC, Golden West can demonstrate whether the application of education, training and technology to the scrap-metal challenge will result in a dramatic reduction in deaths and injuries. The project is not yet funded. ♦

See Endnotes, page 113



Allan Vosburgh is a retired U.S. Army Colonel, Master EOD Technician and the former Assistant for Explosive Ordnance Disposal, Humanitarian Demining Technology and Munitions in the Office of the Assistant Secretary of Defense (Special Operations and Low-intensity Conflict) at the U.S. Department of Defense. He currently serves as the Director of Explosive Safety for the Golden West Humanitarian Foundation.

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News Brief

Help Wanted: 2,000 Iraqi Demining Jobs Available

Approximately 2,000 demining positions are available in Iraq, having been created to help boost clearance operations in the country. Individuals chosen will receive training and then travel to various areas around the country to continue essential clearance activities. The majority of jobs will go to residents of Basra, which is plagued by about five million landmines, many dating to the Iran-Iraq War of the 1980s.

Each employee will receive 150,000 Iraqi dinars (US\$128) in monthly wages and a risk allowance of 50,000 dinars (\$43). UNICEF figures from 2006 indicate an average gross national income of about 2.6 million dinars (\$2,170), making this total salary slightly less than the national average. The contractors are essential to continued mine-action efforts in Iraq, which has struggled with demining because of the inability to procure and maintain modern equipment. The security situation in Iraq also makes demining activities difficult, as trained deminers must contend with roadside bombs, car bombs, missiles, mortar rounds, and other stand-alone and cached weapons.