The Journal of ERW and Mine Action Issue 10.2

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Call For Papers
Journal of Mine Action
Deadline: July 1, 2007
Publish Date: December 2007

RESEARCH, TECHNOLOGY AND DEVELOPMENT IN MINE ACTION

The Journal of Mine Action is soliciting articles in the field of research, technology and development. All articles on current trends and developments in R&D will be considered. Topics will include but not be limited to:

- Detection and Neutralization
- Mechanical Equipment
- Manual Equipment
- Data Fusion
- Biometrics (including dogs, rats, bees)
- GIS, Mapping and Terrain Analysis
- Personal Protective Equipment
- Demining Tools
- Metal Detectors
- Needs of Users
- Lessons Learned in the Field
- Test and Evaluation
- Information Technology
- Mine-Detection Test Facilities
- Landmines, ERW and Ordnance

FOCUS
Middle East/North Africa

Issue 11.2 of the Journal of Mine Action will focus on landmines in the Middle East and North Africa. Countries of particular interest include Algeria, Guinea-Bissau, Iran, Iraq, Israel, Jordan, Kuwait, Lebanon, Libya, Senegal, Syria and Yemen. Articles are sought that deal with clearance, survivor assistance, community risk-reduction initiatives, socioeconomic impact and technology being produced or tested in any of these target countries. We will also accept nonpolitical historical pieces highlighting the conflicts that resulted in the mines being deployed and giving researchers and aid workers an understanding of the country and context in which they are working.

FEATURE
Environmental Impact of Demining

The JMA is soliciting articles for issue 11.2 on the environmental impact of demining—articles about how to reduce the environmental impact, what to consider regarding the environment before commencing demining, methods and equipment that produce the least environmental impact, and related story angles will be considered.

SUBMISSION GUIDELINES:

Article length: 1,000–2,000 words and submitted in digital format (i.e., Microsoft Word). R&D articles can be up to 2,500 words.

Images/photos: Must be scanned at 300 dpi or better. Line art, graphics and charts should be scanned at 600 dpi or better. Submit all images/graphics by CD, Zip disk or e-mail (.zip files cannot be received via e-mail at JMU).

Important: Please do not include images in your documents. The quality is too poor for printing. Originals are encouraged and will be returned upon request.

Please note: We do not accept overly promotional articles. If you are promoting your business or product, be sure to give data and/or solid examples that demonstrate your accomplishments.

Contact information/bio: Articles must contain a title, author and full contact information at the end of the article (i.e., phone, e-mail and mailing address). Please include a head-and-shoulders photo and biography (no more than 60 words) of the author for inclusion at the end of the article. Consider including credentials, books authored and other biographical information.

Spread the word about your research! Get others talking. Submit your article today.
Dear Reader,

As we see it is the case with everyone reading the JMA, we at the MAIC were disappointed and troubled by the recent conflict between Israel and Hizbollah in Lebanon. The extent of the damage and danger left behind is still being determined, but we can be assured that there will be much work to be done to make this area of the world safe and livable again.

In light of recent events, we thought it appropriate to focus the attention of the Journal on the events in Lebanon and Israel and the issue of explosive remnants of war in general. Mine-action practitioners on the ground have realized that their work goes far beyond finding and disposing of landmines, to other explosive remnants that are a threat to civilian populations. Thus, we wanted to give everyone in the community to discuss how the overarching issue of ERW affects their work.

As the voice of the mine-action community, the JMA strives to capture the realities of situations dealt with by the community. Thus, realizing the fact that mines and ERW are often difficult to distinguish in an operational context, we think of mines as one element of ERW. We recognize that mines and ERW are regulated by different legal documents, however, which cause some in the community to define ERW as separate from mines. When authors have written articles using this more legalistic definition of ERW, we have not changed the wording to say that their articles accurately reflect their perspective.

Regardless of how you define it, ERW is more and more becoming recognized as an issue that mine-action programs must deal with on many fronts. We hope you have captured that reality in this issue and will welcome further submissions on the broader subject of ERW.

Our thoughts are with all the victims of the recent conflict and we hope those working in the region can minimize the continued effects on the civilian population.

Nicole Natzry
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Letters to the Editor

As an independent journal, we provide topics that stimulate conversations. We give the mine-action community a place to sound off. Every issue brings us rants and raves—happily, usually many more raves than rants. We’re sharing some of them here.

I was disappointed by the article “An Alternative Perspective on Landmines and Vulnerable Populations” in your [August 2006] issue arguing that landmines have positive uses. Several times in the past I’ve argued that the fact that a magazine seeking to educate the public about the challenges of removing anti-personnel landmines from the ground and their impact on civilian populations to simultaneously publish an editorial that advocates their use. How on the one hand can you display a poignant message of mine-risk to children in Africa on the cover and at the same time allow an author to rationalize planting new mines that could put such a child’s life in danger?

In addition, the article was poorly reasoned and factually inaccurate, which is a further disservice to your readers. The portrayal of the ICBL as obfuscating facts and manipulating survivors’ images to serve their own agenda and losing sight of the fact that a few civilians may have used landmines as weapons is the idea that these weapons actually kill people. I don’t think anyone would seriously argue that information on the ICBL’s annual Landmine Monitor publication (www.icbl.org/itm) is testament to the thorough and serious work we do to collect accurate data. Landmine survivors speak out against mine use on their own accord because they are committed to reducing the risk to others from these vile weapons. Further, the heart of the author’s argument is that AP mines have been and would be used by civilian populations to defend themselves, whereas in fact it is almost always soldiers (government or non-state armed groups) that lay the mines and their goal is not to protect civilians. History has shown that these horrific indiscriminate weapons only lead to lost lives, limbs and economic opportunities for decades to come. It is hard to imagine any community choosing such a future for itself.

Sylvia Breyer, Executive Director, ICBL

In Dr. Weitzel’s article, the Journal modified the caption of a photo showing the International Committee of the Red Cross (ICRC) to say that minesfields... defended vulnerable populations.” This is exactly opposite of what we have observed for decades in mineaffected areas. The ICRC has explicitly called the use of landmines “absurd,” when taken with the fact that these weapons actually kill people. I don’t think anyone would seriously argue that information on the ICBL’s annual Landmine Monitor publication (www.icbl.org/itm) is testament to the thorough and serious work we do to collect accurate data. Landmine survivors speak out against mine use on their own accord because they are committed to reducing the risk to others from these vile weapons. Further, the heart of the author’s argument is that AP mines have been and would be used by civilian populations to defend themselves, whereas in fact it is almost always soldiers (government or non-state armed groups) that lay the mines and their goal is not to protect civilians. History has shown that these horrific indiscriminate weapons only lead to lost lives, limbs and economic opportunities for decades to come. It is hard to imagine any community choosing such a future for itself.

Sylvia Breyer, Executive Director, ICBL

Response from MAIC Director Dennis Barlow: We at the MAG and certainly behind the publication of the article, “An Alternative Perspective on Landmines and Vulnerable Populations” as we do all the articles we publish. This is not as an advocate of mine action, but rather that we are independent of the organization and its mission. We welcome the responses of Dr. Trevelyan and the Director of the ICBL in rebuttal; we have been publishing for eight years and this is the first input we have received from ICBL, so perhaps we have Dr. Weitzel to thank for that. We recognize the key contributions of Dr. Trevelyan and Ms. Breyer to mine action, and we are indeed proud to have had them. We agree that there “are better ways to protect vulnerable populations” than landmines. However, we disagree that such articles have no place in the JMA. We believe that all points of mine action can (and should) withstand critical, and we also believe that no position should be “off limits” to honor freedom of expression.

Dennis Barlow, Director, Mine Action Information Center

Encouraging diversity of opinion is a fine objective for JMA, but there is a reason to consider the balance between the “negative” effects of landmines and the “positive” effects on communities that may benefit from them. Although the author may have had a different perspective, it is important to note that there are countless examples of communities that have successfully cleared landmines and are now enjoying the economic benefits that come with it. In addition, the article highlights the need for further research and discussion on the issue.

Reuben Negistes-McCarty, Landmines and Small Arms Team, UNICEF

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Dennis Barlow, Director, Mine Action Information Center
The Mine Action Experience... or the Wreck of the '09

The author discusses current challenges relating to an effective global mine-action strategy; he considers approaches and policies that could enhance or impede demining efforts worldwide. There are many emerging concepts to consider in order to improve mine action, such as mainstreaming, risk management and national ownership. The author discusses potential future plans of action the community must undertake regarding these issues in order to deal effectively with landmines and explosive remnants of war.

by Denis Barlow [Mine Action Information Center]

In the 20th century, railroad lines became famous for highly efficient, progressive and dependable travel—or for dramatic accidents which epitomized the height of negligence and had planning. Whether these railroad events are agonizing or amazing, the images and emotions they evoke—similar to mine-action accidents or accomplishments—stay indelibly etched into our minds.

At the Mine Action Information Center, it seems to us that the rapidly developing state of mine action has reached the point where it, like great and majestic train lines, combine the best of many technologies and innovations to provide effective and secure service—or it can force together conflicting strategies and mechanisms to cause its own “great train wreck.”

Over the past year, some of the best practitioners, policymakers and pundits involved in mine action have developed some thought-provoking and timely concepts that should be considered for integration into mine-action campaigns. I will discuss a few of these ideas here, not only with a view to their validity in specific ideas, but also with an eye to integrating them into a total system that will yield the greatest overall efficiencies.

Effective national ownership implies a string of interrelated conditions. It suggests a strong national will; an integrated group of government agencies; the ability to identify, build and maintain capacities; and a skill and willingness to engage the populace. These characteristics have proven difficult for countries emerging from crisis situations. Therefore, the mine-action community has by and by crafted an informal set of global support networks available to the landmine-impacted countries. Donor states, the United Nations, major non-governmental organizations, regional organizations and corporations have formed a complex network of interrelated activities to help these countries. But the concept of building national independence from without—that is, by external forces—is typically at best. National ownership implies sovereignty and independence; yet foreign technical advisors, donor representatives, U.N. field workers, guest militaries and diplomats are often inserted into the process, sometimes technicallyclouding the issue of national independence even while striving mightily to help develop strong national capabilities.

The above situation is the best-case scenario. Reports at both the most recent International Meeting of Mine Action Programme Directors and U.N. Advisors in July and Ottawa Convention States Parties Meeting in September suggest a significant number of impacted governments are just “not there” when it comes to accepting national ownership. The United Nations, United States, European Union and other donors and advices would like to help off the engine, but often they are alone in the cab and cannot take the risk of learning the engine-assemblies.

Mainstreaming

If mine action is a viable and valid humanitarian endeavor, for it is one of the most successful in history, it is because it is tied to the concepts of development, infrastructure, stability, confidence and security. In other words, the individual tragedies of landmine accidents, while emotionally compelling, pale in numerical comparison to other threats (AIDS, malnutrition, factional violence, motor vehicle accidents, etc.) which individually claim far greater numbers of victims than landmines.

Landmine action, therefore, should be given priority consideration among other national programs, to the extent that it supports socioeconomic development. Ah, but the rub comes when trying to disengage the highly successful mine-action juggernaut, which has carved out such a huge niche in defining its role among donors, non-governmental organizations, diplomats, journalists, governments and a worldwide public following, and fit it into a larger and less discrete development program. Many in the mainstreaming crowd are asking whether we must turn the chronic over to development officials and more toward the task of the rail, out of sight of the engine, gauges and view ahead. Their worries may range from the abstraction of techniques of information gathering, but their concerns are real nevertheless.

Development plans and officials are not always enamored with or cognizant of the complexities of mine action, nor are donors necessarily eager to fund such activities other than those specifically earmarked for mine action projects. It remains for those in the global community to foster vehicles such as the Millennium Development Goals5 to promote these settings to tolerable risks and promote an environment of trust and comfort in which mine-action activities can be integrated with other projects and programs.

Landmines and Other Explosive Remnants of War

To achieve any end, we must first determine what is impeding our way. The great railroad planners were able to scout ahead and surmise the challenges that terrain, indigenous populations and climate would pose. In the area of mine action, we were forced to add more and more threats and the initial concerns that began with the singular task of finding anti-personnel landmines.

We realized that battlefields and chateaux also usually contained unexploded ordnance. Then we had to add that caches of ammunition, small arms and light weapons, booby traps, and improvised explosive devices could each be part of a post-conflict environment. While the Ottawa Convention6 is concerned solely with APLs, countries at risk have had to deal realistically with all potential explosive remnants of war. The landmine strategy has been successful, but it still needs to address the question of the growing threats of other EWRs.

Some, such as Tim Carstairs of Mines Advisory Group, argue that the mined weapon consideration must be taken into account and that donors and policy makers must consider the concept that landmines, small arms and light weapons, UXO, etc., must be considered and planned together in order to assure that the land is indeed safe and preparation for development is assured.

The good news is that many organizations, such as the European Commission, the U.N. Mine Action Service and the Geneva International Centre for Humanitarian Demining have taken the pragmatic step of including broader EWR considerations into mandates to support mine action, and some countries such as Cambodia have adopted a holistic approach to post-conflict EWR threats. The bad news is that this concept will deal separately with AP/Ls and EWRs as defined by the Ottawa Convention and the Convention on Certain Conventional Weapons.7

Release of Land

When humanitarian demining was beginning as a new movement, it developed an admirable method for trying to identify mined areas—which after all, is the precursor to dealing with the landmine threat. Impact surveys were instituted in most countries at risk from APLs. Based on these surveys, suspected mined areas were identified. Predictably, in an effort not to pass over contaminated areas, many suspected mined areas were identified as real only after they were seeded with mines. It now appears that upwards of 90 percent of operators’ time and resources are being spent in areas where there are no mines.8

It will require imagination and courage to deal with this situation, for the cold, hard fact is massive quantities of land are declared out of bounds, which is a major factor keeping developing countries from expanding education, trade, agriculture and other development. Predictably, with a perceived “mine free” land area to be identified and released the wrongly identified land will require considering such ideas as tolerable risk, implementing new and improved technology, and training of deminers, and reclasifying land under review, immediately placing land declared “released” from threat into productive use. Nergaard recommends a greater use of technical research and geographic information systems polygon-control measures to take some of the guesswork out of release. He accepts the fact that liability, risk and standards will come into play but insists these concepts are simply that have to be faced. Others will not accept such an interpretation because they believe it is too intolerable, and other risks with a perceived “mine free” scenario called for by the Ottawa Convention.9

More consideration of these concepts, especially the various aspects of risk management and risk tolerance, is being undertaken by Harvard Bach and Tim Landwar of the Geneva International Centre for Humanitarian Demining, and we eagerly anticipate their further research.

Mines-free; Impact-free

Perhaps the most basic prerequisite to having a safe and effective railroad journey is fixing a definite schedule and timetable. While it is lucky to think of boarding a train without either passenger or engineer aware of its destination, this is the plight that many...
mine-action managers find themselves faced with today. In the simplest of all strategy formulas, we ask “Where are we? Where do we want to go? How do we get there?” If we do not know where we want to go, no effective strategy can be planned, and we will surely never reach our goal.

Many signatories have emphasized their position at each of the seven Convention Review Conferences that “impact-free” landmine-free zones do not measure up to the specific requirements of Article 5. However, the European Community’s policy “is dramatically reducing the lingering threat and impact of land-

mine-free zones.” It has therefore articulated a “zero-victim target.” In a situation in which many nations at risk receive support and advice from many different quarters, they are often given conflicting or redundant guidance. What is clear is that the differences among the approaches will be vast. Clearing all landmines from all affected countries by 2009 will not only be daunting but resource-intensive. Just as in curing any social ill (pollution, extreme poverty, HIV/AIDS, malnutrition, unemployment, etc.), erasing the last vestiges of the threat often requires the largest application of resources. This comes at a time when there are indications that donor funding will become more difficult to obtain. Alastair Craib of the United Kingdom gave a sobering discussion of this trend at the Mine Action Directors Meeting in July 2006.

We at the MAIC further note that only 12 countries are on a pace to complete their Article 5 requirements by 2009. This alone suggests that the absolute position of Article 5 may be unrealistic. If Belgium is not ready to declare itself free of all landmines, how can we expect that Laos, Cambodia, Monambique and the many other impacted countries will be able to do so within the specified time period?

A clear and compelling explanation of the ramifications of the decisions of a mine-action program is set out in Bob Kealey’s article, “Are We Setting the Wrong Targets?” After reaching the conclusion that the literal interpretation of Article 5 could be impractical, he makes a logical assumption that an end-state should be defined as being the “point where there is no economic demand for the land left undetermined and when all reasonable and practicable steps have also been taken to prevent casualties in the areas that remain contaminated.”

Kealey contemplates the courage to face this issue head on and modify Article 5 of the Ottawa Convention.

The Rise of ERW as a Threat to Civilians

Since the beginning of the 20th century, the world has witnessed several destructive and deadly wars. Two of the most horrific were the First and Second World Wars, during which explosives, engines, rockets and shells were used widely. Many people died and large amounts of property were destroyed. Of great concern is that a significant number of people continue to be at risk due to the existence of thousands of explosive remnants of war, including landmines, resulting from these and other conflicts.

To some degree, landmines are losing their importance in the face of the new trends in military tactics, as can be observed in the recent massive military campaigns in Iraq, Bosnia and Herzegovina, and Lebanon, for example. These conflicts have essentially been led as air strikes rather than ground attacks. This change in tactic produces a complicated situation in which children and other innocent civilians increasingly have to deal with a large quantity of unexploded debris (mines, shells, rockets, bombs, engines) right in their own community and homes. This new environment of the battlefield contributes to worsening significantly the living situation for civilians — buildings and bridges are destroyed; many fires spread due to the presence of incendiary ammunition and explosives; broken iron and glass litter communities; people suffer a loss of electricity due to the destruction of electric power stations, etc.

Consequently, a civilian population is almost certain to suffer losses. This is the major activity in the mine-action process. Otherwise, the naked eye could be protected from threat, but the indirect threat from ERW remains a problem. The two World Wars gave landmines an important tactical role. The combination of tanks and air attacks was a crucial strategic principle for success during these wars. At the same time, in order to protect one’s own position from the infantry’s attack or an armoured assault, the tank forces all laid mountains of landmines in northern Africa, but the mines weren’t as effective as in the past because the tanks used by the military could roll right over them without being affected. Because so many mines were employed, huge quantities of landmines and ERW remain today.

Increased Use of Missiles and Ordinance in the Gulf Wars

On 15 January 1991, U.N. Coalition Forces struck air targets on Iraq, but the ground attack did not begin until 24 February. This situation reflects how the previously important role of the tank in warfare has lessened and how mines as well have lost some of their value as a weapon in armed conflict. With battle tactics shifting to the air with such warplanes as the F-117 and B-52 and other aerial vectors that drop immense quantities of bombs and rockets on the battlefield, the tank’s role in war has decreased. The result that has dramatically increased the use of improvised weaponry, such as the Patriot missile, and other means of aerial attack and defense were used in the first Gulf War and since then to gain a strategic advantage. The resulting destruction from these tactics is systematic, leading to massive collateral damage on the ground. The tactics of modern warfare have continued to involve more ERW than mines, as seen in the March 2003 invasion of Baghdad, Iraq, during which Coalition Forces dropped munitions from the air in large quantities. As a result, the incidence of ERW has grown significantly, while the use of landmines is decreasing. In addition, Iraq has seen a large increase in the use of improvised missiles and other explosive devices by non-state actors, leading again to an increased threat of harm from ERW.

As a result, ERW — instead of mines — are now the biggest threat to civilians; indeed, this shift in warfare highlights the need for a new approach. For this reason, the importance of an effective response to the threat remains a major concern for all those responsible for ensuring the well-being of victims. The methods used to combat ERW have evolved over the years, focusing on three threats to civilians: landmines, unexploded ordnance and improvised ordnance.

By Lt. Colonel Mahgoub Potential Dina Nema | Mauritania National Demining Office |
by both sides across the border along with an Israeli ground invasion into Lebanon. In particular, Israel dropped or fired over a million submunitions from cluster munitions into Lebanon land.

The destruction was systemic, leading to an environment at the end of the war that is not only very unknown but also continuing to be critically dangerous to civilians due to the massive quantity of bombs, bomblets, shells and rockets that remain everywhere in southern Lebanon.

To the outside world, it seems during Israel’s air strikes there was little difference established between the military objectives and civilian targets. Bridges, roads and airports were destroyed so strategically crippled enemy forces; yet this also made the delivery of humanitarian aid not only hard but nearly impossible.

Suggestions for Protecting Civilians

Many measures can be taken to ensure the safety of civilians, particularly with the increased threat they face in modern warfare. In the Middle East and other regions at risk of conflict, it is important to protect civilians by providing the poorest countries with bunkers and other protective installations in the main cities during peaceful periods, with a particular focus on schools and hospitals.

Additionally, international law should strictly enforce the convention against killing civilians and destroying civilian areas during conflict, prosecuting under criminal law those who do not follow this convention. The United Nations Security Council should also be given the power—and be willing to use it—to stop any war in which genocide is observable.

Finally, in mine action, activities need to focus on providing updated awareness campaigns that are informed by the changing reality of recent conflicts to ensure that children and other vulnerable people are protected. See Endnotes, page 109

Conference on Women in Armed Groups, Human Rights

In November 2005, Geneva Call and the Program for the Study of International Organizations from the Geneva-based Graduate Institute of International Studies held a workshop in Ethiopia entitled “Women in Armed Opposition Groups in Africa and the Promotion of International Humanitarian Law and Human Rights.”

The workshop sought ways to strengthen international humanitarian and human-rights law within African armed groups and their political groups. Thirty-nine female leaders from armed opposition groups and civil society from countries currently involved in conflict or recently involved in the post-conflict recovery process came together for the conference. The workshop also sought to increase the international community’s understanding of and ability to work with African armed groups.

Four topics were discussed in working groups during the workshop:
1. Humanitarian law
2. Human-rights law
3. Disarmament, demobilization and reintegration
4. Transition into governance rules

The final report from the conference, which presents information and analyses that came out of these four thematic working groups, is available in English and will soon be available in French. The report can be downloaded at http://snipurl.com/xiy4. If you would like a printed copy of these four thematic working groups, it is available in English and will soon be available in French.

Additional information, including a prioritization component using a socioeconomic approach, is currently available. After highlighting gaps in IMAS related to assessment and survey, an improved aspect of mine-action planning methodology is presented, which includes a prioritization component using a socioeconomic approach.

The result is LIRA: a landmine impact combined with a new measurement of risk assessment. This updated model can contribute to improved safety, quality and productivity of landmine action through more effective strategic planning tools.

The authors present a critique of the International Mine Action Standards currently in use. After highlighting gaps in IMAS related to assessment and survey, an improved aspect of mine-action planning methodology is presented, which includes a prioritization component using a socioeconomic approach. The result is LIRA: a landmine impact combined with a new measurement of risk assessment. This updated model can contribute to improved safety, quality and productivity of landmine action through more effective strategic planning tools.

The vast majority of mine action is paid for with donor funds, but are these funds always utilized for the optimum benefit of the affected population? Any money spent on bureaucracy lessens what is available for reducing the physical, social, psychological and economic effects of conflict. Many argue, with some justification, that attempting to impose international mine action standards (or even International Organization for Standardization [ISO] standards) on populations clearly unaccustomed to these methods can, without appropriate managerial training and support, jeopardize their efforts for the sake of attaining a standard they may not be capable of achieving. Any increase in safety and quality requirements must be measured against productivity; in other words, any funds used to pay forstringently high safety and quality standards must be measured against the lives lost and injuries inflicted by the consequent reduction in clearance activities.

The original intention for standards such as the International Mine Action Standards was that they should form a baseline by which pragmatic implementation of a foundation of “standards” would take into account the particular situation in each affected country. However, recent interpretations of the text illustrate that the IMAS have now become a vehicle for those who wish to impose standards. The cost of some projects has been dramatically increased by those using IMAS as a quality-assurance/quality-control vehicle to increase demands on or delay the work; whether through a lack of understanding, a difference in interpretation of the text or by design. In some cases, the IMAS documents seem to confuse rather than clarify due to unclear text and a plethora of paperwork. In some specific areas—assessment and survey—the IMAS appear to have lost direction. The aims and objectives of these standards (and the number of other documents and references) made throughout the IMAS are the subject of this article.
Within this SLA framework, the LIRA process should be:

- **Purposive**, meeting its aims and objectives
- **Focused**, concentrating on what is critical, not only the key result indicators but also the key steps.
- **Adaptive**, responding to issues and realities
- **Participatory,** fully involving all stakeholders
- **Unambiguous,** being clear and easily understandable
- **Rigorous,** applying best “practitioner” methodology
- **Practical,** establishing mitigation measures that work
- **Credible**, carried out with objectivity and professionalism
- **Efficient,** imposing least-cost burden on proponents

The SLA process is similar for mine action programs that have been undertaken, Environmental Impact Assessments have been implemented, redefined and developed, for which socio-economic elements (e.g., the Social Impact Assessment) are but one small part. EIAs are now the fundamental assessment without which development activities throughout most parts of the world cannot exist. This process is designed to define the problems and decide on a direction and course of action. The socio-economic approach and LIRA, while attempting to adopt the SLA mechanism, fail to undertake the assessment or approach in a systematic manner and start from the premise of identifying and providing a series of actions directed toward more effective management of the problem.

Fundamentally, the LIRA process lacks a risk-assessment phase that is measurable to some initial condition (a baseline). The integration of this risk-assessment phase in conjunction with the component of risk/impact reduction verifies the strategic decision-making for a defensible Landmine Impact and Risk Assessment. The methodology required for such a process definition, and the development of a prioritized risk-based clearance program such as a LIRA necessitates a systematic approach that is defined with the following three core values:

1. **Integrity:** The LIRA process conforms to agreed standards.
2. **Utility:** The LIRA process provides balanced, credible information for decision-making.
3. **Sustainability:** The LIRA process results in good program outcomes.

The LIRA, as a component of a Strategic Landmine Assessment, should be a systematic and transparent tool integrating many different components to decision-making; address socio-economic effects of strategic clearance operations; include policy, plans and program decisions; be undertaken when alternatives are still available; and be a flexible, diversified process.

The key objectives of the SLA would be to facilitate informed decision-making, contribute to socio-economic and sustainable clearance decisions, and identify and address cumulative effects.

The most important issues. The assessment tendency is to concentrate on mine-action elements such as local communities, local elements such as mines and unexploded ordnance, damage and risk type, etc. The General Mine Action Assessment (IMAS) states, “The true measure of success of mine action is based on its impact on the local specific conditions and the problems in the needs of the local community. A number of Landmine Impact Surveys also concentrate on elements of the local community. This trend to follow the IMAS approach with an over-emphasis on the local community is surely incomplete. While they are both essential elements, the General Mine Action Assessment and the local community are in one of the most important aspects of strategic planning. It is not about where to demise and for what reasons and technology, planning and resource availability, but in what order the tasks should be undertaken.

The “We acknowledge the IMAS have created a sound foundation, they have also created a mountain of documentation.”

Commercial or Social Precedence

The IMAS and GMAA concentrate on the local issues, and accordingly this is where the greatest impact is perceived, from the economic repercussions for families, small communities and medical facilities to the emotional aspects of injuries and deaths; but is this perception correct? Take for example the mines and UXO in Kosovo, Iraq, Lebanon and Angola, to name just a few. The local communities in these countries are as devastated as anywhere else in the world, with injuries, death and economic hardship, among other problems. Yet, mines and UXO in these and other countries also debate or have delayed registration of national commercial activities such as oil and gas exploration and extraction, denying the affected country millions of dollars each and every day, which could have been used to help solve the mine and UXO problem.

Allowing an emotional response or local considerations alone to distill clearance requirements in effect delays the economic recovery of the country, maintains dependency on donor funds, and restricts the development of local and regional areas. A national priority that creates economic regeneration and growth cannot be totally ignored due to local and social considerations, in just the same way that death and injuries cannot be totally disregarded due to the demands for national commercial precedence.

Commercial and social aspects are important but they have to be considered together, separately and collectively; indeed, prioritization in order to create regional and national economic growth may well be applied in some cases to establish the sustainable future environment for future mine-action activities. Each country and each region within a country is different and these differences need to be defined. The defining process must be realistic, coordinated and integrated with all authorities. It must address, among others, medium and long-term requirements, provide a decision-making basis, be capable of being implemented, and be based on practical and practice.

Some believe a number of activities cannot be accurately measured. An example is the importance in community area of communications and transportation infrastructure during the emergency phase, a time when medical services and accessibility to clean water are critical. In addition, there are rules that determine if an activity is a clearing activity. Such rules and regulations are omission, the resources available would impact the method of LIRA used as cost, information, time and personnel inevitably vary with each specific case.

Information required for establishing the measurement tool and/or baseline conditions (often elicited through a baseline survey) includes current conditions, current and expected trends, off-site activities already being implemented and the effects of other activities yet to be implemented. Information gathered as baseline data of reference; impact analysis, to predict the effects of specific clearances across activities and strategies for mine action; mitigation, to establish measures to prioritize high- and-impact activities; resource, to prepare the information necessary for decision-making; review, to check the quality of the LIRA report; decision-making, to approve or reject the specific clearance activities and set conditions; follow-up, to monitor, manage and audit post clearance impacts; and public involvement, to inform and consult with stakeholders. The “impact analysis” or detailed study phase of the LIRA process should involve three activities: identification of impacts more specifically, prioritization of the characteristics of major impacts, and evaluation of the significance of residual impact. In this process, a number of impact-identification methods might be utilized. These could include checklists, matrices, networks, overlays and geographical information systems, expert systems, and professional judgment (see Table 1). Ultimately, the choice of a LIRA method would depend on a number of factors, including the type and size of the activity, the type of alternatives being considered, the nature of the likely impacts, the availability of impact-identification methods, and the experience of the LIRA team with their use. In addition, the resources available would impact the method of LIRA used as cost, information, time and personnel inevitably vary with each specific case.

“in all mine-action programs, the number of resources available is almost always fewer than what is needed to address the mine and UXO problem immediately and thoroughly.”

Advantages

- **Checklists**
  - Simple
  - Good for understanding a clear decision-making process

Disadvantages

- **Committed to the SLA**
  - DO NOT distinguish between direct and indirect impacts
  - Do not link action and impact
  - Do not link action and impact

- **Matrixes**
  - Link action to impact
  - Good process for displaying EI/RA results

- **Networks**
  - Link action to impact
  - Useful for identifying gaps between decision-making

- **GIS and Computer Expert System**
  - Excellent for impact identification and analysis

- **Survey**
  - Good for experimenting

Table 1: Advantages and disadvantages of impact-identification methods.
Some years ago the major issue in mine action was about safety and quality versus productivity. Now is the time to take a more pragmatic approach and look at all three subjects in a balanced manner. A foundation based on standards has now been accepted by the international community as essential to maintaining quality and safety. However, control must be exercised by donors to not fund studies and improvements that fail to provide a noticeable improvement in the quality of life of those whose daily struggle is one of survival. What is critical is the need to modify the present IMAs and the other documents in order to conduct strategic planning in a systematic manner. Policies concentrating on local aspects need to take a broader view and a recognition of the importance of prioritization is needed, which must be initiated at the earliest possible opportunity. Even with the best intentions, demining that is less effective in some places than it is in others is simply demining in the wrong place and is an ineffectual use of time, effort and limited financial resources. Currently the documentation presented does not complete the picture or provide a coherent approach; there is now an urgent need to “close the circle” by providing and utilizing the missing information.

See Endnotes, page 109

Conclusion

It is common knowledge that mechanical demining has to be part of the complete demining process to improve the speed of operations, deficit major obstacles for manual deminers, reduce costs and simplify quality assurance. It is also common knowledge that the car and aircraft industry that quality must be continuous and cannot be guaranteed by inspection alone.

Modern quality-assurance programs (such as the Failure Mode and Effect Analysis) have to be used to ensure a capable process. The FMEA is a method for failure-prevention and should be used for the design, system, assembly, production and, of course, demining process. The FMEA for tiller operation must include clearing-depth control, vehicle-speed control, cut of revolution for tiller and flare, and engine-temperature control.

Based on our demining operations in Bosnia and Herzegovina with Mr. Peer Scholfield’s HELP and Norwegian People’s Aid, we reached the following conclusion: The tiller process suffers from limited and uncontrolled demining depth and limitations imposed by soil, terrain and vegetation—meaning it can miss intact mines. These findings are confirmed in various other publications.

The tiller process requires intensive follow-up verification of clearance—additional demining operation by hand and dog—which is time-consuming and costly.

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To Walk the Earth in Safety Chronicles U.S. Mine-clearance Efforts


Department officials announced that, owing in part to U.S. assistance, Costa Rica, Djibouti, Guatemala and Honduras would not appear in the report because they have become free from landmine impact. Attention is also paid to U.S. policy toward landmines and total U.S. contributions to landmine action, which exceed $1 billion.

The Office of Weapons Removal and Abatement, divisions of the Department of Defense and U.S. Army, James Madison University’s Mine Action Information Center and several in-country centers are profiled in the report. There is also coverage of the DOS Quick Reaction Demining Force, the only standing humanitarian-demining unit with worldwide deployment capabilities.

A PDF version of the sixth edition is available at http://pep1.com/kq/e. To request a printed copy of To Walk The Earth in Safety, e-mail your complete mailing address and postal (or ZIP) code to John Stevens at stevej@state.gov.

Quality Assurance for Mined and Survey Areas

Mechanical demining is an important and essential aspect of any demining process, and quality-assurance methods must constantly be revised to address the balance between safety and efficiency. Based on experience from the MineWolf mechanical demining experience, the tiller system would improve the demining process significantly, thereby increasing speed and reducing the costs of demining operations.

by Heinz Raith and Dieter Schröder [Safety Technology Systems]

Important Requirements

A Total Quality Control system—a management tool for improving performance that aggressively strives for a defect-free process—was requested and includes the demining-organizations, equipment choices, standard operating procedures, training programs and the following essential requirements:

1. Ground-penetration depth up to 30 centimeters (12 inches).
2. Multiple operations with the tiller, to break up partially demanaged or remaining mines and explosives components not completely destroyed by the tiller.
3. Effective depth-control for both the flail and tiller system.
4. Monitoring of drive control to be displayed inside the cabin for all relevant technical data such as clearance depth, rate of revolution for tiller and flare, vehicle speed, engine temperature and vehicle positioning.
5. Global-positioning system navigation for directional control.
6. Driver on board to intervene if needed with difficult topography and obstacles.
7. Quality track-recorder for all relevant data to be printed from data loggers.

The tiller process has the potential to be capable of destroying all mines, provided the tiller rotates clockwise with a revolution speed of at least 300–400 revolutions per minute and is fitted with special cutting tools to destroy all mines, avoiding slipping, burrying and bow waves. In general, a Total Quality Assurance program as used in the aircraft and car industry is required because it will analyze all aspects of quality on a continuous basis. In general, a TQA program provides a modern, overall quality concept of a company or system. It is easy to see if the process is capable or not by looking at the area after the demining process. The area has to be homogeneous after a uniform process as this is the basis for a capable process.
Proposed Quality-assurance Process for Mined and Survey Areas

While the MineWolf tiller system provides a capable process with control of demining depth, tiller rotation and vehicle speed, which is the basis for hitting every mine without fail, mines can be destroyed without being detonated. Consequently, mine pieces such as TNT, fuses, or steel bodies of fragmentation mines will be left and might pose a limited risk. There is a capable technology to find the steel bodies using Foerster MultiCAT or the Ebinger large-loop detector UPEX 740. Experience has shown that most mine pieces are thrown onto the surface by the force of the tiller. Visible control of the cleared area would identify the areas requiring an additional quality measure.

There remains the risk that a small number of parts and fuses located in the ground, either ferrous or non-ferrous, will not be detected. We believe that the limited risk has to be taken. If there are records or signs of fragmentation mines or items of unexploded ordnance, the Foerster MultiCAT or the Ebinger large-loop detector UPEX 740 is capable of finding them. It should be noted that small metal parts cannot be found with 100 percent certainty by manual methods.

If we take into account statistics published by the Geneva International Centre for Humanitarian Demining in A Study of Mechanical Applications in Demining, which indicates that only 2 percent of the demined areas worldwide are contaminated by mines, we do believe it is worth the risk.¹

Proposed Quality-assurance Methods

Based on our experience, we recommend the following four methods for quality assurance:

- **Scheme 1.** Visual control of the cleared area by means of an armed tractor to identify and mark areas requiring additional quality measures. If no detonations are reported or mine residue found, the area can then be declared mine safe, meaning no further quality measures are required.

- **Scheme 2.** If detonations are reported or mine residue found, a complete search of the cleared area needs to take place, by means of establishing a grid of working lanes as given by the standard operating procedures, followed by a manual or explosives-detecting dog team. Residue must be removed. The area can then be declared mine safe.

- **Scheme 3.** If only a small number of detonations were reported or residue of mines found, a partial manual-demining operation is proposed to ensure that fuses and explosives are found and evacuated. The area can then be declared mine safe.

- **Scheme 4.** If there are records or signs of fragmentation mines or items of UXO, the Foerster MultiCAT or the Ebinger large-loop detector UPEX 740 can be used. The device is focused on steel bodies greater than 0.7 kilograms (1.5 pounds) because fragmentation mines have steel bodies that cannot be fully destroyed by mechanical demining (only the fuses are cut). Foerster and Ebinger equipment is proposed to find the remaining bodies because they are specialized to locate steel objects within this range. The equipment can be fitted to an armed tractor to locate the steel bodies or items of UXO. Supplement the search for fuses and explosives with a handheld detector around the steel bodies to evacuate fuses and explosives. The area can then be declared mine safe.

Summary

The tiller-demining process, combined with total quality-control methods, strives to move from the ground-preparation process currently used, to a “mine free” process. By using the follow-up verification system, additional quality control after mechanical demining will be minimal, fast and more cost-effective without reducing aspects of safety.

For additional references for this article, please visit http://snipurl.com/15ixk

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¹ See Endnotes, page 109

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News Brief

Taliban Suspects Killed Emplacing Mines

Four suspected Taliban terrorists died while emplacing landmines along roads in southern Afghanistan in late July. Three Taliban members reportedly blew themselves up in one incident as the landmines they were laying on a road in the Arghistan district of Kandahar province exploded.

In a separate and apparently unrelated incident, another suspected Taliban member died when a mine being emplaced in Shah Wali Kot, a district north of Kandahar city, exploded unexpectedly.

While the former hard-line Islamic regime was deposed by Coalition Forces in 2003, supporters of the Taliban have recently increased attacks in southern regions of the country.
Explosive Remnants of War and the Reality of Azerbaijan

This article explains the danger of explosive remnants of war when located within communities and the precautions that need to be taken in order to get rid of this problem. It also describes how the Azerbaijan National Agency for Mine Action is trying to address the problem of abandoned ammunition storage in one of the most highly contaminated areas among existing abandoned ammunition storages in the world.

by Nazim Ismayilov and Emil Hasanov (Azerbaijan National Agency for Mine Action)

Despite the fact that Azerbaijan has not signed the Ottawa Convention, the country is supportive of it according to the “Azerbaijan and the Ottawa Process.”1 This document states, “The government of Azerbaijan has supported from the outset the idea of having a comprehensive international legal document on prohibition of use, stockpiling, production, and retention of anti-personnel mines. Our country has learnt the catastrophe that this ammunition can bring. Therefore Azerbaijan advocates diminishing and destruction of mines. Azerbaijan shares all concerns taken into consideration while coming to the statement of the Convention and is involved neither in transfer, transportation, nor in production of anti-personnel mines. But continued conflict prevents Azerbaijan from according to the Document.” The government of Azerbaijan hopes to sign the Ottawa Convention once the conflicts in its territories are resolved.

UXO Operations and Abandoned Ammunition Storage Clearance

History of the problem. A military ammunition warehouse located in Agstafa, consisting of 138 bunkers, was the largest Soviet warehouse in the south Caucasus. Agstafa is located in the northeast part of Azerbaijan, bordering the Karabakh region in the west, Tovuz in the east, the Republic of Georgia in the north and Armenia in the south. In 1991, when Azerbaijan regained independence, the warehouse was destroyed by the Soviet Army before it departed. As a result of the explosion, thousands of pieces of UXO were scattered over 44 square kilometres (17 square miles), posing serious humanitarian, socioeconomic and environmental threats to the local population. Since the explosion, 148 UXO-related accidents have been reported, with 31 people dead and 80 injured. To collect scrap metal from the UXO, people are exposing themselves to injury and death. Some companies trying to gain profit have been involved in illegally collecting UXO from surrounding areas, devising simple methods involving very unsafe techniques. By selling the metal and non-ferrous parts of the projectiles, both individuals and companies supplement their income. This is the principal cause of many deaths and injuries among the people living near Saloglu, a village in Agstafa. A recent accident involved the death of a young man searching among the unexploded bombs for copper to sell at the local market. Azerbaijan appealed to NATO for assistance in the clearance of the Saloglu area and the destruction of stockpiled UXO. As an initial step, the NATO Maintenance and Supply Agency conducted a technical assessment of the site and consequently the Partnership for Peace Trust Fund in the Saloglu Project was established. The role of the lead nation in the Saloglu Project was given to Turkey.

On 14 February 2005 all efforts aimed at facilitating the Saloglu Project in Azerbaijan were brought together at the NATO headquarters in Brussels, Belgium. Turkey signed the Financial Management Agreement for the project at a special ceremony involving NATO Secretary-General Jaap de Hoop Scheffer and the representatives of contributing countries.

The total cost of the project is valued at €1,047,649 (approximately US$1.3 million) and is estimated it will last 16 months. Azerbaijan, as a host nation, met all the commitments on the project. With contributions from NATO and individual partner nations—namely Australia, Finland, Luxembourg, Norway, Switzerland, Turkey.
and the United States—as well as the United Nations Development Programme, the required funding for the project has been raised. The Azerbaijan National Agency or Mine Action UNO team, with a capacity of 11 UXO operators, launched the project 13 December 2005. ANAMA instructors joined with United States European Command (USEUCOM) specialists to train an additional 36 UXO operators for the same project at ANAMA’s Regional Office in Khanlar (UXO team capacity within ANAMA was created with the support of USEUCOM in 2002).

Abandoned ammunition storage clearances. In describing the problem of ERW, the threat of abandoned ammunition is also significant. When rescuing information on the subject of abandoned ammunition, cases can be found in Nigeria, Almatia and Kuwait, but thus far minimal information describing Abandoned ammunition problem is available. The Soviet warehouse in Agara provides an additional case for better understanding the threat of abandoned ammunition and the challenges that facing ANAMA face in order to clear this type of ERW.

The task for abandoned Soviet munition storage clearances in Agara is very complicated and dangerous for several reasons:

• The occurrence of “ammunition speaks” in which different types of ammunition are mixed and scattered throughout the area.

• The presence of degraded flechette and fragmentation ammunition, which consists of small projectile darts and shaped that are hazardous and not immediately identifiable.

• The presence of white phosphorus, which ignites when exposed to air.

• Incorrect or misleading marking of UXO.

Taking into account that 15 years have passed since the warehouse explosion, clearance of this ammunition is a complex, yet extremely important—task.

In addition to planned clearance projects such as those mentioned, ANAMA also provides rapid response to mine/UXO-related emergencies. When one Agara scrap-metal workshop set up by local exploded approximately 200 meters (219 yards) from a residential area, the workshop itself was totally destroyed and, according to official information by local authorities, three people were killed and 23 injured. Additionally, the explosion damaged houses as far as three kilometers (two miles) from the workshop. Immediately following the explosion, ANAMA established a team of UXO operators to carry out emergency marking and clearance operations in the incident area. Operations lasted for one month and as a result, 175,000 square meters (42 acres) of land were cleared and more than 5,007 items of UXO (among them, 1,261 pieces containing white phosphorus) were removed from the area and destroyed. ANAMA has continued to react quickly to any mine- and UXO-related emergencies.

Conclusion

As the Japanese might say, “Tada yori mato wa nai” (“We have to pay much for something we got for free”).

It is important to figure out how to solve the existing problem of UXO and abandoned ammunition and how to protect ourselves from ERW in the future. Human beings created the problem—dropping the bombs and abandoning the ammunition “for free” on Azerbaijan—and now they must correct it at great cost by cleaning up the country and making it safe again.

News Brief

Death Valley Challenge to Raise $100K

Miners Advisory Group, in partnership with CEIA USA, will sponsor a 423-kilometer (263-mile) bike trek across Death Valley, USA. Event organizers hope to raise nearly $40,000 ($62,774) to support mine-action efforts around the globe.

From 4-11 March 2007, 40 participants will travel and cycle to raise money and awareness. The registration fee for the event is only $175 ($325), but each participant is asked to raise $2,750 ($5,100) in sponsorships, half of which will cover the cost of running the event. Included in the trek costs are London-to-Las Vegas airfare, accommodations, nearly all meals, the use of bicycles and other sundry expenses.

For more information on this trip, visit www.mgpclearemines.org.

Follwing a conflict, humanitarian organizations are generally the first to enter a country to deliver aid and start to rebuild the country’s infrastructure. Aid workers often rely on a 4x4 sport-utility vehicle to transport supplies and people. This type of carrier is viewed as a big, strong vehicle with high mobility; but it offers little protection against landmines and other explosive remnants of war. It is what is known as a “soft vehicle.”

The term ERW is very wide and covers anything from handgrenade ammunition to aircraft bombs. The majority of injuries, however, are caused by devices like anti-personnel landmines, anti-tank mines and, as seen recently in Lebanon, air-dropped submunitions “bomblets.” Apart from being the most numerous, AP mines are directed against people on foot and are normally designed to explode following a relatively small impact—often by pressure of a foot or the tripping of a mine.

At the same time, small- or large-caliber gun ammunition, aircraft bombs and mortar rounds tend to be more stable—although when they do explode, the results can be much more devastating.

The extent to which AP mines endanger passengers in a soft-skinned SUV depends heavily upon which type of device we’re talking about. We can separate the various devices into two groups depending on their primary kill mechanism:

• Blast ammunition works by creating a powerful blast wave that destroys objects in close proximity to the explosion.

• Fragmenting or dumb ammunition works by creating high-velocity steel fragments intended to inflict as much damage as possible to anything or anyone in the surrounding area.

Most AP mines inflict injury primarily through the blast effect and normally detonate by pressure. The effect from the blast wave decreases rapidly with distance and it is often a “one kill” weapon. On the other hand, some AP mines and many types of air-dropped bombess work with fragmentation as the primary kill mechanism. The same goes for almost all mortar rounds and artillery ammunition. Contrary to a blast wave, which loses its power very quickly, the high-density fragments surrounding the explosives maintain...
their energy for much longer and can inflict injury quite far away from the explosion. Due to this extended range, most types of fragmenting AP mines have the option of trip wire detonation, which enables the mine to go off when a person or vehicle trips a wire up to 10 metres (33 feet) away. A person is at risk in two different situations while travelling in an SUV: If the vehicle detonates on an AP device that works primarily through blast, the distance from the expected impact point (below the vehicle) to the vehicle in which the person is normally high enough to create a safe distance. However, if the device creates fragmenting AP, the distance to which the vehicle will suffer almost no protection against the high-velocity steel fragments. The standard car-body steel is 0.8 millimeter (0.03 inch) thick and will not prevent fragments from entering into the cabin.

To express it another way, when we are talking about various AP devices, the main concern for passengers in a vehicle is fragmentation rather than the shock or blast effect from the explosion. For this reason, in an area with a high risk of setting off fragmenting AP ammunition, fully armoured SUVs are recommended. However, apart from being very costly, excessively heavy and hard to obtain in sufficient numbers, fully armoured SUVs tend to give the wrong impression of the humanitarian workers—namely that they are not willing to take the same risks that the inhabitants must take on a daily basis.

As an alternative to fully armoured vehicles, there are a number of retrofit solutions on the market today that cost significantly less and provide a higher level of protection for passengers travelling in soft-skinned vehicles. Although retrofit solutions do not provide the same level of protection as factory-armoured SUVs, some can work well against a large number of ERW threats for a fraction of the price of a fully armoured vehicle. Consequently, a much higher number of vehicles—and thus passengers—can be protected for the same money. In addition, the retrofit solutions protect soft vehicles, like ballistic blankets (described below), can be delivered quickly and most can be installed in the field.

Built-in Ballistic Blankets
Most retrofit solutions to protect SUVs are based on aramid fabric, such as Twaron® or Kevlar®, which is ballistic material used in most body armour. By using flexible armour, it is possible to design solutions that fit into the curved interior and floor of the SUV.

In terms of level of protection, flexible solutions using aramid on the interior and floor of the vehicle generally represent a lower level of protection than those found on the sides of a factory-armoured SUV. Ballistic blankets are available from several sources and are a system of tailor-cut and overlapping blankets that cover as much of the interior of the vehicle as possible up to the windows.1 Ballistic blankets offer a good level of protection against fragments coming from below or from the lower sides. They are installed below the carpet and inside the side panels and doors and require a complete rearrangement of the vehicle. After reinstallation, the movement of the interior vehicle looks the same as before, with no visible signs of it being protected.

The level of protection of the blankets is normally specified according to a North Atlantic Treaty Organization standard STANAG [Standardisation Agreement] 29202 and the standard level by most non-governmental organizations is a level referred to as 600 m/s. It is not possible to connect this level directly to any specific mine or grenade as the actual conditions have an enormous influence on the real threat. However, a level of 600 m/s can be directly compared to other means of protection; for instance, standard body armour (without vest-inset plates) represents a level of protection of 450 m/s and contains only 10% of the ballistic material. A passenger in a vehicle that is fragmenting ERW is much better off if the vehicle is equipped with ballistic blankets than if he is wearing body armour; in addition to a higher ballistic level, the ballistic blankets will offer protection of the extremities and not only the torso.

In comparison to a fully armoured SUV2 many soft-skinned vehicles equipped with ballistic blankets are better protected against landmines detonating on the ground. The reason for this seeming inconsistency is because most armoured SUVs are designed with a level of protection according to an old German standard for armoured limousines known as the “two hand grenades” level. Unfortunately, the specified grenade—the German type DM51—is quite small and contains relatively small fragments that are easily stopped. In addition to blankets, various systems exist on the market to shield the passengers from fragments.

New technologies with in-field armouring options can be fitted and removed when there is no immediate danger. This type of protection is designed to provide an increased level of protection against ERW and other threats for vehicle owners.

In turn, these options and those developed and implemented in the past are expected to continue the work of reducing the safety potential of vehicles working in proximity to ERW. For example, in February 2006, two teenagers—brother N. Yorov, 15, and sister M. Yorova, 16, from Besimas village in Hissor district—were injured by a UXO. The UXO, which is believed the total number of items of UXO, no matter the type, greatly exceed the total number of mines. UXO and other explosive remnants that make up the total number of UXO (all grouped together under the term explosive remnants of war) continue to appear in huge numbers in proximity to conflict. Some countries, like Laos and Vietnam, are also affected by UXO more than mines.

Nowadays the international community is paying more serious attention to the risks posed by the UXO problem. This is reaffirmed by the adoption of Protocol V to the Convention on Certain Conventional Weapons. The protection of Protocol V on 28 November 2005 has been possible thanks to governments acknowledging the seriousness of the post-conflict problems posed by UXO as well as the necessity to minimize the risk and impact of UXO. Tajikistan ratified Protocol V on 20 December 2005, and the Protocol entered into force for all parties on 12 November 2006. In accordance with the Protocol, the term ERW encompasses UXO and abandoned explosive ordnance in conflict areas. This Protocol obliges the conflicting parties, as well as States Parties, to be responsible worldwide, landmines and unexploded ordnance in conflict areas kill and maim approximately 20,000 people annually, one third of them children.3

Recent years, the international community has not paid serious attention to the risk posed by the UXO problem (i.e., explosive ordinance that is used during armed conflict but fail to detonate). It is impossible to accurately count the number of unclassified mines and it is also uncertain how much UXO remains. However, it is believed the total number of items of UXO, no matter the type, greatly exceed the total number of mines. UXO and other explosive remnants that make up the total number of UXO (all grouped together under the term explosive remnants of war) continue to appear in huge numbers in proximity to conflict. Some countries, like Laos and Vietnam, are also affected by UXO more than mines.

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Explosive Remnants of War and Their Consequences

This article examines the post-conflict situation of Tajikistan, which has not only anti-personnel mines but various kinds of explosive remnants of war. Recently Tajikistan signed Protocol V of the Convention on Certain Conventional Weapons, which includes a commitment to clear the nation’s ERW. The author highlights some of the different sources of ERW in Tajikistan as well as the progress being made by authorities to clear and destroy ERW.

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 regards to UXO under their control. Tajikistan also has a landmine problem and has not signed the “mine” Convention. Together, these two documents stipulate that after active military fighting ceases, countries should mark and clear the mines as well as liquidate and destroy all mines and UXO under their control.

Impact of ERW in Tajikistan

In addition to the landmine problem, items of UXO also pose a great challenge in Tajikistan. It is presumed that most ERW remains in the country due to the civil war (1992–1997). The UXO in Tajikistan that remains on the ground is the result of being fired from military planes and helicopters, as well as shelling. A large number of Tajik citizens have been completely cleared. It is necessary to note that items of UXO also appear in the country for reasons unrelated to war, including armed violence, and attempted revolts. In Tajikistan, as in many other countries, mandatory military service requires continuous and regular military training for the Armed Forces. It has been the case in Tajikistan that not all soldiers have been fired and accidentally landed outside the military training zone. These shells remain uncleared in areas where access to the public remains open, putting the local population at risk.

In Tajikistan, despite the ERW problem, civilians go about their daily business and continue to find themselves in dangerous areas, at times receiving injuries. For example, in February 2006, two teenagers—brother N. Yorov, 15, and sister M. Yorova, 16, from Besimas village in Hissor district—were injured by a UXO explosion while cutting wood. N. Yorov’s leg was seriously injured and his sister received injuries to her stomach. Due to the lack of financial means, the family was unable to provide necessary medical care for the teenager, which has greatly hampered her recovery. An investigation into the cause of this explosion revealed

A group of farmers in close proximity to a mine danger zone. All photos courtesy of CLEF/INTERLION.
In March 1993, two brothers—Bahriddin and Nuriddin Eshonov, ages 18 and 17—found a piece of UXO and began to open it. This action resulted in an explosion and the brothers were both killed.

On 23 July 1993, 11-year-old Khusrav Rafiyev found an item of UXO and tried to burn it. The resulting explosion blinded the boy.

On 2 December 1994, the President of the Republic of Tajikistan issued the Decree on Voluntary Surrender and Repatriation of Fire Arms and Military Ammunitions from the Population. This decree became an instrument for dissolving illegal armed groups and recovering firearms that remained in the hands of the civilian population. Table 1 shows the number of firearms returned from 1994 to 2006.

In accordance with the agreement between the government of the Republic of Tajikistan and the Organization for Security and Co-operation in Europe dated 16 May 2005 and within the framework of the Programmes of Small Arms and Light Weapons, an Explosive Demolition Centre was established within the Ministry of Defence. Its major objective is to facilitate the demolition of ERW. More than 70 metric tons (77 tons) of ERW have been demolished as of 19 October 2006, and the work is ongoing.

Conclusion

Taking the serious consequences of ERW into consideration, it is necessary to point out that the adoption of Protocol V by the international community and its entry into force has great importance for the safety of civilians. Of course, it significantly depends on the process of accession of the governments and the fulfillment of its provisions by State Parties. TMAC hopes the implementation of Protocol V allows all parties to take practical measures to demilitarize ERW efficiently and productively to provide safety for all.

Two children walking along a dusty road.

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Industrial Ammunition Stockpile Recovery

Recovery: Saving Energy and Resources and Protecting the Environment

This article presents the opportunities for the disposal of ammunition in an economically and environmentally feasible way, focusing on post-conflict disposal of larger stocks of ammunition with a special view to the ongoing Ammunition Stockpile Destruction Programme in Afghanistan managed by the Afghan New Beginning Programme. The contents of the article are based on the experiences gathered under the umbrella of the research and development programmes Western European Ammunition Group European Cooperation for the Long-Term in Defence and European Union L’Instrument Financier pour L’Environnement (EU LIFE), together with a study carried out for NATO’s Maintenance and Supply Agency, followed by field studies on ammunition stockpile destruction in mine-action programmes.

by Erik K. Lauritzen, Mogens Struup and Inés García Sánchez | NRAS DEMEX & NRAS Chemcontrol |

O bsolescence is a major problem in many countries, especially in war-torn countries like Afghanistan, Iraq, Sudan and Lebanon. To restore peace, it is imperative to dispose of the ammunition, as this will reduce the capabilities to continue the warfare. Exploitive remnants of war are normally destroyed by open burning or open detonation (OB/OD) in suitable amounts according to national regulations or according to International Mine Action Standard 11.30 and 12.20; These methods create environmental problems, however, as huge quantities of metal fragments, dust and nitrogen oxides (NOx) are emitted to the environment.

Agenda for ERW and Ammunition Stockpile Disposal

As a result of the end of crises and conflicts around the world, vast quantities of ammunition have been destroyed by OB/OD. They have come from a variety of sources, primarily:

- Excess stocks of military ammunition resulting from the ending of crises/conflicts
- Unexploded ordnance on former military training or gunnery ranges
- Mines and UXO remaining from military and some civil conflicts

The amount of ammunition in abandoned stockpiles in Iraq and Afghaninam comprises several hundred tonnes of various types of munitions. In the wake of the recent conflicts in the Persian and Balkan areas, many questions have been raised about post-war effects, such as the environmental pollution caused by OB/OD of ammunition stockpiles. Kuwait has claimed compensation from the Iraq government for severe damage of the desert environment caused by chemical pollution of sand and soil because of OB/OD disposal of abandoned Iraqi ammunition after the First Gulf War in 1991.

Today the international market for scrap metal is very favourable, and the prices of scrap iron and especially copper, stainless steel and aluminium are rising.

Recovery and recycling of explosives for industrial use has not proven feasible. Recycled explosives from ammunition are not competitive with industrially manufactured explosives. However, explosive compounds might be incinerated for energy recovery or reclaimed for fertilizing or other chemical purposes.

The distance of abandoned ammunition stockpiles in a post-conflict area, necessary logistics management and implementation of appropriate ammunition-disposal procedures require a lot of human resources. The work related to ammunition-stockpile management is highly suitable for demilitarization, demobilization and reintegration programmes.

Taking all environmental, economical and social benefits derived from the recovery of ammunition stockpiles into consideration, industrial ammunition stockpile recovery is far preferable to the currently applied, normal practice of OB/OD. However, further investigation and proof of concept is urgently needed.
**Principles of Demilitarisation and Ammunition Disposal**

Demilitarisation of ammunition can be performed in many ways. Different techniques and methods for demilitarisation of ammunition are presented in IMAS 11.10: Figure 1 illustrates a general methodology for demilitarisation. There are many phases to follow and options that can be chosen. Each phase is composed of a set of processes and many of the stages consist of a number of sub-phases. The most appropriate demilitarisation process to be implemented will be dictated by a number of factors, such as available technology, environmental legislation, contract conditions, commercial issues and safety regulations.

Munitions are inherently dangerous and the demilitarisation process involves considerations about explosive safety and environmental risks. In particular, demilitarising and treatment stages are the most critical, during which the explosive constituents are subjected to processes that can be hazardous depending on the working methods, sensitivity of the explosive components, etc.

In order to save resources and protect the environment, demilitarisation processes must aim for maximum recycling and minimal waste disposal. Furthermore, the processes must be as harmless as possible with respect to workers’ health and safety, and emissions into the atmosphere, soil and water.

Munitions are, with few exceptions, designed with focus on the use phase, and little or no thought is given during the design phase to the end-of-life stage, when demilitarisation is required. Consequently, demilitarisation of munitions is often a more complex process than initial construction. Modern design of munitions is becoming more and more complex, and therefore demilitarisation has to be more carefully considered at this initial stage. With growing requirements for insensitive munitions, the energetic constituents are evolving and becoming more difficult to deal with compared with traditional explosives, such as TNT. Munitions containing TNT can easily be melted out, since TNT’s melting point is lower than that of water, however, new melting compositions tend to be based on nitramines embedded in a cross-linked polymeric matrix with a higher melting point.

**Mobile Ammunition Disposal Plant**

In May 2006, NIRAS DEMEX published a report, *Research and Development Technologies for Safe Disposal of Explosive Waste*, which compiled the results of a project carried out under the EU-LIFE programme. The project demonstrates by means of laboratory tests that it is possible to extract the explosive content from the ammunition shells, mix it with water and incinerate the resulting mixture without risk of explosion.

NIRAS Chemcontrol has designed and set up two large incinerators and a small-scale, mobile incinerator for disposal of hazardous waste like projectiles, PCB, etc., such as the one shown in Figure 1. NIRAS DEMEX and NIRAS Chemcontrol have further been responsible for the design, construction and setup of a plant for ignition of fired small ammunition at the Danish Ammunition Arsenal, as shown in the photo on the next page. The process ensures any remaining explosive material within the disposed ammunition items is burnt out and disposed so in a way that guarantees safe handling and eventual recycling of the shells.

During the incineration of explosives, it is possible to recover the generated energy and clean the exhaust gases to emissions comply with the environmental requirements in the area. This technique is therefore preferable to OB/OD from an environmental perspective. Moreover, mobile incineration units can be established on-site and thus offer the same logistic advantages regarding local disposal of ammunition waste as the currently DR/DH.

The extraction of the explosives from the ammunition shells and their incineration has only been tested on a laboratory scale, however. A full-scale demonstration test is under preparation.

**Proposed Design for Mobile Ammunition Disposal Plant**

**Overall layout.** Due to the safety risks associated with the transport of ammunition, having a relocatable or transportable facility for its safe disposal constitutes an essential advantage. Several small incinerators at the Danish Ammunition Arsenal, as shown in the photo on the next page. The process ensures any remaining explosive material within the disposed ammunition items is burnt out and disposed so in a way that guarantees safe handling and eventual recycling of the shells.

**Extraction of explosive material and preparation of explosive/water mixture.** Explosive content is extracted from the shells by high-pressured water. The shell is then cleaned so the metals can be recycled, constituting a considerable income from the overall process. In regions where armed conflicts are still ongoing, shells should be transported to the country to prevent them from being refined with explosives. The transport of ammunition shells is not problematic, as they are composed of non-explosive and non-hazardous materials.

The extracted explosive material is mixed with water in such a proportion that the resulting mixture has some specific properties with respect to explosive capability. An important criterion is that the mixture shall not explode by shock or exposure to temperatures below 60°C (140°F). The mixture is not considered explosive material, and can therefore be stored in dedicated vessels until disposal.

**Incineration process.** The explosive/water mixture is pumped into the primary incineration chamber, where a pilot flame ensures the mixture is ignited and the incineration process is initiated. The incineration speed is an important parameter, which is also controlled by the mixture composition. Too fast an incineration speed—too low a proportion of explosive material—could damage the equipment, or in the worst case the whole plant could explode. Too low an incineration speed—e.g., too much water in the mixture—might hinder the ignition in the chamber. The results obtained during the LIFE project have been valuable in estimating the optimal water/explosive proportion.

**Secondary combustion chamber.** A secondary combustion chamber could be installed to guarantee the destruction of organic compounds. In this way, European criteria for incineration of hazardous waste, e.g., more than two seconds at 1,300°C (2,372°F)—would also be met.

**Energy recovery.** A boiler is installed to recover the energy generated during the incineration of the waste/explosive mixture and reuse it for, among others, heating purposes. The energy recovery supplies added income for the project.

**Blue-gas cleaning.** A full blue-gas cleaning system is installed to minimize the emissions and ensure they comply with the legal requirements. It is expected the emissions will comply with the latest EU emission requirements for incineration of hazardous waste. The main focus of the blue-gas cleaning system will be to remove dust and nitrogen oxides.

An emission-monitoring system will continuously ensure air emissions comply with the established legal requirement for the future gas.

**Control system.** The incineration process is carefully controlled by a computer system to ensure safe and environmentally sound operation. In case of abnormal operation, the process will be stopped in a controlled manner.

**Mechanical safety measures are incorporated to protect the equipment from damage in case of improper operation or unexpected events. A tentative sketch of the overall process is shown in Figure 2 below.**

**Ammunition Stockpile Destruction Programme (Mobile) of the Anti-Personnel Mine and Ammunition Stockpile Destruction Project.**

The Afghan New Beginning Programme (ANBP) was launched the ammunition destruction project in December 2005 based on the Anti-Personnel Mines and Ammunition Stockpile Destruction Project. The Coalition Forces and the International Security Assistance Force in Afghanistan have conducted and continue to conduct the destruction of ammunition stockpiles in Afghanistan. However, this work is not co-ordinated with the United Nations Mine Action Centre for Afghanistan or ANRB and has sometimes resulted in failed bulk demolitions and the accidental displacement of ammunition, requiring time-consuming explosive ordnance disposal claims operations.

The ammunition destruction project is a continuation of the Afghan Disarmament, Demobilisation and Reintegration Programme managed by ANRB. During the DDR activities, a large amount of stockpiled ammunition was found and ANRB became aware of the need for ammunition stockpiles to be destroyed. Parallel to the ammunition destruction project, ANRB is also running the Disbandment of Irregular Armed Groups...
Project. The DIAG project has Weapon Collection Teams that perform similar work to that of the ex-Yugoslavia DDR Mobile Disarmament Units. The ammunition the WCTs find will be handled within the ammunition destruction project. The project has been running since December 2004. The organisation of the ammunition destruction project is shown in the right.

The Anti-Personnel and Ammunition Stockpile Destruction Programme under the supervision of the Ministry of Defence and Interior and the National Department of Security are being surveyed, and the ammunition is classified into three categories:

1. Ammunition required by the Afghan National Army for service
2. Ammunition that might be required for service of the ANA
3. Ammunition to be destroyed, including APMs

During the transfer of the ammunition from the cache, ANA transports the first two categories of ammunition together, and there is no registration of the specific types of ammunition belonging to each of the two categories. ANRP transfers serviceable ammunition to temporary and permanent ammunition storage points called Temporary Ammunition Consolidation Points and Permanent Ammunition Supply Points, respectively. Two Ammunition Supply Points are planned in the Kabul area and another five elsewhere. The ASPs are mainly existing storage sites that have to be repaired and secured. They need to be cleared of UXO and the ammunition already stored has to be sorted. Some of the ASPs are ready, and ANA has started transporting ammunition to some of the prepared Ammunition Survey Teams.

Each of the eight Ammunition Survey Teams simultaneously undertakes the ammunition survey in multiple locations on a nationwide basis. ANRP conducts the transportation of serviceable ammunition to regional ammunition supply points with assistance from the U.S. company UXB International and ANA. ANA handles storage of the ammunition without support. Destruction of serviceable ammunition (unsafe, unexpended and non-required) and APMs is conducted by implementing partners, The HALO Trust and UXB International, by means of open-air burning and bulk demolition. The Ammunition Survey Teams are surveying ammunition cache.

The ASPs also empty the ones not considered suitable for future storage. Unsafe, unexpended and illegal ammunition, including anti-personnel mines, are destroyed by implementing partners. The rest is moved to Temporary Ammunition Consolidation Points. The survey teams consist of one ANA Team Leader, one ANA Deputy Team Leader, one International Advisor, one Translators/Associate and four drivers. Each team has two trucks and two cars. Technical assistance is provided by HALO Trust personnel.

The actual destruction of ammunition is conducted by implementing partners including The HALO Trust, RONCO Consulting Corporation and UXB International.

Proposed Industrial Ammunition Disposal Programme for Afghanistan

By the end of 2005 it was estimated that total stocks of abandoned ammunition in Afghanistan amounted to 50,000–100,000 tonnes (51,000–110,000 U.S. tons). Some of the ammunition was deemed serviceable by the Afghan Army and had to be recovered, while the remaining stocks had to be demilitarised.

New strategy. The EU prepared a new strategy for ammunition management for the Afghan government. Current demilitarisation practice by OB/OD may only be used up to 2007. Starting in 2007 demilitarisation of ammunition shall be performed in an environmentally friendly way. By 2012 all serviceable and unwanted ammunition currently stored shall be destroyed.

It is proposed that the demilitarisation should be performed in accordance with the European Commission principles of best available technologies not entailing excessive cost, the EU directives of waste management and the International Mine Action Standards.60 Most likely a large proportion of the ammunition that has been consolidated will turn out to be obsolete or unserviceable stocks that must be destroyed. However, ammunition stocks contain valuable materials that can be recovered. If innovative, environmentally friendly demilitarisation techniques are proven to be cost-effective, then scrap metal and explosives could be recycled for commercial use. Energy and nitrogen-based compounds can be recovered from explosives to be used in fertilisers and scrap metal can be recovered from the casing materials. The present world prices for scrap steel are relatively high and it is therefore recommended that an industrial demilitarisation system should be analysed in detail, with the indirect objectives of improving business activities and creating employment for the local Afghan population. An industrial demilitarisation system could be established in connection with the Temporary Ammunition Destruction Points, for example a mobile demilitarisation plant based on closed incineration or similar technologies. It is strongly recommended that existing/open demilitarisation of ammunition should not continue as a demilitarisation technique, due to the proven environmental damage and inefficient use of resources. Furthermore, it is mentioned that the U.S. South-Eastern and Eastern Europe Clearinghouse for the Control of Small Arms and Light Weapons has considerable experience with demilitarisation technologies, and the publication Briefing 10—‘Preparing the Bullet’ gives practical guidelines for the ammunition stockpile management.

Capacity building. It is a priority for EC projects to build up local capacity. After one year of ammunition stockpile destruction, an appropriate national capacity has been established. A capacity-building plan is supposed to be prepared with special focus on local ammunition technicians and leaders of Ammunition Survey Teams. Furthermore, the capacity-building plan must be accompanied by a plan for transfer of ownership from ANBP to a local organisation and by a specific exit plan for ANBP, the international implementing partners and Technical Advisors.

It is assumed that the initial phase of the ammunition destruction programme will be implemented via cooperation between U.N. humanitarian organisations, international NGOs and other civil implementing partners on one side and the military security (including the Coalition Forces/International Security Assistance Forces), ANA, police, and security forces on the other side.

It has been proposed that industrial ammunition recovery might be transferred to commercial companies—possibly international companies in cooperation with local companies—in accordance with specific international procedures stipulated by the donor organisations. The contract must be based on industrial demilitarisation practice in compliance with the above-mentioned requirements for health, safety and environmental protection.

For additional references for this article, please visit http://journalex.com/154j.

See Endnotes, page 109

Figure 3: The ammunition destruction project. (KTOS—Ammunition Technical Officer)
In many countries where landmines and unexploded ordnance threaten populations, people ignore warnings about these hazardous explosives to collect exploitive remnants of war for the valuable scrap metal they contain. The author discusses a program proposed by the Golden West Humanitarian Foundation to manage this dangerous practice.

These numbers certainly do not mean we should abandon efforts to educate the population about avoiding death and injury from mines and UXO. On the contrary, what it may suggest is new ideas are needed to address specific types of hazards and categories of potential victims, particularly amateur scrap-metal collectors. According to reports by the Cambodian Mine/UXOVictim Information System, 353 people were injured or killed between January and August 2006 in Cambodia. Of those casualties, 62 percent were men, 8 percent were women, and 30 percent were children under 18 years of age. Fifty-eight percent of the casualties were people injured or killed by UXO and 42 percent by landmines. These numbers indicate a disturbing trend in which casualties are increasing despite greater efforts to eliminate threats. This trend also exists in Vietnam, Laos, and other areas. We think it points to an underlying problem—collecting scrap metal is the new growth industry in these countries.

The Golden West Humanitarian Foundation has taken a pragmatic approach to MRE, generalizing it to become a new approach to behavior change.

### Sneaky Devices

In central Vietnam and Laos, many deaths or injuries are caused in particular by unexploded cluster submunitions or 40-mm grenades. These unstable, long-lasting munitions are a widespread hazard, frequently concealed by tall grass or shallow dirt. Not only are they hit by farmers’ hoes or plows, exploded when fires are built on top of them and irreducible to children, but these dangerous munitions are often the very devices scrap-metal collectors intentionally gather, disarm and sell.

In addition, unexploded mortar projectiles can be a threat. Mortar projectiles come in a huge variety of sizes and contain a number of different fillers. In Vietnam, mortars can be found from 60-mm to 100-mm. Fillers may include energetic explosives, high explosives, white phosphorus and other smoke and flares. Fuzes may incorporate proximity devices, or use impact, powder rails or timing mechanisms for initiation. Unfortunately, once the paint and markings are weathered away, it is often difficult to accurately identify the type of filler or fuzet, and therefore, the explosive threat. Mortars can be small, easy to move and less intimidating than artillery projectiles and bombs. They can also be deadly.

These munitions, submunitions and grenades share a single deceptive characteristic: that bulk hits cannot transform them into a false sense of security: inconsistency. They often fail to fully arm and detonate due to a variety of permanent mechanical faults in their arming or firing mechanisms. However, at other times, the device is armed, arm but not arming but preventing firing. In these cases, items of UXO may require only heat, shock or pressure to detonate—sometimes years later. Firing mechanisms are complex and designed to accept input from almost any direction. Because these mechanisms are also often damaged and prevented from functioning, people come to believe they are harmless. When a civilian picks one up and it doesn’t kill him or her, that person is more likely to pick up the next one. However, the next munition or the one after that may detonate without warning, killing or seriously injuring both the civilian who picked it up and anyone nearby.

### Challenges to Conventional Mine-risk Education Practices

So what might the problem be? Why would anyone who has received training pointing out the dangers of interesting work intentionally do it anyway? Is there something about the training that makes it ineffective? Are there other factors at the workings? Are there ways to enhance the training to make it more effective? The answers to these questions are complex and there are no easy solutions.

Many programs engaged in MRE recognize that people are frequently injured by dually trigger explosions in the process of their daily work, but those most resistant to behavioral change are scrap-metal collectors. Scrap-metal trading has become a well-entrenched part of many local economies throughout Southern Asia. Scrap-metal collectors engage in their dangerous trade for a variety of reasons, but most say they simply need the money they earn from its sale. Studies have shown people are generally well-aware of the dangers they face, but feel compelled to continue the dangerous activity due to the pressures of poverty. They often report feeling they have no choice.

### The Solution

The apparent failure of various kinds of education to change this risky behavior signals a need for a change in our MRE approach. Instead of spending all our energies trying to eliminate risky behavior, we should be trying to find new ways to make this inevitable behavior safer. This proposed approach will undoubtedly find many opponents who feel we are simply encouraging more risky behavior; however, at Golden West we believe in taking a pragmatic approach to behavior that we think will continue with or without our intervention.

Golden West believes we can successfully combine our experience with Explosive Remnants of War Indicators Programs and our popular Explosive Harvesting System into a concept that addresses the growing number of scrap-metal-related casualties. Educating people and providing a more robust explosive ordnance disposal response to ERW reports will hopefully encourage the public to make more reports. Rather than use training to eliminate threats from the most dangerous items (primarily submunitions, grenades and mortars), there might be ways to develop an exchange system for the less hazardous ones.

### A New Response to Scrap-metal Collection

In this concept, expanded explosive ordnance-disposal teams respond to UXO reports from civilians, assess the threats and return harmless items to be sold as scrap. For questionable items that cannot be safely handled, for a fee equal to the weight of the usable metal would be paid by the team to educate the victim of the sale.

**Table 1: Examples of options for different threats.**

<table>
<thead>
<tr>
<th>Status</th>
<th>Action</th>
<th>Reimbursement</th>
<th>Disposition</th>
</tr>
</thead>
<tbody>
<tr>
<td>No hazard: contains no explosive</td>
<td>None</td>
<td>None</td>
<td>Turn over to finder for sale</td>
</tr>
<tr>
<td>Extreme hazardous, contains explosive (do not move)</td>
<td>Test, report, leave in place or move remotely and BIP</td>
<td>Market price</td>
<td>Destroy on site</td>
</tr>
<tr>
<td>Dangerous: sized and contains high explosive (transportation hazard)</td>
<td>Attempt render-safe procedures</td>
<td>Market price</td>
<td>Treatment facility and BIP</td>
</tr>
<tr>
<td>Dangerous: no fuse and contains high explosive (no transportation hazard)</td>
<td>Transport to safe holding area</td>
<td>Market price</td>
<td>Treatment facility</td>
</tr>
</tbody>
</table>

*As determined by EOD only.*
people to obtain needed money in exchange for suspect items. There will no longer be an excuse that they had no choice because we are providing a choice. People do not need to endanger their families, neighbors or themselves to make a little extra money.

The senior EOD Team Leader will be provided with small amounts of cash to do on-the-spot reimbursements for dangerous items removed by the team. Scrap resulting from processing of munitions will be sold and any profits reinvested in the program. Any recovered explosives will be used to support disposal of other unusable munitions. There will be a strict system of accounting for funds. The physical inventory of munitions in the program’s safe holding area validates the expenditure for funds. The physical inventory of munitions in the program’s safe holding area validates the expenditure for funds. The physical inventory of munitions in the program’s safe holding area validates the expenditure for funds.

Barricades will be field-expedient: locally produced and using rubber tires filled with sand or sand-filled concrete pipes; no permanent facilities will be constructed. Disposal tools will be remotely operated and procedures monitored via closed-circuit TV. With some modification, many of the tools and procedures used by the Golden West Explosives Harvesting System may be appropriate for use in the demilitarization facility. When fuzes can not be safely removed, projectiles can be cut behind the booster or fuze base. Once the forward part of the projectile is removed, the explosive can be rearmed and the fuze portion burned in a portable demilitarization furnace. Once the explosive charge is removed, the metal is added to the scrap to be sold. No fuzes containing primary explosives will be held and all will be treated with heat or destroyed by detonation.

The key to this program will be well-trained, competent EOD and demilitarization personnel. They must be willing to submit to a stringent training and quality assurance/quality-control program and concentrate on safety at all times. All the skills needed to make an EOD team effective can be taught or reinforced by this program. Large areas of land can be cleared of the most dangerous items in fairly short order by these teams. While the teams will do no surface clearance past shallow-buried bombers or projectiles, the surface clearance will pay big dividends.

Conclusion

Despite repeated warnings and dedicated MRE programs, casualties from scrap-metal collection continue to increase. It seems warnings aren't enough and high-risk behaviors like collecting scrap metal must be addressed by either technical or economic solutions. This proposed program combines these two elements and helps address root economic issues through the application of new technologies and incentives. The concept includes provisions for assisting scrap dealers who currently traffic in dangerous munitions. The program may also help eliminate the illegal collection and use of explosives for fishing or other illicit purposes. It certainly isn't a total solution, but it may begin to reverse the climbing rates of injuries and deaths resulting from the scrap-metal business. Costs of the program can easily be offset by real reductions in the fiscal and societal costs resulting from scrap-collection-related deaths and injuries. Golden West will develop and implement this program when funding is secured.

Excerpts, page 110

The Aftermath of War

The recent conflict between Hezbollah and Israel resulted in many civilian victims, and though the fighting has ended, the problems are nowhere near over for the civilians of Lebanon whose country is littered with cluster bombs. This article explains the effects of the conflict on Lebanese civilians and describes how organizations are trying to eradicate the cluster-submunitions problem and provide aid to affected civilians.

by Katie FitzGerald | Mine Action Information Center

For 34 days of fighting between Israel and the Hezbollah militia in southern Lebanon, the United Nations Security Council adopted Resolution 1701 on August 11, 2006, which was aimed at ending hostilities, and a ceasefire entered into force August 14. Despite only a month of fighting, the conflict greatly disrupted the normal lives of many Lebanese due to the damage to their homes and fields, and the remaining unexploded ordnance—mainly cluster submunitions—that littered the ground. The conflict killed over 1,500 people, many of whom were Lebanese civilians, and displaced approximately 900,000 Lebanese and 350,000 Israelis.

The Victims

Many of the victims of this conflict were civilians in Lebanon and Israel. As artillery and missiles were fired by both Hezbollah and Israel, approximately one-quarter of the Israelis killed by Hezbollah and the majority of the Lebanese killed by Israeli forces are reported to have been civilians. Little information is available on UXO in Israel, but it is clear that the estimated 1,800 cluster bombs (containing over 1.2 million cluster bomblets) fired into Lebanon have devastated the local infrastructure. Along with houses and fields destroyed, hospitals, schools, bridges, roads, factories, airports and main seaports were also demolished. Particularly affected areas were southern Lebanon, Beirut and the Bekaa Valley. The northern part of Israel was most affected by Hezbollah attacks, which sometimes consisted of 150 rockets fired per day.

It has been reported Israeli used cluster munitions primarily defensively by artillery projectiles, followed by Multiple Launch Rocket Systems and a lesser number of aerial cluster bombs. MLRS in particular are believed to be in use by both Hezbollah and Israel. They are capable of firing a high volume of mostly unguided munitions. The rockets are designed to burst into submunitions at a planned altitude in order to blank the enemy army and personnel on the ground with smaller explosive rounds. The cluster round itself will fail to detonate—believed by the United Nations to be up to 40 percent for some munitions fired by the Israeli Defense Forces in Lebanon—remains on the ground as unexploded submunitions. In addition to the cluster submunitions, an estimated 15,300 items of unexploded ordnance—including air-dropped bombs of 500 to 2,000 pounds (220 to 900 kilograms), ground- and naval-launched artillery rounds and air-delivered rockets—now litter the ground in southern Lebanon.

In an August 30 Reuters AlerNet article, Stephane Jaqueson, a United Nations High Commissioner for Refugees representative in Lebanon, said the organization’s top priority following the conflict was the safe return of the approximately one million Lebanese who fled the month-long war. Though U.N., Lebanese Army and nongovernmental clearance teams immediately started removing bomblets and other UXO, the United Nations and the government of Lebanon have remained seriously concerned about the danger residents could encounter. At the time of writing, the United Nations Mine Action Coordination Centre of Southern Lebanon assessed approximately 85 percent of southern Lebanon for cluster-bomb strikes, and it is estimated that up to one million

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http://commons.lib.jmu.edu/cisr-journal/vol10/iss2/1
Cluster Munitions and ERW in Lebanon

The recent 34-day conflict between the Lebanese armed faction Hezbollah and Israel from July 12 to August 14, 2006, saw extensive use of surface-launched munitions and air-dropped munitions (to a lesser degree), resulting in wartime casualties for military and civilian actors in both Lebanon and Israel. Since the ceasefire agreement, international post-conflict attention has focused on Lebanon due to the large number of explosive remnants of war left behind after the conflict. In particular, cluster munitions are proving problematic for post-conflict reconstruction activities in Lebanon due to their apparent high failure rate\(^1\) and the potential threat they pose to returning civilians, aid workers and military personnel. This article examines cluster munitions and the impact of their presence in Lebanon.

by Danielle Ressler and Elizabeth Wise | Mine Action Information Center |

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**Cluster Munitions and ERW in Lebanon**

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**The Future**

As of October 8, 2006, 770 cluster bomb-strike locations had been identified in the war\(^2\), and according to USO, there were 320 affected communities with each of UXO recorded, although less in some areas and more in other areas.\(^3\) As of October 15, 2006, there were 20 reported fatalities and 120 reported injuries from all types of unexploded ordnance in Lebanon. Children accounted for four of the fatalities and 42 of the injuries, according to Lebanon’s National Demining Office.\(^4\)

As families return home, UXO has posed a major problem to children, who sometimes mistake unexploded bomblets for toys. The United Nations Mine Action Service and the United Nations High Commission for Refugees have partnered to provide mine-awareness training for children from villages near Tyre, where they have encountered clusters of UXO.\(^5\) In addition to the dangers of UXO, upon return, children have faced the threat of disease, primarily due to the decrease of chemically and dust, which have had pulsed the air, causing serious health issues.

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Cluster munitions can be dropped from the air or set on the ground.

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**Impact**

Impact or close to the impact. Typically the delivery systems are designed to carry and deploy hundreds of submunitions at a time. Submunitions are also called bomblets, bomblets, BLUs (bomb live units) or grenades.

Cluster munitions can be delivered by air or surface. Air-dropped cluster dispensers (or cluster bomb units) are released from airplanes, and after a specified amount of time or distance, the dispenser opens to allow submunitions to be released. Surface-launched munitions (SLAM) are delivered by artillery launchers on the ground that are fired over a long range to detonate either in the air or on impact. In the case of cluster munitions, (e.g., missile, rocket, projectile) carries a payload of submunitions that is released after the dispenser is in flight, to drop over the target area.

During a conflict, cluster weapons are used by the military for attacking an area where the target may be moving, such as a military convoy, either to attack and destroy the enemy by dropping explosive bomblets (impact) or to prevent or deter enemy movement from or to an area by dropping devices that essentially function
As landmines (are deceased)? It is important to note that submunitions are different and not just ‘bomblets’. Even testing and reporting the way that it is popularly understood; for example, “Iraqi forces are not involved here” are victim-activated and classified as landmines. For the purpose of this article, the terms “bomblets” or “submunitions” are used to be meant to explode on impact.

The area a single cluster munition can create is very large. It consists of a burst print, and depending on the delivery system and type of weapon, one cluster munition submunition may strike an area as large as one square kilometer (247 acres). Cluster munitions and bomblets with different abilities and uses, a convoluted understanding of the potential number of submunitions from Israeli campaigns have been confirmed and continue to exist.

Because there are clear kinds of cluster munitions and bomblets with different abilities and uses, a convoluted understanding of the potential number of submunitions from Israeli campaigns have been confirmed and continue to exist.

Reasons for a high failure rate vary and depend on the age of the submunition, storage conditions, production (design, construction, quality of fuse, ammunition and delivery techniques, altitude of delivery), or land (angle of impact, softness and slope of terrain, vegetation such as grasses, bushes, trees, mud, snow, or water).12

Cluster munitions are often delivered as “unguided bombs,” meaning that they can be aimed, but once fired, there is no control as to where they land. This results in a higher probability that they may miss the intended military target and hit civilian areas.

The tension over cluster munition use and testing environments are linked as of October 10, 2006.19 Additionally, IHL prohibits irresponsible attacks, or any “attack or threat of attack” that is an intersection of humanitarian concerns and military interests. This is reflected in debates over the future of cluster munitions. Some nongovernmental organizations—especially the Non-Compliance, Committee—have long been advocating for a total ban on cluster munitions.12 Other

Controversy about Cluster Munitions

The dual role for cluster submunitions varies dramatically; reported failure rates can range from under 2 percent to over 30 percent.11 The potential high failure rate of some cluster submunitions is one reason they are controversial. The range in failure rate is extreme in part because of their design and the parts vary greatly, particularly in the fusing, resulting in varying levels of successful explosions. Even in cases where the submunitions have an unexpectedly high failure rate, for example, faulty fuses can be a reason for failures.

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Cluster Munitions

As discussed in the earlier article, early reports soon after the end of the conflict in Lebanon have documented that ini-
tial findings of unexploded cluster submunitions on the ground in Lebanon include M42s, M46s, M85s, M77s and BLU-63s. Human Rights Watch also released an unconfirmed report that states Hezbollah fired Chinese cluster munitions with Type-90 submu-
nitions into Israel during the conflict. Most of the unexploded submu-
nitions so far reported are surface-launched Dual Purpose Improved Conventional Munitions, with one air-delivered submunition also documented. These submunitions and their cluster weapon de-
signers are examined here.

Surface-launched DPCMs Found in Lebanon and Israel

Most of the unexploded submunitions being found in Lebanon are Dual Purpose Improved Conventional Munitions. DPCMs are designed to function as anti-tank, anti-personnel and anti-aircraft. The anti-tank feature results from a “HEAT” (High Explosive Anti-
Tank) shaped charge in the submunition that allows it to penetrate metal, while the anti-personnel feature occurs via an enhanced frag-
mentation case on the submunition that explodes to create a powerful blast and shrapnel effect.

The M42, M46, M85 and M77 have a drag ribbon, which, when fired, unrolls to stabilize the bomblet. The ribbon will vibrate in the wind, arming the bomblet. If the ribbon does not unroll, or becomes entangled, the bomblet will not be armed, and therefore will not ex-
plose on impact, resulting in a bomblet that could explode later. Due to the compact size of these bomblets (sometimes compared with the size of a D battery), it is possible for a majority of the duds to become hidden when they land, resulting in UXO that not only may be hard to see, but may also look like a toy to a child.

M42 and M46 (via M48A1A1)

One type of surface-launched cluster munition used in Lebanon is the M48A1A1 155-mm artillery projectile. The M48A1 is delivered from a Howitzer, a type of cannon-

ary artillery that can fire from the ground at high angles. During flight, some of the bomblets are also blown off by a preset fuse, with the exploding force88 of submunitions out of the container to fall out over a target area.

The submunitions in the M48A1A1 are M42s and M46s. Sixty-
four of the submunitions (the M42s) are scored, or notched, to cause them to explode into anti-personnel fragments of metal; the HEAT warheads of all 88 of the submunitions can penetrate 75-centimeter thick armor.

Two other DPCMs being used are the M42A4 and M46A4. Sixty-
four of the submunitions (the M42A4s) are scored, or notched, to cause them to explode into anti-personnel fragments of metal; the HEAT warheads of all 88 of the submunitions can penetrate 75-centimeter thick armor. The M42A4 DPCMs have a touted failure rate of 2 to 4 percent, but high initial standards of existing stocks has produced a dud rate closer to 14 percent.33

M85 (via M395/396)

Two other types of cluster munitions used in Lebanon are the M85 and M395/396, 155-mm artillery projectiles. These two Israeli-produced munitions contain 63 and 49 M85 submunitions, respectively. The range of the M395 is 25 kilometers (15.5 miles) and the M396 has an extended range to 30 kilometers (18.6 miles).33

The M395/396 are similar in ballistic performance to the M48A1A1. Unlike the U.S. model, however, reported submu-
nition failure rates in testing are much lower at 1 to 2.2 percent; this lower rate is due to the addition of a self-destruct device and a highly sensitive impact fuse.33

However, by September 13, 2006, the UNMACC-SL reported that a total of 5,849 submunition duds they had located and destroyed in Lebanon.

Steve Goose of HRW noted that the number of M85 duds was strik-

ingly high for a submunition with a self-destruct feature that claims to dramatically reduce the failure rate.

However, Colin King, international landmine and explosives ordi-

nance disposal consultant, reports that in Lebanon, initial findings suggest that rather than one type of M85, clearance teams are actu-

ally finding three variations of the M85 with completely different de-

signs. Two of these submunitions have a self-destruct capability, but the third type also used does not have this feature. While both the self-
destruct and non-self-destruct variants have been unexploded, further research is needed to determine their individual failure rates, the condition they were left in, and why each variant failed to explode.

Conclusion

The Montreux Committee has used the phrase “drop today, kill tomorrow” to describe the danger cluster munitions pose to civilians.33 This is clearly the case in post-conflict Lebanon, where unexploded cluster submunitions are already killing civil-

ians. However, not all cluster munitions are created equal, and this issue is complex. The debate continues with some defending the use of cluster munitions, others advocating for improvements in technology or stronger legal regulation and still others deeming any use at all unacceptable. What is undeniable is that the threat submunitions have resulted in explosive remnants of war that continue to injure innocent civilians. There may be more than one solution to the problem of cluster munitions, but it demands an answer and should not be ignored.

Cluster Munitions in the Recent Israeli/Hezbollah Conflict, see the MAIC fact sheet on page 113.

Air-dropped Submunitions in Lebanon

BLU-63 (via CBU-39/BLU-58)

CBU-39/BLU-58s are aerial aircraft cluster bomb containing 650 BLU-63 bomblets, developed in the early 1960s and supplied by the United States. These unexploded bomblets are hull-actuated submunitions three inches (7.5 centimeters) in diameter with a wound steel casing that can produce 280 fragments on impact for an anti-personnel effect.

While a reliable failure rate is not known, HRW observers report-
ed in the recent conflict seeing one cannister stamped with load date of September 1973 and two catastrophic failures, where “the weapon completely failed to function and none of the bomblets were dispersed or exploded.” Unexploded BLU-63 bomblets were also found in Lebanon after Israel’s cluster bomb attacks in the conflicts of 1978 and 1982.

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Special thanks to Colin King for his assistance in providing information for parts of this article.

For additional references for this article, please visit http://isat.tamu.edu/cluster
Explosive remnants of war represent a constant threat to normal life and activities of the population living in mine-affected areas in the Republic of Croatia. The author considers the extent and impact of unexploded ordnance and other ERW contaminating the country as a consequence of military operations between 1991 and 1995.

Mine and UXO Contamination Analysis in the Republic of Croatia

Based on the publication of the Geneva International Centre for Humanitarian Demining, Explosive Remnants of War (ERW)—A Threat Analysis, the factors affecting overall ERW threats are:

1. The type of conflict (i.e., international versus civil war)
2. The number of forces involved
3. The tactics used by the warring parties (i.e., use of air power rather than ground assaults)
4. Types of weapon systems deployed
5. The duration of conflict
6. Munitions expenditure
7. Failure rate of ammunition used
8. Terrain (soft, wooded areas will generally lead to more failures than concrete, urban areas)
9. Population density
10. Population movement in contaminated areas
11. Population awareness
12. Progress of clearance operations

The text below presents mine- and UXO-contamination analysis for the Republic of Croatia. Each of the items on the above list is described in more detail.

Details of the Conflict

The conflict described is widely known as the Croatian War of Independence or to others as the Homeland War. The basic premise behind the conflict was Croatia’s desire to be a full, self-sufficient republic after being oppressed by the Communist ties of the former Yugoslavia. This attempt at independence was met with resistance by Croatian Serbs, who felt that this new republic would be a threat to them since in this new state, they would be considered minorities; therefore, Serbian rebels, with the aid of the Yugoslav People’s Army, fought against the newly formed Croatian Army to determine control over the country. The conflict lasted from 1991 until 1995 with the Croatian government ultimately claiming victory over the rebels and the JNA.

Explosive Remnants of War in the Republic of Croatia

by Drazen Simunovic [Croatian Mine Action Centre]

The types of weapon systems deployed during the conflict include (see below for specific information):

- Small arms
- Cannons
- Howitzers
- Self-propelled guns (76-mm Helcar, 90-mm M36, etc.)
- Mortars (60 mm, 82 mm, 120 mm)
- Rocket weapons (including cluster munitions)
- High-explosive anti-tank (HEAT) rockets
- Aircraft bombs and rockets (including cluster and “dumb” bombs)
- Air-to-ground rockets
- Anti-aircraft rockets

Ammunition Expenditure/Failure Rates

- Small arms ammunition (≤ 14.5 mm): Most of the ammunition was originally packaged and represented a small threat to locals. Little effort was needed to remove and destroy them. According to the official statistics from the CROMAC database, eight persons have been wounded by this type of ammunition since 1991.
- Pyrotechnics (smoke, flares): Pyrotechnics represented a small quantity of the findings and a medium-level threat for locals, and little effort was needed for their removal and destruction. The most common pyrotechnics found were the mushroom-shaped simulant/INL (≤ 35 mm P51 cartridge and cannon blast simulant). Two persons have been wounded since 1991 by these munitions.
- Cannon shells and artillery projectiles (≤ 14.5 mm): A medium quantity of almost all types of artillery cartridges and projectiles (shells and shrapnel) was found in the Republic of Croatia, representing a huge threat for locals. Their removal, disposal, and destruction were of medium risk. Two persons have died from this type of ammunition and six have been wounded since 1991.
- Submunitions: Attacks deploying submunitions occurred in 1991 (around the Vranksa lake area, Gospić and Medimurje) and in 1995. In 1991, one person died and one person was wounded by this type of submunition since 1991.
- Hand and projected (rifle) grenades: These grenades are common in the Republic of Croatia. They represent a huge threat for locals. It takes medium risk for their removal, transport, and destruction. Thirty-three people have died and 66 have been wounded from this type of UXO since 1991.
- Mortar ammunition: A huge quantity of mortar ammunition was found because it was used for destroying targets up to six kilometers (four miles) away—the range between parties to the confrontation. This type of UXO represented a high threat because it included a certain number of unexploded mortar HE shells that usually were 60-mm, 82-mm and 120-mm calibers. These require a very high risk for removal and destruction and represent a medium threat for locals. One person has died from this type of UXO and 14 have been wounded since 1991.
- Free-flight rockets (ground-to-ground and air-to-ground): These rockets were found in quantity and are a huge threat for locals, although their destruction is relatively easy. Nineteen persons have died from this type of UXO and 15 have been wounded since 1991.
- Guided missiles: A small quantity of guided missiles was found, but they represented a huge threat for locals as it takes a medium risk for their destruction.

Continued on page 43
to first survey the ground to large depths (usually up to 4 metres [13 feet]). In some of these survey areas, cannon shells may have been dropped, which represents a threat to the local population. Also discussed were specific problems related to UXO and ERW laid within mine-suspected areas in the Republic of Croatia. During the symposium, the following guidelines were agreed upon to improve detection and removal of UXO:

- Improvement of legislation concerning UXO
- Definition of space and location for which some indications on UXO at depths of over 20 centimetres (8 inches) exist
- Application of new methods, operating procedures and devices
- Improvement of safety measures

A database that includes information on types of UXO found, the amounts collected, location of the UXO, methods used to retrieve them and methods of their destruction.

From 2003 to 2015, CROMAC surveyed the land and concluded that 1,174 square kilometres (455 square miles) of Croatia were contaminated with mines and UXO. Included in this area, CROMAC classified 121 towns and areas within 12 counties as suspected of being within the vicinity of mined areas. As of January 2006, Croatia reported that number to 1,147 square kilometres (443 square miles) as being contaminated with mines. There are still an estimated 155,198 anti-personnel mines and 88,678 anti-vehicle mines that need to be demined. Fortunately, pieces of UXO are not too threatening to the community as they have been well-marked and made recognizable to the public. Croatia is now working towards a goal of clearing 546 square kilometres (214 square miles) of mines-contaminated land by the end of 2009. This goal is subject to change due to the speed of demining activities, which varies depending on the availability of funds, the cost of demining, and capacity.

Conclusion

The ERW problem has not yet been successfully solved in the Republic of Croatia. It is important to point out that all projects for ERW removal in Croatia require considerable funds to fulfill capacity requirements, equipment-procurement needs, work methodology and other expenditures. From the knowledge and experience gained so far, Croatian explosive-ordnance-disposal professionals are able to apply their expertise to other ERW-affected countries. Professional personnel dealing with ERW are CROMAC employees as well as employees of the Ministry of Interior Affairs and Ministry of Defence. The Republic of Croatia, and CROMAC specifically, will be working to solve the ERW problem as a part of the broader humanitarian-demining issue.

See Endnotes, page 110

Continued from page 41

No victim has been registered from this type of UXO since 1997.

Aircraft unitary bombs. These bombs were found in a medium quantity and represented a huge threat for locals. It takes a moderate amount of risk for their destruction. Most aircraft unitary bombs are found in exploded ammunition depots in Volimac, on the border between Croatia and Bosnia-Herzegovina and at the former military airports in Udbina, Croatia. In most cases, aircraft unitary bombs were found individually.

Anti-personnel mines. AP mines were found in large quantities during demining. According to the CROMAC database, since 1998, 17,905 such mines have been found and destroyed. They are highly risky to remove and create a daily threat for the local population.

Dražen Šimunović, B. S. is currently working as a UXO specialist at CROMAC. A native of Konjic, Bosnia-Herzegovina, he has been teaching students about demining and UXO at Polytechnic College Velika Gorica in Croatia since 2006 and also at the Police Academy in Zagreb since 1985. After graduating from Military University in Zagreb in 1987, he worked as a military engineer in Konjic for six years and then as a professor at the Croatian Military Academy “Petar Zrinski.”

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“Devil’s Garden” Cleared of Explosive Debris

The thousands of landmines, unexploded and abandoned ordnance, and booby traps located in minefields around Bagram, Afghanistan, have been successfully cleared. During the effort, two deminers were accidentally killed by mines booby-trapped to hinder clearance.

Touted as the “Devil’s Garden” because the area was considered to have the most dangerous minefields in the world, the land is now being used by 72,000 refugees and thousands of internally displaced persons for agriculture, habitation and commerce.

The HALO Trust conducted clearance of the minefields with financial support from the U.S. Department of State. Clearance operations began in December 2001 and cost nearly $US5 million. Additional funding was provided by Roots of Peace and the governments of Germany, Ireland, Japan, the Netherlands, Norway, and the United Kingdom.

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Several countries in North Africa are affected by mines and ERW as a result of the North African Campaign of World War II, also known as the Desert War, which was fought between 1940 and 1943. Algeria, Egypt, Libya, Morocco and Tunisia are dealing with the contamination that has resulted from internal and regional conflicts over the past 60 years in addition to the Desert War contamination.

Algeria

Algeria is affected by ERW as a result of World War II, the Algerian War of Independence and ongoing conflicts with terrorist groups. There is no distinction between landmine and ERW estimates, and the contamination of affected areas is different depending on the decade in which it happened. The contaminated areas in the east and west, known as the Mzab and Chaîne lines, are most affected by mines, as are the strategic areas in the north that the Algerian Army secured with mines in its ongoing fight with terrorist groups. The other affected areas of the country are mostly ERW-affected due to battles fought during WWII. Algeria estimates there are 3,064,180 mines and ERW affecting 5,676 hectares (22 square miles) due to battles fought during WWII. Algeria estimates there are 3,064,180 mines and ERW affecting 5,676 hectares (22 square miles) (864,654 acres) needing to be cleared before land can be returned to the people.

Egypt

Egypt is affected by ERW in two main areas. The first area is in the north and includes many locations from Borg El-Arab, which is 60 kilometers (37 miles) west of Alexandria, to the Egyptian-Libyan border, with a 30-kilometer (19-mile) distance from the Mediterranean Sea, which is affected as a result of World War II battles in North Africa during 1942 and 1943. The second area is in the south and includes all of the Sinai Peninsula, the western coast of the Red Sea and the Suez Canal as a result of Egyptian-Israeli wars (1956, 1973, 1976). In addition to these areas in the Sinai Peninsula, there are also 7,000 mines/ERW victims registered with the Ministry of National Solidarity, which are not known as affected but have witnessed some ERW accidents.

Humanitarian impact. In 1999, Egypt declared there had been 8,313 mine and ERW victims in the previous 20 years. It is very difficult to know how many of these were ERW victims since specific records were not kept. However, by extrapolating the data, we find the ERW victims can be estimated between 1,662 and 2,078.

Information on the number of ERW victims in Egypt shows that the 500,000 people living in this area are most affected by ERW than mines. Being a mine or ERW victim in one of the affected regions in Egypt is a complicated health issue because of the limited health services in these areas.

All of the victims are found in three groups of people—those who work on the development and repair of infrastructure, Bosnians, or farmers, which means that they lose their main income once injured. The social system in Egypt does not give any assistance for mine/ERW victims; they might receive a payment of up to USD80 after a long process of filing out paperwork to prove their injury. This amount is the same to give people affected in natural disasters. Forty adult victims are responsible for a family, which, on average, consists of five people, and the injury affects the family’s future. Some of the families have had to take their children out of school to begin working to help the family survive. After the main breadwinner in the family was injured, many of the family members were fired or mine/ERW victims in Egypt, and this increases the victims’ suffering in other ways.

Economic impact. Irrigation projects, which are an essential facet of development projects in desert areas, have experienced delays and increased costs because of the need to clear mines and ERW from prospective sites and routes. This happened with both the El Hamam Canal in the western area and the El Salam Canal in the eastern area, with a total of 839,000 soldiers (864,654 acres) needed to be cleared before the irrigation and follow-on agriculture projects could begin. Mines and ERW are also a serious impediment to the development of traditional and nontraditional sectors of the power-supply industry in Egypt. The need to remove ERW delayed large wind “farm” projects in the western area and increased the costs of 500-kV power cable connecting Alexandria (the main port for Egypt) and the second largest city) with the existing eastern electrical network, scheduled to be connected through the western area to the North Africa network, then maybe to the European Union.

The petroleum sector, which plays a leading role in Egypt’s national income, is also affected by mines and ERW. Egypt estimates there are 4.8 billion barrels of oil and 13.4 trillion cubic metres of gas in the western area, and all petroleum areas (except for those in the sea) are in mine/ERW-contaminated or suspected areas. Any petroleum/gas project must budget for mine/ERW clearance before beginning production; this amount varies from area to area.

In 1998, a German tourist was seriously injured due to an accident involving unexploded ordinance in Elain Elshohna on the Red Sea coast. In 1999 four tourists, two German and two Swiss, were injured after their car hit an unidentified mine, and due to another kind of ERW in the western area. In addition, all tourist sites in Sinai and on the coast of the Red Sea are at close proximity to mines/ERW. These two accidents have not affected travel plans for 13-17 million German tourists, who could have a serious impact on tourism, which is Egypt’s second largest source of revenue.

Mines/ERW affect accessibility to schools in the western area. In the governorate of Marsa Alam, all schools have to build new schools to make them easily and safely accessible for children. Mines/ERW affect the infrastructure and development of the new port and the attached free industrial zone of Elain Elshohna on the Red Sea, which is on track to become the largest port in the Middle East by 2010. The Egyptian Army cleared this area for infrastructure, but some mine/ERW incidents occurred subsequently, requiring the area to be demined again, making the plans and the associated financial cost.

In 1994, in the southern area, 3,064,180 mines and ERW affected approximately 248,000 hectares (1,085 square miles) of farmland and delayed the project completion. In addition, the economic impact includes all of the Sinai Peninsula, the western coast of the Red Sea and the Suez Canal as a result of Egyptian-Israeli wars (1956, 1973, 1976). In addition to these areas in the Sinai Peninsula, there are also 7,000 mines/ERW victims registered with the Ministry of National Solidarity, which are not known as affected but have witnessed some ERW accidents.

There are an estimated 11.62 million to 12.45 million ERW victims in Syria, which affect approximately 248,000 hectares (1,085 square miles) in the western area and a 1.27 million to 1.53 million ERW that affect approximately 20,000 hectares (77 square miles) in the eastern area. This debris includes air-dropped bombs, bullets, fuses and other types of ERW.
In 1972, the Ministry of Agriculture and Land Reclamation published an estimate of the total income loss from not using affected lands at 18,897,760 Libyan Dinars. Landowners in Morocco, which is mostly an important source of income for people in Libya, and having adequate land for grazing livestock. Demining is no longer a priority for the Libyan authorities estimated 1,452,077 hectares (5,607 square miles) of affected land could not be used for grazing. In addition, 75,000 camels, 48,750 sheep and 1,250 cows were lost because of mines/ERW incidents. Due to rising population rates and the slow process of demining, these statistics have shown some improvement over the past 30 years.

Many ports in Libya were affected by sea mines/ERW, and clearing them was too expensive. These included Benghazi, Derna, Tobruk and Tripoli ports. Mines/ERW have affected the infrastructure of the transportation network in Libya, causing delays in road reconstruction. The oil sector is also affected by mines/ERW; they increase the costs of any petroleum project due to the need for demining before drilling can begin. The Great Man-Made River that brings water from underground in the south to the populated areas took much longer and cost significantly more than was originally expected to complete because of existing mines/ERW clearance.

Outlook. After decades of sanctions and with Libya’s new strategy for trade and interaction with the world, many projects are planned to take place in different parts of the country, including for tourism. This will bring more people to the affected areas, which will both humanize and economic impact. Libya established a National Program for Demining and Land Reclamation in 2005. However, the country still does not have a future plan for national mine action.

Morocco

Morocco is not affected by ERW and mines except for the territories it controls in Western Sahara. Between 1975 and 1991, the Western Sahara territories witnessed a sovereignty conflict among Morocco, Frente Popular de Liberacion de Saguia el Hamra y Rio de Oro (The Polisario Front)—a Sahrawi nationalist organization—and Mauritania, before its withdrawal from the conflict in 1979. This conflict came after the withdrawal of the Spanish colonial forces from the territories. All parties to the conflict used a variety of weapons and munitions throughout their fighting.

Tunisia

Tunisia is affected by an unknown number of ERW and mines because of World War II conflicts in North Africa and anti-tank and anti-personnel mines is emplaced to secure its borders with Algeria and Libya. During its conflict with Libya from 1970 to 1980, Tunisia planted 1,530 anti-tank mines (including the Egyptian Mk7 and Mk4, the American M6A2 and the Yugoslavian TM3A1/TMA4) in nine minefields along its border with Algeria. Libya, ERW-affected areas in Tunisia include Mareth, Marmara and El Hamma regions in the south, Kasserine and Faiedh regions in the centre, Le Cap-Bon and the northeastern region of the country. Minefields planted by Tunisia include several boxes traps that are attached to some of the anti-tank mines to prevent removal. However, the exact number of boxes traps is unknown.

Humanitarian impact. The humanitarian impact of mines in Tunisia is very minor, though the humanitarian impacts of WE from World War II are more significant, although it remains relatively small by international standards. Most of the minefields and ERW-affected areas are located in remote desert areas with few or no local population. From 1995 to 2005, there were nine mines victims. These were killed because of World War II ERW. No one in 1995 and one in 1999 and one in 1996. From 2001, one child was injured by ERW while he was working as a shepherd. In 2002, four children were injured in two different accidents by ERW in the same manner.

Economic impact. Economic impact is limited due to the location of ERW in remote areas, except in some areas that are used for grazing. Any large-scale construction or engineering projects in Tunisia require prior clearance of all ERW by the engineering and construction firms working in the affected areas. Outlook. Tunisia has a national commitment to implementing the Mine Ban Convention and currently the Tunisian Army is the only authority that conducts demining. Tunisia began demining in late 2004 and is nearing clearance completion, but the plan has been made dependent for ERW clearance. The Tunisian government intends to construct new roads throughout the country, including a road between Tunis and Tripoli. It also plans to build up a gas pipeline that will cross the Tunisian/Libyan border. To begin these projects, clearance of mines/ERW on the border area is needed.

ERW in North Africa and Security Concerns

Beyond the basic economic and humanitarian impacts these North African countries face due to the presence of mines/ERW, these weapons create a security risk for civilians as well. Incidents involving the use of ERW and mines in criminal and terrorist activities have occurred in many of the affected areas in North Africa. Removal of ERW is important for the security of the region. ERW can be used for criminal activities such as smuggling, illegal immigration, illegal fishing and disrupting political and security stability in affected communities. ERW can also be used in conflict as an explosive weapon because it offers a significant amount of active explosive that can be used easily with a little bit of experience.

In October 2004, an unknown terrorist blew up the Hilton Taba Hotel and two small tourist camps located in Taba and south Sinai in Egypt. The official declaration of the Egyptian Ministry of Interior stated that the terrorist used explosives that they took from mines and ERW in Sinai. According to Promotion of Armaments and Consequences, a nongovernmental organization working on the mine and unexploded ordnance problem in Egypt, unconfirmed reports stated that some people in the western desert used to sell explosives that were taken from mines and ERW to fishermen or to those who work in mining. Some claimed that the terrorist groups in Algeria use explosives that they took from mines and ERW in Algeria. The Polisario Front stated that it uses mines that Morocco employed in the six-years, or defensive walls, it built in Western Sahara during the sovereignty conflict.

External ARW in the land without fences.
Successful Implementation of Protocol V

Protocol V of the Convention on Certain Conventional Weapons recently entered into force, and the author hopes lessons learned from the operations of the Ottawa Convention can be applied to this Protocol.

by Kerry Brinkert (Geneva International Centre for Humanitarian Demining)

On 11 November 2006, Protocol V of the Convention on Certain Conventional Weapons entered into force; it addresses the humanitarian impact of explosive remnants of war other than landmines. This “Protocol on Explosive Remnants of War” as it is frequently known contains “remedial measures of a generic nature in order to minimise the risks and effects of explosive remnants of war.” With the Protocol having become binding international law, attention has turned toward the work necessary to implement it.

Much of this attention has focused on practical operations of the Protocol. For instance, it has been frequently mentioned that various lessons from the operations of the Ottawa Convention (e.g., an informed sponsorship programme) could be applied to Protocol V. While valuable operational lessons can be applied in terms of how the Protocol functions, what is often overlooked is an essential lesson that can be applied from the Ottawa Convention regarding what might be implemented.

Lessons Learned from the Ottawa Convention

Some central concepts in the work to implement the Ottawa Convention

• Responsibility: It is the responsibility of each individual party to the Convention to fulfill certain obligations in areas under its control or jurisdiction.
• Measurable and time-bound obligations: Key provisions of the Convention call for actions that are clearly quantified and must be carried out over a set period of time.
• Cooperation and assistance: Notwithstanding the fact that Ottawa Convention States Parties are responsible for fulfilling certain measurable and time-bound obligations, other States Parties are required to assist when feasible and to the extent possible.

A complication exists, though, when obligations are not measurable and time-bound, or even universally applicable. In such cases, it is difficult for cooperation and assistance to manifest because objectives and deadlines are not clearly defined. A central and active role of the state is exactly how the States Parties to the Ottawa Convention have dealt with the ambiguity surrounding the Convention’s obligations in relation to mine victims.

The imperative to assist mine victims is manifested in a legal obligation for “each State Party in a position to do so” to “provide assistance for the care and rehabilitation, and social and economic reintegration of mine victims.” However, unlike the Ottawa Convention’s clear obligations to destroy or ensure the destruction of stockpiled or replaced anti-personnel mines, the obligation concerning mine-victim assistance is ambiguous. It is neither defined nor measurable. Moreover, even if defined, the implementation of objectives and deadlines would not be universally applicable.

The Ottawa Convention’s States Parties have first dealt with the ambiguity of mine-victim assistance by clearly defining mine victims and victim assistance, and adopting certain common understandings regarding the place of victim assistance in broader contexts.

Second, a number of States Parties have chosen to “self-identify,” an act of indicating that addressing the matter of victim assistance is truly relevant and necessary for them. Certainly it is understood all States Parties have a responsibility to support mine victims, no matter the number of victims in a particular state. However, this responsibility is particularly pertinent for those States Parties that have indicated significant numbers—hundreds or thousands—of survivors in areas under their control or jurisdiction. A total of 24 States Parties have self-identified, acknowledging that comparatively they have some of the gravest needs and greatest responsibilities to provide victim assistance.

Third, because these Parties are ultimately responsible for their populations, the matter of identifying what can and should be done by what deadline has been turned over to each individual state because conditions are unique to each of them. In addition, while acknowledging that assistance victims is a long-term task, a timeline has been established for the achievement of a meaningful level of interim progress: the Ottawa Convention’s Second Review Conference in 2009.

Applying these Lessons to Protocol V

Protocol V contains an obligation in Article 8.2 to assist victims of explosive remnants of war that is basically identical to the obligation in the Ottawa Convention. Hence, the lessons of the Ottawa Convention can easily be applied to the effort to implement victim assistance under Protocol V. However, even beyond victim assistance, the Ottawa Convention’s lessons can be applied to Protocol V’s Article 5, which addresses the clearance, removal or destruction of ERW. Additionally, to ensure Protocol V has a more immediate and noticeable impact, these lessons might also be applied to Article 7, which contains an implicit appeal that clearance, removal or destruction measures be undertaken without delay, that is, as soon as possible.

Protocol V’s Article 3 calls for each High Contracting Party to “mark and clear, remove or destroy explosive remnants of war in affected territories under its control,” according to priority to those areas “posing a significant humanitarian risk.” Article 5 includes specifics regarding how these provisions should be applied, including surveying and assessing the threat; prioritising needs; marking and clearing, removing or destroying, carrying out these activities in accordance with high standards (left to the reader to define); and mobilising resources to carry out these tasks.

However, despite these specific provisions, success or failure in the application of Articles 3 and 5 will depend on the application of other measures, time-bound or universally applicable. Therefore, the High Contracting Parties to Protocol V may benefit from applying the Ottawa Convention’s methodology for victim assistance, which is the focus of several complementary efforts in application. This methodology could be applicable to Protocol V’s Articles 3 and 7 regarding clearance, removal or destruction of ERW, as well as to the victim assistance obligation found in Article 8.2, and might include the following principles:

• States that wish to address the problem first, those with respect to new and existing ERW could be asked to self-identify.

• As the responsibility to address problems caused by ERW rests with individual Parties that have self-identified, these Parties could be asked—without assistance if necessary—to provide baseline information on the problems they face and to establish specific, measurable, achievable, relevant objectives and timelines for achieving these objectives.

• States could be asked to develop and implement plans to achieve their objectives. As part of these plans, there should be a clear articulation of priorities for assistance.

• High Contracting Parties in a position to provide assistance could respond to prioritised assistance needs as articulated by Parties that have well-developed plans.

• High Contracting Parties could periodically hold Conferences of States Parties to assess progress in achieving the objectives as previously articulated by the self-identified Parties.

Conclusion

This approach may sound self-evident, but such was not the case when similar work to implement the Ottawa Convention began. Moreover, there is an important nuance to this methodology that places the affected Party at the front and centre of addressing its Protocol V needs and obligations. As such Parties hold ultimate responsibility, notwithstanding the responsibility of others to assist, these affected states should have their voices heard when it comes to their needs and aspirations. Equally, these should not be demands for large-scale assistance until affected states have also demonstrated a solid, realistic and measurable plan for implementation.
Spacetoon Kids TV: Educating Kids on ERW

by Daniele Ressler | Mine Action Information Center |

Spacetoon Kids TV is a television program that aims to educate children on explosive remnants of war and how to stay safe around them. The program targets children in the Middle East and focuses on producing entertaining and informative content that can be broadcasted to various regions.

The Spacetoon Kids TV Regional Office in Jordan works closely with the Ministry of Planning and the National Mine Action Authority to ensure that the messages are disseminated effectively. The office also collaborates with other organizations, such as the United Nations Mine Action Service and the International Committee of the Red Cross, to ensure a comprehensive approach to addressing the issue of landmines and other explosive remnants of war.

Conclusion

With the help of new donor sponsors, Spacetoon's Regional Office in Jordan plans to address the urgent need of ensuring children's safety in Lebanon, as well as continue to deliver MRE activities in Iraq where children are also at great risk.

See Endnotes, page 111
Gasimov taught mine-risk education to schoolchildren in affected areas of Azerbaijan. “I used to go to schools, conducting mine-risk education in order to prevent incidents such as my own,” he remembers.

Gasimov’s commitment to his work in mine action helped him receive the promotion to Team Leader of the Training and Quality Assurance Team at ANAMA, an important component of the mine-action program in Azerbaijan. The T&QA Team at ANAMA was created specifically to oversee the clearance operation of the demining companies and to identify and address any problems that arise during the de-mining process.

As part of his training for the T&QA Team at ANAMA, Gasimov attended a number of courses in mine action. He provides the following description of the main functions of his team: “We conduct trainings, work on capacity building, conduct monitoring, technical audits as part of QA, and also ensure that the land clearing by the de-mining agencies has been done in accordance with the National and Institutional Mine-Action Standards.” He adds, “We make sure that nothing remains there, and that was no mind-game.”

Gasimov recognizes mine clearance is at times an overwhelming undertaking, sometimes marked by unexpected barriers. “All of my achievements in this field have been ongoing process. We work and we learn. Sometimes, we learn [by making] mistakes, but one first goal is to make the land free from mines using the approved standards.” Gasimov is happy to dedicate his life’s work to the de-mining devices that are so harmful. “Each deployed mine and each unexploded piece of ordnance means someone’s created life re-processed here.”

In spite of the difficulties that accompany working in minefields, Gasimov feels his work as mine action has been rewarding. He hopes one day all countries, including his own, will be free from the complications inflicted by mines and UXOs. The young T&QA Team Leader would also like to see the injury and death caused by mines and UXOs averted from the world. “Some of our people will try and reach us to tend their animals and they are injured by landmines,” Gasimov laments. “It is very hard.”

When asked about his suggestions for the mine-action community, Gasimov believes communication is essential to solving the mine problem. “My suggestion is to work close; to share the experience with other countries and to work as one force against the problem. We can share how we have learned so that others do not have to learn from their own mistakes, annually,” he concludes.

It is Gasimov’s sense of hope, compassion, and unity that makes him a valuable member of the demining community. He not only contributes his knowledge and dedication to the field, but he also has taught mine victims that recovery from tragic situations is well within reach.

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Retired police mine victims founded AVISCAM.

ALL PHOTOS COURTESY OF VINICIUS SOUZA & MARIA EUGÊNIA SÁ
mistaken strategy of removal and reinforcement of the landmines, caused dozens of accidents. Eighty-one of the professionals who had worked in the Division of Safety in Lethal Activations-Explosive Devices for Self-protection Unit were involved in explosions. Many of them were immobilized and five died as a result of their wounds. Of the survivors, 41 were injured too badly to return to work, and 35 are still working with mild injuries. Eight founded the Asociación de Víctimas y Trabajadores de la Minas y Minas (AVAM)), which today plays the necessary international assistance and support to have reformulated, re-equipped and better-trained work teams. Within the National Police, the Dirección de Seguridad Civil (DIVSICOEM), with approximately 80 members, received support for training and learning new techniques from the Organization of American States. The new methods are completely different from those employed by the WBC in the 1990s and comply with codified international standards. Divisions of the national police, without any experience, had long neglected but exposed on location with total safety.

Each demining squad comprises eight professionals: one squad head, two detectors, two problem experts, one expert in explosives, one male nurse and one team member responsible for the campaign of awareness and mine-risk education for the communities living near the affected areas. They use metal detectors and protect themselves with proper boots, vests and anti-impact helmets. Demining quality assurance for all towers should have been completed by June 2006, but, due to bureaucratic problems, the deadline for the agreement between Peru and QAS was post-poned, which led to a great financial loss, paralyzing these activities for a long period. As there have been no regular MRE activities in Peru since 2003, accidents involving civilian communities have increased. Consequently, Nac Naam, a young boy who lived with a native family in Huancavelica department, didn’t know how to handle an object he had found. As Freddy had done, Nac also picked up from the field an object he did not recognize. He took the artifact home and on the following day, tied it to a stick and put it into a wood stove. It exploded and the 10-year-old was completely burned, suffering from third-degree burns.

The internal conflict ended, the children educated and under explosive remnant of war continue to live, fight and destroy lives and properties as well as serve as a hindrance to the country’s socioeconomic development.

The National Police stated that 1,431 previously demined power towers in Huancavelica, Ica and Lima were still considered dangerous. As a signatory of the Ottawa Convention, Peru today ratifies the need for continuous international assistance and support to have reformulated, re-equipped and better-trained work teams. Within the National Police, the Dirección de Seguridad Civil (DIVSICOEM), with approximately 80 members, received support for training and learning new techniques from the Organization of American States. The new methods are completely different from those employed by the WBC in the 1990s and comply with codified international standards. Divisions of the national police, without any experience, had long neglected but exposed on location with total safety.

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**A CHANGE OF HEART**

by Dahib Mohamed Odwaa | Handicap International

Gardika Dheenta is a small village in Somaliland located 45 km south of Hargeisa, the capital of Somaliland. In the late 1990s, SNM troops dispersed into towns, leaving empty camps open to the public.

Somaliland. The project aims to provide an adequate and effective exposure to MRE to children 5–14 years of age working as herders in affected communities in Awdal, Togdheer, Sahl and Galbadda regions of Somaliland. Being a MRE, SNM troops often went into these areas and demonstrated UXOs and anti-tank/anti-personnel mines. Another target of MRE is adults and younger teenagers aged 14–29. Replicating around 50 percent of all mine and UXO survivors, they are often at risk of being harmed by UXO or anti-tank/anti-personnel mines.

Another target of MRE is children aged 5–14 years. Most of the UXO victims are children, and many of them are injured or killed while playing near UXO. The MRE project focuses on the population mainly affected by the mine and UXO risks, especially children who have never been educated about the dangers of UXO.

In January 2008, the two teams from Radio Hargeisa and HAVOCO conducted an Audience Feedback Survey in 32 highly and moderately mine-affected villages in the Galbadda region (Hargeisa area) including Gardika Dheenta village. The teams met in Mohamed Gahayr Geele’s village, a local nongovernmental organization, and issue these public-service announcements every three months, asking how they felt and what perspectives they could provide to other communities with UXO in their area or in their homes. He replied that he was very proud to hand over the UXO. He said he had the same scene in the village, where people from the same community collected the UXO from citizens. The MRE team worked with the DDG Quick Response Team to collect the UXO from the UXO affected area, including Gardika Dheenta village. The teams met in Mohamed Gahayr Geele’s village, emphasizing their objective to ensure a safe environment for inhabitants. During the survey, the team also collected use data to be used for the production of MRE radio programmes such as interviews and reports. The teams sought to disclose how many UXO affected the area. During his interview, Gele admitted he had hidden some UXO items on his farm and said he wanted to hand over the UXO to the authorities. Radio Hargeisa did not notify the authorities; instead, he aired the interview with Gele three weeks after the event. Gele had already contacted DDG’s operations manager and Handicap International’s MRE team to identify the person who had admitted to hiding UXO and to hand over the inventory to the authorities.

Later, the Radio Hargeisa journalist interviewed Gele again, asking how he felt and what perspectives he could provide to other communities with UXO in their area or in their homes. He replied that he was very proud to hand over the UXO. He said he had the same scene in the village, where people from the same community collected the UXO from citizens. The MRE team worked with the DDG Quick Response Team to collect the UXO from the UXO affected area, including Gardika Dheenta village. The teams met in Mohamed Gahayr Geele’s village, emphasizing their objective to ensure a safe environment for inhabitants. During the survey, the team also collected use data to be used for the production of MRE radio programmes such as interviews and reports. The teams sought to disclose how many UXO affected the area. During his interview, Gele admitted he had hidden some UXO items on his farm and said he wanted to hand over the UXO to the authorities. Radio Hargeisa did not notify the authorities; instead, he aired the interview with Gele three weeks after the event. Gele had already contacted DDG’s operations manager and Handicap International’s MRE team to identify the person who had admitted to hiding UXO and to hand over the inventory to the authorities.
Being a specialist insurance broker to explosive-ordnance-disposal organisations around the world has provided Howard Thompson with the opportunity to be on the sidelines of the humanitarian-demining community. But during a 10-day visit to Cambodia, he was able to experience first-hand the significance of humanitarian demining and clearance. He writes about this experience here.

For many years now, my company has specialised in the insurance requirements of mine-clearance and explosive-ordnance-disposal organisations operating around the world. During that time, I have learned much about the skills and methods engaged in the field and have been fortunate enough to visit many mine-clearance operations, particularly in Bosnia-Herzegovina and Kosovo. In 2006, I joined one of my clients, Mines Advisory Group, for a 10-day visit to their operations in Cambodia and there saw even more beautifully, what the "human" element of humanitarian demining is really all about.

Having seen many specialists working in the field, demining by hand with the aid of machines and dogs, I have nothing but admiration for their work. However, this visit showed me something to which, until then, I had not attached a real human face. How many times have I read, heard and even said "the purpose of humanitarian demining is to return land to its people?" but had never actually been there to see it for myself.

During that time, I have learned much about the skills and common sense it takes to be a specialist in mine-clearance operations. Particularly in Cambodia, the familiar sights of a demining programme were well in evidence, whether manual, mechanical such as the Bozena (see photo 2)—or of the canine variety as displayed by the Cambodian Mine Action Centre team in photo 3.

The next woman we met was far less forthcoming, she lived in a rather fragile house, alone with her children. Her husband had recently died of tuberculosis, and one of her children had to live elsewhere because there was no room for all of them in this new home. She had held back tears as she told her story. She kept her distance from the visitors and the children, but the helpers who attached themselves to her perceived her thoughtfulness for their community. She now has a new home and a completely new start. Her story is a sad one, yet I hope her life and her children's lives will soon improve at the least, we can hope to feel like a real part of this new community.

The familiar sights of a demining programme were well in evidence, whether manual, mechanical, such as the Bozena (see photo 2)—or of the canine variety as displayed by the Cambodian Mine Action Centre team in photo 3.
Increasing the Impact of Mine-action Surveys

While mine-action surveys are an important tool in mine clearance, there are several challenges that must be overcome for survey results to be fully effective. Some of these changes include alterations in priority setting, information management and impact scoring. This article presents some potential obstacles to completing and evaluating mine-action surveys and proposes possible solutions to these challenges to increase their effectiveness and impact.

by Charles Downs \[ New York University Wagner School of Public Service \]

Mine-action Surveys and Priority Setting

Priority setting is the most critical process in mine-action programme management. The approach to priority setting should support the goals of the respective programme. These include direct mine action goals (rapid reduction of new victims, elimination of all landmines and effects of landmines) and support to local and national development (e.g., support to local economic development, support to regional road or electrical system rehabilitation).

Priority setting based on hazard alone may eventually lead to the elimination of all landmines and may permit more efficient clearance planning and logistics, although it may not provide much immediate relief to the population nor support government development activities. Priority setting based on community impact will respond better to perceived community needs, although it may not fully support national development. It makes a difference which communities are addressed first and which communities are left for later, and proper consideration of these opportunity costs requires appropriate priority setting. This is a management process that requires information, consultation and judgment—including periodic review of results and reassessment of the assumptions and decisions made.

General Approach to Landmine Impact Surveys

Feedback to government and communities. While Landmine Impact Surveys always begin with the agreement of the host government, actual commitment to the survey often is manifested only when the results begin to...
Use of Impact-Survey Data

Community impact scoring. Design of the LIS scoring system produced a simple system for ranking community impact as low, medium and high. The ranking system proved very powerful in directing attention to high-impact communities by highlighting them and their limited number, which presented a more “bounded” problem to those planning to clear or mark these high-impact communities. The scoring system proved very useful in showing the extent of contaminated areas, since survey teams were neither expected nor trained to carefully determine boundaries. This apparent increase in the total contaminated area reduces the credibility of the survey results. This requires a significant adjustment to the scoring system and planning for clearing or marking as appropriate.

Assessing the Results of Mine Action

Post-clearance impact assessment. Post-clearance impact assessments were conducted following the clearance of blockages in order to determine the use of the cleared land and thus the benefits deriving from mine clearance. These surveys are expected to be continued and refined as the implementation process matures, and they can be aggregated to estimate global progress towards solving the worldwide landmine problem.

Conclusion

The mine-action survey process today—with its focus on community impact—has developed far beyond the minefield surveys of the 1990s and the rapid appraisal approach of other development fields. Landmine Impact Surveys have been conducted in at least 10 countries and regions as of May 2006 (as seen in the above map), and IMSMA is now the core database in most mine-action programmes. In this process, numerous lessons have been learned, yet further challenges remain.

This article is derived from a chapter in A Study of the Role of Mine Action. The reference section for this chapter includes relevant references. The full text of the chapter is available in the Global Mine Action Information System (GMAIS) database. The database is accessible through a web interface or through direct download of the data. The database can be searched by various criteria, including location, type of data, and specific keywords. The database also includes links to other relevant resources, such as reports, articles, and organizations involved in mine action. It is a comprehensive resource for anyone interested in learning more about the progress and challenges of mine action.

Information Management

IMSSM limitations constrain programme management. The LIS results are recorded in the IMSSM database. Within this system, the data obtained to date has also presented some limitations. First, the IMSSM database was initially developed as a data repository and not as an instrument for operational management of mine-action programmes. As a result, each mine-action programme where IMSMA was deployed had to develop its own parallel software to support operations, some of which have been incorporated into later versions of IMSSM. Second, there is a need to integrate other key data sets (e.g., bombing data, previous survey data requiring verification) into the minefield databases and the availability of the necessary resources for the community to make full use of the land once the blockages have been removed.

Use of minefield databases. Where minefield databases already exist, the LIS should utilize them as valid sources to identify known mine-affected communities and Suspected Hazard Areas while also searching for more. Full survey visits will still be required to obtain blockage data and update SHA and vicinities; this information will be more complete and reliable as the community sources of high-impact communities or SHAs are discovered, or new mine incidents occur; they should be added. The results of mine action to clear or mark areas to eliminate blockages should be updated into the database. A procedure is needed to remove SHAs from the previous list due to the community or SHA no longer existing. These technical issues create important challenges to effective information management in the community.

LIS results are recorded in the LIS database. The LIS database should be kept up-to-date. Ongoing analysis of survey results and programme progress requires ongoing involvement of mine-action staff as well as institutionalization of the Impact-Survey process. The initial LIS, sometimes referred to as a “snapshot,” is better thought of as a starting point—an investment in comprehensive data collection that should be continued to reflect changing reality. As new mine-affected communities or SHAs are discovered, or new mine incidents occur, they should be added. The results of mine action to clear or mark areas to eliminate blockages should be updated into the database. A procedure is needed to remove SHAs from the previous list due to the community or SHA no longer existing. These technical issues create important challenges to effective information management in the community.

Assessing the Results of Mine Action

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Contributing to Progress in Sri Lanka

This article highlights the activities of People to People International in Sri Lanka. As part of its commitment to Sri Lanka, PPI not only assisted in the clearance of high-priority minefields, but also provided aid following the 2004 tsunami. Today, PPI remains dedicated to helping the Sri Lankan people.

by Liz Wegman | People to People International |

P

eople to People International was founded by President Dwight D. Eisenhower in 1956 and is now led by his granddaughter. Working with The HALO Trust, a nonprofit organization specializing in the removal of war debris, PPI has cleared 13 high-priority minefields totaling 9,392 square meters (2.3 acres) and containing nearly 600 mines in Sri Lanka since joining the U.S. Department of State's Public-Private Partnership Program for Mine Action in 2002, according to Mary Jean Eisenhower, President and CEO of PPI. People to People has embraced Sri Lanka and become a major contributor to the rebuilding of a country wracked by both women and natural disasters.

Today PPI remains committed to helping Sri Lanka achieve its identified goal of becoming “mine-free,” thereby making it easier for the thousands of civilians who were displaced or forced out by the conflict to resettle in their homes and resume cultivating their land. In addition, PPI has built three schools in the Jaffna area, which was hit hard by the December 2004 tsunami. The 20 years of civil war between the government and the Liberation Tigers of Tamil Eelam2 took place mainly in northern and eastern Sri Lanka, home to a significant number of ethnic Tamils. Both the Sri Lankan Army and the LTTE used mines extensively throughout the conflict. The HALO Trust established an operations base in the northern Jaffna district, where the landmine problem is most significant. Its focus is government-controlled areas, though it does provide assistance in LTTE-controlled areas on request.

Mary Eisenhower and PPI's Deputy CEO Marc Bright made their first trip to Sri Lanka in late 2003 to visit the Jaffna region. Struck by the beautiful scenery left desolate because of the risks posed by mines, they returned with an increased determination to raise the funds necessary to finance a demining team. Also in 2003, the government of Sri Lanka declared its goal of becoming a mine-free country within three years. The expansion of capacity needed to meet this goal is progressing more slowly than anticipated, forcing the date to be set back. Total clearance of high-priority areas, however, is achievable in 2007.

The goal set for PPI's project included clearance of 13 minefields, all of which are high-priority sites. Areas where landmines lay in close proximity or denied access to schools were of main concern. The first two cleared minefields were in the village of Chirrapulladi, approximately seven miles (11 kilometers) north of Jaffna town. It is a naturally fertile area—one of the best on the Northwestern Peninsula. The soil allows several crops to be grown in rotation annually and the need to remove arable farmland was urgent. The demining team cleared two minefields of 341 mines, and farmers have subsequently returned to the land.

Next, the team moved 12 miles (19 kilometers) northwest of Jaffna to the village of Strewlal. Sri Lankan security forces seized this area in 1992, which led to the displacement of many citizens in the area. Previously, the land belonged to 70 people who mainly engaged in farming. In an area of 927 square meters (0.23 acres), the team cleared 62 mines.

The deminers also began clearing a minefield that lay in close proximity to a primary school. The minefield was separated from the school by nothing more than an old military defense line formed by a mound of dirt. It also denied access to agricultural land and blocked resettlement. Several accidents, some resulting in casualties, have taken place in the area.

Clearance of the premises of a second school followed, this time in Alaveddi village. The number of students had decreased dramatically due to injuries on school grounds. In total, 14 mines were removed from the area, restoring it to a usable state.

The second minefield in the Alaveddi northern region lay in another area captured by Sri Lankan Security Forces. People had been permitted to return to the region in 1992, but livestock were often injured or killed by remaining mines in the years prior to the clearance of the area. A total of 397 square meters (0.1 acres) was cleared, and 14 mines were found and destroyed.

The team then moved on to clear two minefields in the high-priority area of Ravalai. This village is located just before the entrance to the Military High Security Zone. An estimated 2,000 mines had been laid in the area by the SLA since 1995. The local population was in desperate need of land as houses were being built closer and closer to the minefield. Once the field was demined, it was put to use immediately for planting, grazing and transit to other agricultural areas.

Several schools in the same area were situated on or near LTTE-laid minefields, with no records available of where mines were laid. Mine removal within these fields required total clearance to a depth of about six inches (15 centimeters). In the Ravalai area, 74 mines were removed from an area of 1,218 square meters (0.3 acres).

The final project for the PPI-funded section was at the Mantikai School in northeast Jaffna. There, an SLA minefield crossed a path that was used by over 400 schoolchildren each day; clearing it restored confidence in safety to the local residents. Eisenhower returned to Sri Lanka in 2005. While it was difficult to see the physical effects of the progress made by PPI's demining team, the effects of the 2004 tsunami were readily apparent. The Jaffna region was one of the hardest hit. Land around the schools may have been cleared of mines, but the schools themselves were swept away. Eisenhower soon realized that the contributions made to PPI's Tsunami Relief Fund would be best put to use in Sri Lanka by continuing to assist the people of the country on the road to normal life in their native land. In less than a year, three new schools were built in the Jaffna region. Eisenhower and Bright returned a third time in April 2006 for the schools' dedication ceremony.

News Brief

Sweden Supports OAS

The government of Sweden provided US$600,000 to the Organization of American States to support demining work in Nicaragua. The grant will also support a mine-risk education program, “Safe Step without Mine,” and rehabilitation/reintegration services for landmine victims.

Operations made possible by the grant from the Swedish International Development Agency will be coordinated through the OAS Mine Action Program. The donation will advance the Nicaraguan National Demining Plan by about 90 percent.

The OAS reports that, in 1990, more than 550,000 Nicaraguans lived within five kilometers (three miles) of a landmined-infested area; currently, fewer than 45,000 people live under those conditions.

The OAS is considering an expansion of rehabilitation and social reintegration programs because of strong financial support from nations such as Canada, Italy, Norway, Sweden and the United States. If enlarged, the programs would not only serve greater numbers in Nicaragua but also neighboring Honduras.
Humanitarian Landmine Action in China and the Role of the NGO

Though China is not a State Party to the Ottawa Convention, the country has long been involved in humanitarian efforts to alleviate the landmine problem. Nationally, China has launched mine-clearance campaigns, and has become a State Party to the Convention on Certain Conventional Weapons.2 Two organizations have also been established to alleviate the landmine problem.

Internationally, China has sponsored several mine-clearance workshops, and has promoted international partnerships to work toward mine clearance.

by Zhai Dequan [China Arms Control and Disarmament Association ]

B eing a State Party to the Convention on Certain Conventional Weapons (CCW) and its Amended Protocol II, China has made tremendous efforts to promote exchanges and cooperation with the States Parties to the Ottawa Convention. China attaches great importance to the humanitarian issues of landmines and supports the efforts of the international community to address the problems caused by landmines. China and the Role of the NGO

In the 1990s, China successfully undertook two major campaigns to clear the landmines in the provinces of Yunnan and Guangxi, removing the threats to the local civilian population. This effort helped remove the local environment, rehabilitate victims and ensure the safety of border trade. In the two mine-clearance campaigns of 1992–1994 and 1997–1999, China cleared 800 square kilometers (116 square miles) of 83,000 landmines and pieces of UXO along the China-Vietnam border and demobilized 700 metric tons (772 tons) of old munitions and explosives without committing a single error.

When it ratified the CCW Amended Protocol II in 1998, China indicated that it would observe the optional nine-year deferral period for compliance with key restrictions. It has since entered into a dialogue with signatories to the Ottawa Convention. China has done much since 1998 to further advance in mine action. For example, in 1999 and 2000, China sponsored two mine-clearing training courses for the personnel from seven mine-affected countries: Cambodia, Ethiopia, Mozambique, Namibia and Rwanda. China also donated USD 100,000 to the U.N. Voluntary Trust Fund for mine clearance in Bosnia-Heregovina. In 2001, China provided mine-detecting and clearance equipment worth $1.26 million to seven mine-affected countries: Cambodia, Namibia, Ethiopia, Eritrea, Rwanda, Angola and Mozambique.

In 2002, as part of a bilateral border agreement with Vietnam, China started mine-action activities in Guangxi and Yunnan. China and Vietnam agreed to complete the Technical Survey of mined areas by the year 2005, and it was completed on time.

In April 2004, an international workshop on humanitarian mine action took place in Kunming, the capital city of Yunnan, and the experts participated in the conference to learn about the mine problem in the world. In December 2005, China sent an expert mine-clearing group to Thailand to train the local personnel with Chinese-aided equipment. Representatives from China have also attended numerous mine-related meetings around the world. As of 2006, China participates in several international organizations and is one of the CACDA members of corporate members, there are many international organizations and nongovernmental organizations which are active in landmine action. In addition, there is cooperation between CACDA and Handicap International in the area of mine action.

Compared to organizations in other countries, CACDA and Huakai are new. Their goal is to contribute to humanitarian mine clearance and improve the lives of those in need by working in partnership with other organizations. Recently, CACDA and Handicap International-Belgium cosponsored a documentary film about mine action. It is designed to be used for mine-risk education. The film covered the whole process of eliminating landmines— from the devastation of human lives, to destruction of livelihood and property to humanitarian-dimming activities and rehabilitation with domestic and foreign assistance to community reconstruction. Another MRE film the company developed details the history of landmine development; the present international mine-action institutions and systems; conventions, protocols and agreements to limit, ban or destroy landmines; rules, regulations and mine-action standards; technological elaboration of landmine types, composition and their use; reading markings; and demining methods and technologies. This film is designed to raise the landmine-risk awareness of the community.

China’s Demining Future

Although the need for mine clearance in the mine-affected countries of the world is extensive and demanding, the usual practice of multilateral cooperation among states, international institutions, enterprises and/or NGOs often falls short of a total solution to the problem. Therefore, it is necessary for all the parties to explore new ways to cooperate with one another, such as working on the same project, dividing work equitably and taking full advantage of financial and technical resources, information, technologies, equipment, management, etc. The United Nations’ institutions must continue to be involved in organizing, coordinating and monitoring various activities and promoting various actions.

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IMSMA Version 4: A Collaborative Approach

From July 24 to 27, 2006, the Geneva International Centre for Humanitarian Demining hosted a workshop in Murten, Switzerland, to introduce and discuss the release of the Information Management System for Mine Action version 4. Participants included management, operations and technology professionals involved in mine-action information management. During this workshop, results from IMSMA v4 pilot field tests were presented, and changes and innovations were explored, and a demonstration of IMSMA v4 with new handheld and Geographic Information System components was offered. IMSMA v4 reflects a collaborative effort to improve the accuracy and ease of mine-action information management in the field.

IMSMA is a licensed and registered trademark product of the Geneva International Centre for Humanitarian Demining, created as a database to assist in managing and standardizing mine-action data collection and information management. IMSMA has undergone several updates since its first release in 1999. The most recent version of IMSMA, v4, has gone through pilot tests in five countries and is being refined for distribution by the GICHD to all existing IMSMA users by the end of 2007. The information-management workshop hosted by the GICHD provided a forum to discuss, plan and ask questions about the then-forthcoming v4.

IMSMA v4: A Collaborative Effort

As Alan Arnold, Program Manager for the GICHD's Mine Action Information Systems and host of the July workshop noted, IMSMA v4 is not simply an updated version of IMSMA v3, but it is new and different in significant ways. The updates to IMSMA reflect an expanded effort utilizing the collaboration of various groups in a variety of subject areas of expertise.

System and program improvements. After feedback from field users was collected to determine how the product could be improved, the GICHD completed an open tender process for the work required to redesign and develop v4 application which would enhance IMSMA’s capabilities as an information-management tool. FGM, Inc. assisted in providing information technology services to design some of IMSMA’s updated program applications. Version 4 is written in the Java programming language, allowing it to be compatible with a variety of operating systems, including Linux, and IMSMA no longer requires users to have Microsoft® Office or Microsoft Access database capabilities.

Building on the concepts expressed in v3, v4 provides even greater flexibility and allows users to create a customized information-management system that suits the needs of their specific mine-action situation. One example of this is that, unlike previous versions of IMSMA, which offered only predefined forms, v4 allows users to create or alter all data-collection tools (e.g., forms and surveys), reports and elements. Version 4 provides some default forms with most of the elements that were in the v3 forms, but v4 now allows these to be changed.

Additionally, new forms can be completely designed locally and from scratch. Also, v4 users can add their own forms and elements to IMSMA, assigning them to the preferred “user-defined data fields” that already exist in the system. This allows users to customize the data collection process using locally produced forms and systems-access permissions.

Flexibility is furthered with the introduction of expanded language options. Using new language-translation features, v4 can be translated into virtually any language and currently ships with Arabic, English, French, Portuguese, Russian and Spanish. If there are system users with different language preferences, the shared system allows any of these languages to be used simultaneously and in formation to be listed multiple times in different languages. Users can also now add and publish locally created forms in other regional languages.

GIS and “locality” basis. One of the major updates in v4 is the integration of a Geographic Information System component. This addition provides a graphical interface on the basic screen that is used to organize IMSMA data around the concept of “location.” Data and reports are represented by symbols on the map found on the main screen and can be accessed by theme, report, incident, date or location for geographic reports and analysis. Multiple reports associated with a single location can be stored and evaluated cumulatively over time.

The University of Kansas Department of Geography and Kansas Applied Remote Sensing Program joined the collaborative effort of v4, and the University of North Dakota presented a module on GIS at the conference. The University of Kansas team has created a new and standardized set of humanitarian-mine-action symbols that are used in v4’s display. They have also supplied joint operations graphic maps, LandSat satellite imagery, elevation data and population data useful in IMSMA v4 that are specialized for each country.

Handheld unit. A final innovation to IMSMA v4 is an additional handheld tool that allows field personnel to capture information and transfer it to their main IMSMA database with ease. The Swedish Army Forces engineered the handheld unit through their Swedish Exploritive Ordinance Demolition and Demining Centre and it connects to the “EOD IS-SURVEY” handheld computer with Bluetooth® wireless technology. Formally called the Explosive Ordinance Disposal Information System Survey Tool, the EOD IS-SURVEY allows users to:

• Download IMSMA forms and data to the wireless handheld computer unit
• Enter data into forms while in the field during surveys (with location information from the GPS and the laser binoculars connected directly to the wireless handheld unit)
• Attach and save photos to other files (e.g., maps, gazetteers, dataset information) to or from the wireless unit
• Transfer all data back to the main IMSMA database

With the technical assistance of FGM, Inc., the IMSMA v4 developers, the mine-action (X)missible Mark-up Language was programmed into IMSMA v4 to allow for the transmission of standardized data between different information systems: xMAML is the schema that links the metadata specifications and therefore the information between IMSMA (in Java) and the EOD IS-SURVEY (using a Microsoft product) by creating a common language. Unlike the handheld data-collection implementation used with v3, IMSMA v4 allows for the direct translation of data between the handheld computer and IMSMA program, making it easier to transfer information between the two.

The EOD IS-SURVEY has been field-tested in a number of locations and the team from the University of Kansas has also produced a formal report documenting these evaluations.

EOD IS-SURVEY Demonstration and Country Presentations

Two highlights of the conference were a hands-on demonstration of the new EOD IS-SURVEY handheld unit as the field survey and reporting tool for IMSMA v4 and presentations about the results of IMSMA v4 pilot testing in five countries.

For the final EOD IS-SURVEY demonstration, participants spent the day outside and practiced using laser binoculars to plot a perimeter and transmit the coordinates into the handheld computer unit. The handheld unit allowed forms to be filled out and saved or changed as needed. Coordinates appeared on the screen over a map of the area, allowing the capability to accurately plot any physical locations deemed important.
also refer to be able to electronically trans- 
mit data between regional centers and or- 
ganizations rather than traveling through con- 
clict zones. Jordan discussed using v4 as a 
tool for improved quality management and 
organizational coordination activities. 
In the case of the Falkland Islands, the 
use of v4 will allow Argentina and the United 
Kingdom to coordinate and share national 
data for clearance efforts. Uganda’s 
United Kingdom to coordinate and share 
organizational coordination activities. 
whose data collection efforts were dis- 
sissed during the conference, which described the 
results of pilot tests that began in the fall of 
2005. Both, data from various govern- 
mental organizations was entered into 
v4 to be organized and compiled for 
protections activities. Colombia reported that 
v4 provided the necessary decentraliza- 
tion of information management by allow- 
ing the program and forms to be specialized 
and changed for each region’s needs; it was 

also referred to as being directly transferred from 
the EOD IS-SURVEY and observed the recently 
collected data were noted as important and 
useful. 

As the pilot test results from five 
countries reinforced the potential that v4 has to 
address a variety of different mine-action 
situations with its new mobile, custom- 
bable and innovative features. The GICHD 
distributes IMSMA software at no charge and 
provides on-site training for its use. GICHD 
staff can transfer all data from earlier versions of 
IMSMA to v4. New or updated equipment is 
not required for v4 and users do not need to pur- 
chase GIS software or licenses in order to use 
the mapping features. The GICHD, in col- 
laboration with FGM, Inc., the University of 
Kansas and the Swedish Explosives Ordnance 
Disposal and Demining Centre have applied 
their efforts to create and not just update versions 
of IMSMA, but a different and in- 
novative one. 

Conclusion 
Some of the changes in v4 offer poten- 
tial improvements in mine-action informa- 
tion management by allowing flexibility, 
creativity and linkage of different systems in 
IMSMA. The integration of a fully func- 
tional GIS into the system allows users to 
navigate the database using the map rather than 
working directly in the database itself. Combined with the direct transfer of 
data to IMSMA from the EOD IS-SURVEY 
software, users will find that IMSMA v4 can 
reduce data-collection efforts, speeds up the 
integration of new data from the field and make it easier to visualize the threat 
situation in a country or region. The updated 
v4 allows for new languages, the freedom to 
create and modify forms and reports, and the ability to combine and link data in ad-

Conference participants practice using the EOD IS-SURVEY and laser binoculars in an outdoor demonstration.
Mine Victims Needs Assessment and Assistance Coordination

A UNICEF feasibility study conducted in early 2001 showed that medical and surgical facilities in Azerbaijan are adequate to meet the immediate needs of mine survivors. In general, physical-rehabilitation facilities are also considered suitable; however, the lack of psychosocial support to assist mine survivors with a disability is of particular concern. The study concluded that an integrated and comprehensive assistance program could not be established for the mine victims of Azerbaijan until a needs assessment was completed. In response, Azerbaijan planned and conducted a national survey to assess mine victims’ needs, including prosthetic, social and economic needs, as a first step to developing national mine-victim-assistance priorities and programs. The results of the assessment are discussed in this article.

In January 2001, UNICEF Mine Action Coordinator Telnaz Danuoz conducted a national mine-action feasibility study in Azerbaijan, which highlighted the need for comprehensive mine-victim assistance. Since then, the Azerbaijan National Agency for Mine Action has been developing mine-victim assistance and implementing MVA-related activities. ANAMA’s strategy involves combining the efforts of national and international organizations in ensuring disabled people as well as in developing and implementing a long-term MVA strategy for Azerbaijan. The Countrywide Mine/UXO Assessment Survey project was initiated in 2001. The project’s objectives included establishing an extensive database, developing a well-articulated strategy and creating an effective network of relevant stakeholders in MVA. The project was funded by the European Commission. An MVA working group was established to complete the project planning, design and implementation phases. The working group consists of representatives of relevant ministries, governmental agencies, and national and international non-governmental organizations.

The working group thoroughly discussed project-related issues and predistilled partner organizations for the implementation phase. These discussions also encouraged ANAMA to conduct a pilot survey in the Fundi district. The project’s results became part of the data of the MVA Assessment Survey. The working group will continue coordinating future surveys results.

The International Eurasia Press Fund was chosen to administer and lead the survey as this NGO has considerable experience in conducting surveys in Azerbaijan. Representatives of three other NGOs actively taking part in the MVA working group—Drehtdar, Shefigh Elker and Babakalah—were also involved in this survey.

The Ministries of Defense and Domestic Affairs supplemented preliminary information on mine/unexploded ordnance (UXO) victims in addition to data from ANAMA’s Information Management System for Mine Action database. The local branches and local authorities of the Republic Military Communication also provided information on mine/UXO victims. The Ministry of Health and the Ministry of Labor and Social Protection of Population actively facilitated arrangements related to the survey.

IMSMA and an MVA Assessment Add-on

Data on almost 2,300 survivors was extracted from about 70 different source lists. The most comprehensive list was from the countrywide IMSMA database, although much of this information was already outdated. Unfortunately, media announcements failed to attract participants who could offer additional information about mine/UXO victims.

In addition to information gathered to answer the standard IMSMA form, which is mainly focused on details of each incident and emergency medical care provided, an MVA Assessment Survey questionnaire gathered comprehensive information on the needs of survivors for medical and psychosocial care, physical and vocational rehabilitation, economic assistance and aid, as well as for education, training and sports.

Consequently, the incident details and needs of 1,883 mine survivors were entered into both the standard IMSMA incident casualty report and another related Microsoft Access database for the additional comprehensive questionnaire data. This new database consisted of seven tables for medical care, physical rehabilitation, social adaptation, economic assistance, professional rehabilitation, education and sport needs, and additional information, which mainly reflects economic status of the survivor. The data was prepared as tables and charts, which were analyzed and summarized. This Access add-on database is related to the various tables in the IMSMA database and further relations can be added if necessary.

Technical assistance was provided for the MVA Assessment Survey to develop the special add-on to IMSMA, ensure accurate data entry, check quality, and extensively review and analyze the data. Together with the information already stored by IMSMA about devices, general survey victim data and impact data from the Landmine Impact Survey, this add-on included multiple references of the newly gathered victim data and identified needs. A special Geographic Information System function was introduced to allow the team to present all the data according to geographical distribution as well.

Capacity Developed

As a result of the project being implemented, 15 people were trained in survey procedures and interviewing techniques; 10 of them gained wide experience in the practical application of this knowledge. Seven people learned the data-entry process, having been introduced to it through IMSMA and Microsoft Access. Shamil Vagnani, ANAMA Mine Information System Supervisor, developed various themes with IMSMA’s Geographic Information System function to represent the spatial data. Extensive expertise was attained in multi-criterion data analyses as well as finding patterns, correlations and conclusions from the responses to the different survey questions. Some results of the Countrywide Mine/UXO Victim Needs Assessment Survey are presented below.

MVA Assessment Survey Results

Medical care. Surgical intervention needs were assessed in 1,973 cases. Fragment extraction accounted for the greatest number of their interventions (544 cases). Some expressed a need for additional surgery, including 21 operations on residual limbs. Eighteen people emphasized their need for plastic surgery.

Medical treatment or consultation with specialists was also a predominant need. The need for a neuropathologist was mentioned by 1,552 people. A visit to a traumatologist was requested by 850 people.

While 802 people required the services of a general surgeon, just over one-seventh of this number—127 persons—actually needed surgical operations due to recent mine/UXO trauma. The rest were suffering from age-specific problems after the incident, such as body growth or shrinkage.

To the special add-on to IMSMA, 632 persons expressed their need for other specialists. It became clear that there is a need for ophthalmologists (seventy), ophthalmic (eye) surgeons and especially orthodontists (thirty-five).

Physical rehabilitation needs: limbs.

Total prosthetic needs were assessed as follows:
- 605 forearms (620 persons, of which 220 required prosthetic devices)
- 65 arms and 172 hands (215 persons, of which 53 required prosthetic devices)
in sign language and lip reading or additional technical means of communication. At the same time, there were many people with other losses and injuries also in need of adaptation due to hearing entervation from mine/UXO trauma.

The same situation occurred with eyesight adaptation, 132 people reported eyesight problems resulting from mine-related accidents. Of these, 111 people reported loss of sight. Forty-nine mine/UXO survivors totally lost vision in one eye and 20 lost all vision. Social adaptation for this category of disabled people requires specific training and equipment.

The social adaptation section of the questionnaire opened new prospects for related activities. Namely, 708 survivors indicated an interest in providing mine-risk education, 693 would have liked to participate in victim support groups, 625 offered to provide personal care, and 706 considered such a need to be a problem for the disabled. These results reflect a great desire for such an association to help create special social adaptation issues, and they should be kept in mind while developing mine-victim-related projects.

Economic assistance. This section of the questionnaire consisted of two distinct parts that could be named “support” and “assistance.” The support area identified daily needs for help. The assistance area asked the question: “What would be of help to you in economically reintegrate into society?”

Answers also were twofold. A great majority (1,204) of the 1,819 who answered this section needed money for medical treatment. Many people (941) expressed a similar need for medications. Cars and housing services were desired forms of assistance for 316 and 1,081 persons, respectively.

Help with starting a business was noted by 1,428 people who dreamed of running their own businesses and would have appreciated startup loans to make that possible. Raising livestock, plant husbandry and establishing small enterprises to meet local needs were the main types of businesses that 949 respondents wished to initiate.

Needs for prosthetic and assistive devices are outlined in Table 1. Prosthetic adaptation. Forty-one people reported a loss of hearing, 10 of whom experienced problems in both left and right sides. But only 25 of the 41 expressed their need for hearing-aid equipment, training and hearing tests.

There were 445 respondents who were currently employed at the time of the survey. The most common professions were drivers (29 respondents), farmers (26), agronomists (24) and teachers (20). The rest of the 3,862 respondents were registered as disabled or on pension. As the interviewees were mainly inhabitants of rural areas, livestock-raising and plant husbandry were the prominent professions. Respondents indicated they would like to do in the future if possible—839 and 570 persons respectively. In industrial professions, a preference for future employment was given to a driving profession (533 persons). Education and sports. In total, 1,787 people answered the education questions. Of the 739 respondents who wanted to take courses, the majority were interested in computer courses (433). Another 199 were eager to learn foreign languages and 107 considered accounting a good subject to start for future. Finally, 208 persons expressed a desire to continue their education in universities.

Of those who answered the sport questions (1,877), table games were the most preferred (807) if proper rehabilitative care was received. Land and raw materials, facilities and equipment, startup capital and specific education would be a great help for this category of mine/UXO survivors.

Professional rehabilitation needs. The survey section about professional rehabilitation needs contained more questions than any other single section in the questionnaire; 1,862 people answered questions in this section. Of these, 1,324 gave information about their previous professions: 343 persons had a profession that required higher education; 442 persons had been manual laborers. Of the 1,862 surveyed, only 82 people who had jobs before the incident said they had jobs at the time of the survey.

Average salary $100
Minimum consumer basket per person $75
Minimum expenditure per working person $85

Table 2: Average salary and minimum cost of living per month estimates in U.S. dollars.

CIVILIAN MINE VICTIMS. Of the 1,883 mine victims, 1,510 persons were members of the military or were civilians working with the army or militiam at the time of their incidence. For the other 373 civilian casualties at the moment of incidence were tending to animals and plants—85 and 73 persons, respectively. Forty-three persons were doing household chores and 32 people were playing or engaging in recreational activities when the incident occurred. Only three people stated that they were tamping with devices. Eighteen people were collecting firewood or waste, 13 were traveling and two people were hunting. Ninety people did not reveal the circumstances in which they were injured by mines or UXO. Six persons were policed on law enforcement duty and one was involved in humanitarian mine clearance. Seven people did not classify their activity at the moment of incidence.

There were at least 1,428 people who dreamed of running small enterprises to meet local needs. A total of 1,264 people answered the question about pension recipients. Of them, 231 were first-degree, 882 were second-degree and 310 were third-degree. Another 375 people were receiving a pension but were not classified with a disability degree.

Unemployment. Of the 3,862 people interviewed who answered this question, 1,397 of them had no job. The greatest unemployment found among interviewees is shown below.

- Baku city: 293 of 882
- Sumgayit city: 51 of 57
- Ganja city: 47 of 54
- Tovuz district: 148 of 213
- Goradiz district: 105 of 354
- Towar district: 61 of 67
- Aghafta district: 24 of 84
- Gazakh district: 55 of 87

In analyzing the unemployed mine/UXO survivors, the researchers found 206 were of the first degree, 780 of the second degree and 99 of the third degree of disability. 312 people with no job had no disability degree.

Monthly Personal Income

According to the Azerbaijan Free Trade Unions Confederation, per-month earning and minimum cost of living estimates by experts at the time of the survey were shown in Table 1. A total of 1,264 people answered the question on their personal income. Income varied from US$354 to $2,520 per month, and 90 percent of interviewees earned a much lower-than-average salary. Eighty-five people had an income in the range noted and only 48 people had a higher monthly income. A total of 98 people had an income less than the minimum salary mandated by law ($20 per month at the time of the survey).

Monthly family income. In 1,605 cases of the 1,883 surveyed, the respondents provided answers on the question of family income. It appeared that 167 families had an income less than the minimum salary mandated by law. Monthly family income exceeded $200 in only six cases, an amount at the higher end of income distribution.

In many cases the disability pension of the mine victim was a big portion of a limited income. Since the unemployment rate was very high, the other sources of income were the pensions of other family members and, in some cases, additional allowances provided for children who were disabled or pensioned, or other reasons.

The highest incidence of families with an income not exceeding 300,000 Azerbaijani manats per month (at the time of the survey) were found in the districts of Tovuz (168 of the 184 that answered), Ganja (76 of 85), Aghafta (56 of 67), Goradiz (148 of 78) and Towar (61 of 67) and in Baku (320 of 385) and Ganja cities (43 of 50).

Distribution by age. Of a total 1,388 interviewees, 1,275 people had information on the incident date and the distribution by age was considered to be applicable only for them. Several years had passed since many of the respondents’ mine incidents. As they aged, they experienced health problems related to the incident as well as additional complications from their economic condition. In addition, their situations became much harder due to the onset of other diseases.

This mine victim, interviewed during the survey, was a child when his accident happened. He now lives in a orphanage.
Most of the losses and injuries of civilians arise due to negligence and carelessness. Civilisans involved in non-military activities accounted for 103 of 143 cases with loss of an arm or hand, eyeight or hearing and 43 of the 192 cases of lower limb amputations. In some cases, civilians were tampering with explosive devices and in other cases they were crossing into restricted areas. It can be concluded that in a number of cases civilian casualties resulted from treating explosive ordnances carelessly.

Recommendations

The main recommendations derived from the survey are as follows:

• Further coordination of mine-victim assistance activities: Activites of various governmental and nongovernmental entities should continue their joint efforts within the MVA working group, ensuring concerted efforts toward sensitizing society to the problems of mine victims and persons with disabilities in general.

• Development of MVA projects and identification of implementing agencies: For projects developed using the needs-assessment-survey data, the emphasis should be on projects empowering the community, e.g., through establishment of associations for mine/UXO victims.

• Establishment of a charitable fund for MVA: Acting within the Azerbaijani legislative framework, a charity should be established to attract money from national and international organizations and individuals to fund various MVA projects.

• Monitoring of the level of mine/UXO victim assistance: For each victim, the level of medical and physical rehabilitation measures, together with the degree of social reintegration and professional rehabilitation, should be evaluated over the course of a year using various methods. Articles about MVA should be published in international and national journals, newspapers and magazines whenever possible to continue educating the public on mine victims in Azerbaijan.

J. M. Aliyev

Aziz M. Aliyev graduated in 1973 from the Azerbaijan State University and worked as a theoretical physicist in the Institute of Physics (Baku) until 1984. He has led the Information Department of ANAMA since May 2000 and is involved with the Mine Risk Education-Cell and Mine Victim Assistance function. The Department maintains the MAFA and GIS with the data from six years of operations and various surveys.

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effects of landmines on Sri Lanka

In Sri Lanka, statistics show people between the ages of 20 and 45 are the most likely to be injured by landmines. When they are disabled, they become a burden to the country’s economy, requiring assistance instead of contributing to the country’s growth. This article discusses how landmines affect Sri Lanka and the efforts being undertaken to lessen their impact.

by K.T. Mamiya Udayangha Hemapala | University of Genova

The Tamil people moved from the southern part of India to Sri Lanka around the 14th century and they struggled with the kingdom of Sri Lanka on and off throughout history. Since 1983, a Sri Lankan separatist group, the Liberation Tigers of Tamil Eelam, has fought with the central government of Sri Lanka for a separate homeland for minority Sri Lankan Tamils. The decades of conflict have resulted in the destruction of large areas of fertile agricultural lands, commercial areas, residential areas, roads and water resources. As a result, people tried to resettle these areas, they encountered landmines and many became disabled.

Mine Ban Convention

The Sri Lankan government has not signed the Antipersonnel Mine Ban Convention.2 Both the government and Tamil Tigers formally committed to a ceasefire in 2002.4 However, there has been a sharp increase in violence since President Mahinda Rajapakse came to power in November 2005. Government security forces are currently engaged in a limited operation in Trincomalee to remove the Tamil forces that wereinezed by the Tamil Tigers. It provides water to over 15,000 families and approximately 30,000 acres of paddy lands in the Werusal, Murur and Ezhalamputu areas in the Trincomalee district. According to government sources, the Mandara area was heavily mined by LTTE forces in an attempt to slow Army progress.5 According to the Landmine Monitor Report for Sri Lanka, there still are 701,000 anti-personnel mines in the ground.6

Mine Clearance

Mine-clearance activities have expanded greatly since the February 2002 ceasefire. The HALO Trust, Tamil Rehabilitation Organization’s Humanitarian Demining Unit, Mines Advisory Group, Norwegian People’s Aid, Fondation Suisse de Déminage, the Sri Lankan Army and BONCOS Consulting Corporation are engaged in demining work in Sri Lanka.7

Currently, there are three main approaches to humanitarian mine clearance in Sri Lanka:

1. Manual clearance—an effective but slow process.

2. Manual clearance with support of mine-detecting dogs—a good method but very difficult in some areas, because the dogs can become confused if they smell explosives coming from several sources at once.

3. Mechanical clearance—the fastest method, but less effective. The speed of manual demining is approximately 25 square meters (30 square yards) per hour. Using explosives-detecting dogs is also a rather difficult process because the effectiveness of the dogs depends entirely on their level of training and the skill of their handlers. Also, all EDDs are brought from foreign countries and are not used to the Sri Lankan climate, so they tire quickly.

Mechanical mine clearance is the fastest method employed in Sri Lanka. The MV-4 Mini Flat System has an average speed around 2,000 square meters (2,400 square yards) per hour for light soil and 1,000 square meters (1,100 square yards) per hour for heavy soil. The Bofors 6 clears around 2,500 square meters (3,000 square yards) per hour for light soil and 500 square meters (620 square yards) per hour in heavy soil.

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Journal of Conventional Weapons Destruction, Vol. 10, Iss. 2 [2006], Art. 1
The other most important factor concerning demining efforts in Sri Lanka, after speed and efficiency, is cost. Table 1 shows the factors that affect the costs of manual demining and mechanical mine clearance. By comparing Table 1 to Table 2, one can see the operating costs of demining machines is less than that of manual demining. However, the most problematic element in mechanical demining is the initial capital expenditure on the machine itself. Sri Lankan technicians are not familiar with the technology behind the machines mentioned above; therefore, after the warranty period, maintenance costs will be high because the machines will require specialists to fix them and the parts are difficult to find.

Conclusion

When considering the challenges of demining in Sri Lanka, it is vital to understand the importance of developing new technologies or introducing existing current technology to improve the efficiency of the task—only with proper training. Humanitarian-demining efforts in Sri Lanka are daunting, not only the threat in the ground but also the tense situation between rebel groups and the Sri Lankan government as well. See Endnotes, page 111

Cost for manual demining

<table>
<thead>
<tr>
<th>Average cost per deminer</th>
<th>$US10,000/year</th>
<th>Daily working hours</th>
<th>6 hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Speed of a manual deminer</td>
<td>25 m2/h</td>
<td>Working days per year</td>
<td>240 days</td>
</tr>
<tr>
<td>Specific cost of manual demining</td>
<td>$US10,000 / 6 hours/day x 240 days x 25 m2/h</td>
<td>($US28,200/m2)</td>
<td></td>
</tr>
</tbody>
</table>

Table 1: Factors that affect the costs of manual demining.

Cost for mechanical mine clearance

| Investment cost for MV-Mini Flail System | $US3,18,000 |
| Fuel consumption | 12 liters per hour |
| Area demined per day | 1,500 m2/h x 12 hours per day x 240 days = 3,6,00,000 m2 |
| Cost of fuel | US$ 1 per liter |
| Operating cost per year | ($12 liters x 12 hours x 12 hour per day x $1 per liter x $10,000 = $44,500) |
| Specific cost of mechanical demining | $44,500 / 1,50,000 m2 = $0.01/m2 |

Table 2: Costs for mechanical mine clearance in Sri Lanka.

The Mine Action Society Formed in Kurdistan

Although a Mine Action Process began in Iraqi Kurdistan more than a decade ago, a considerable threat from landmines and unexploded ordnance remains in the region. Committed and qualified professionals have been working to reduce the impact of the threat, often at their own peril, but a vacuum remained in terms of formal collaboration among these parties.

To address this need, the Fria Society for Mine Action Professionals was formed with the permission of the Ministry of the Interior. The Society works to improve and enhance the working conditions of demining personnel in the region. All mine-action personnel working in the region are encouraged to join by registering their names with the Society. For more information, contact Jamal Jalal via e-mail at Jamal.Jalal@minac.org or jamaljalal@minac.com or by telephone at +964 61 3248 455 8509.
Mine Action Priorities for 2006

The priorities for 2006 support the implementation of the Comprehensive Peace Agreement and efforts for a peaceful resolution of conflict throughout the country, and promote effective and sustained humanitarian assistance. These goals will be achieved through:

- Supporting the development of government and community institutions and capacity;
- Supporting the expansion of the delivery of basic social services;
- Assisting with a comprehensive response to HIV/AIDS;
- Supporting conflict management and reconciliation;
- Supporting comprehensive livelihood programmes;
- Supporting and providing voluntary return and reintegration of displaced people;
- Supporting the implementation of a national demobilisation, disarmament and reintegration programme;
- Providing humanitarian assistance for vulnerable people;
- Supporting the promotion and protection of human rights and the rule of law.

National Planning Assumptions for 2006

The U.N. Country Team and Work Plan Team formulated the following national planning assumptions to guide planning for 2006:

- All Comprehensive Peace Agreement mechanisms will be in place: The Government of National Unity, Government of Southern Sudan and state governments will be established.
- GNU, GoS and local government institutions will be harnessed to financed capacity building.
- International assistance will begin to shift from humanitarian to recovery and development throughout the year.
- The gap between needs and service delivery will remain.
- Peace agreements will be in place in the eastern and Darfur planning regions by the end of 2005 or in 2006 to be followed by improvements in security and the ability to support humanitarian, recovery and development assistance.
- Localised conflicts will remain and could escalate as a result of inequitable distribution of resources and/or political/economic/religious tensions.
- Large-scale returns will take place throughout the country, particularly the movement of IDPs from one area of South Sudan to another.

Mine-action sector priorities. The United Nations and Partners


Mine Action priorities were developed using the MASF process. The priorities are also closely related to the objectives contributing to the MASF. As part of the comprehensive planning process, the programme sought to ensure that the mine-action support services and information management can develop internal operational plans to support planned activities.

- Information management: Establishing an efficient and effective information management system in support of UNMAO mine-action operations through:
  o Institutionalising the Information Management System for Mine Action as the information management system within the Sudan Mine Action Program through the implementation of information management policy and training.
  o Developing and maintaining a fully functional IT infrastructure to provide networking and inter-networking capabilities at UNMAO headquarters, regional offices and sub-offices.

Landmines Affect Civilians and Military Forces

Landmines in two of the most heavily mined countries in the world, Afghanistan and Iraq, pose a constant threat to local populations. In 2004, the U.S. Campaign to Ban Landmines cited 261 Iraqi injuries or deaths from landmines. In the same period, 895 Afghans were injured or killed by landmines.

The landmine contamination also seriously affects United States Armed Forces serving in Afghanistan and Iraq. A fact sheet prepared by the USCBL cited 75 American casualties in Iraq and 59 in Afghanistan since 2001. The accidents have resulted in 35 deaths total.

Conclusion

The planning process in Sudan is an inclusive, proven and holistic approach that aims at developing various planning tools that are linked and consistent with each other. The process is driven by the MASF and national and regional stakeholders. From these priorities, the MAP and Work Plan follow, developing projects in support of the objectives contributing to the MASF.

While these objectives relate to the pillars of mine action with either a humanitarian or recovery focus, they do not make explicit provision for the definition of the objectives and information management. It was decided that three “internal objectives” would be added to ensure that the mine-action support services and information management functions consider the internal operational plans to support planned activities.

-」「Landmine action prioritises through capacity-building.

The process takes into consideration input from all mine-action implementing partners, local authorities and setting of priorities to relieve suffering more effectively and efficiently.
Information Management System for Mine Action in Sudan

by Mohammad Kabir (United Nations Mine Action Programme in Sudan)

The Information Management System for Mine Action is a globally used and internationally accepted database and software system that allows mine-action programmes to efficiently correlate and evaluate information. In addition, IMSMA provides powerful tools to rapidly disseminate information on hazardous areas and other important aspects of mine action by providing digital as well as printed maps and reports.

All U.N. mine-action office and Operations and Quality Assurance Officers in Sudan are equipped with an IMSMA system capable of receiving, analysing and displaying many types of data ranging from minefield locations, clearance operations and mine-risk education activities to agricultural, cultural development plans and movements of internally displaced persons. Following the successful establishment of an IMSMA facility at the United Nations Mine Action Office in Khartoum in April 2002, the Northern Regional Mine Action Office in Kaudhej in August 2002 and the Southern Regional Mine Action Office in Juba in March 2003, a substantial amount of data concerning suspected and actual mined areas, mined roads and landmine victims was collected and entered. A large amount of information on activities and potential threats, unexploded ordnance locations, ammunition dumps and the opening of humanitarian corridors has been collected and recorded during the last two years of operations.

Subsequent collection and analysis of the information demonstrate how the landmine threat in Sudan has a significant and negative impact on the affected area by restricting the access routes of the U.N. Mission in Sudan and also access of humanitarian aid and relief populations.

Mine-action operations in Sudan have been enhanced and standardised by the potential for adding support tools to IMSMA.

Support tools for capturing data on road assessment, minefield locations, landmines, deminers, humanitarian assessment and mine-risk education activities were designed in-country. Some of these tools have been shared with other countries such as Afghanistan, Sri Lanka and Mozambique. The data captured has enhanced the information flow and increased the pace of the mine-action activities.

The information-management policy documents, specifically tailored to the nature of Sudanese mine-action operations, is a document supporting the systematic and methodological procedures of information management in the mine-action programme. This document explains the modules used in IMSMA and its supportive tools, the information flow in the Sudan Mine Action Programme, responsibility of the individual for information flow and other relevant data-management issues.

A training curriculum for the operational use of IMSMA has been developed for the Sudan MAP. The training curriculum includes all the topics that are used for data management at the operational level, such as planning and other management issues.

IMSMA is used in Sudan as an operational tool to this end, comprehensive training was conducted in two sessions, one in Khartoum in October 2005 and the other in Rumbek in February 2006, for the Operations and Quality Assurance Officers on the use of IMSMA. The training brought great changes in the information flow and reporting procedures. IMSMA is widely used within the programme in day-to-day operational activities, planning and other management issues.

All mine-action offices in Sudan can produce IMSMA output, such as maps, graphic presentations and data for planning, to educate people about the impact of landmines/UXO and to reduce the risk associated with mines, an interest broadly shared by the U.N. community, aid organisations and other interested parties.

The information-management section is working closely with United Nations Mission in Sudan, the World Food Programme, the International Organisation for Migration, the U.N. Joint Logistics Centre and the U.N. Commission on Human Rights to develop a common system (not IMSMA, but compatible with it) that can facilitate integrated planning for humanitarian interventions in Sudan. In particular, this system could assist with tracking internally displaced persons/refugees and anticipating their movements and proximity to known/suspected mined or dangerous areas.

See Endnotes, page 112
Update from UNDP

Iraq: The Victorian Surveillance and Victim Assistance Workshop was held August 27–31, jointly organized by the National Mine Action Authority of Iraq, the United Nations Development Programme, UNDP, and the United Nations Office for Project Services for the United States for Centers for Disease Control. The event facilitated policy coordination among NMAs and key ministries with a view to increasing responsiveness and effectiveness of VMUs. A major output of the event was a Plan of Action that responsible governments agreed to.

The Iraqi Landmine Impact Survey is complete, covering 15 of the 18 governorates. Landmines or unexploded ordnance contaminate 2,117 communities or about 17 percent of the total visited; the majority of the contaminated communities are blocked from the productive use of their land. The surveyors documented 377 recent victim incidents. More than 2.7 million people live in these contaminated and impacted communities.

Under the field operation for the Centre and Demining Group, 10 national explosive-ordnance-disposal teams improved the safety of more than 300 farming families and more than 24,100,000 square meters (5,955 acres) available for agricultural use in the Baar region. This was accomplished through the disposal of more than 50,000 explosive items along with the clearance of 24,214,696 square meters (5,984 acres) from May 2005 until the end of July 2006.

Key objectives include:

• Make the national capacity of NMAA fully functional through its restructuring, policy advocacy and technical support
• Prepare the framework and institutional capacity of Iraqi Kurdistan Mine Action Centre and General Directorate of Mine Action
• Strengthen the capacity for Iraq to sign the Anti-personal Mine Ban Convention

Key challenges included the deteriorating security situation in central and southern Iraq.

These achievements have been realized through financial support from the European Commission and the governments of Japan and Japan. For 2007, the governments of Greece and South Korea will provide additional support through the Iraqi Trust Fund for the de- contamination of Iraq. Full support for the management, coordination and technical capacity of Iraqi Kurdistan Mine Action Centre and General Directorate of Mine Action is planned.

Reported $15 million in confirmed and unconfirmed pledges through the Voluntary Trust Fund, which does not include funding for OEE 2006-2007. The UN Mine Action Team will continue to update donors on resource requirements, which are evolving as the full scope of the problem becomes clear.

Update from UNICF

Colombia. Key achievements in Colombia were as follows:

• The dismantling of the mine action and humanitarian component of the NMAA.
• TheTrip marks the first time that the NMAA has established its own own action plan and budget, and UNICEF has worked closely with the management, coordination and technical capacity-building workshops in Montes de María within the joint UNICEF-UNDP project.
• The Department of Mine Victim Assistance was given legal status.
• Training and follow-up took place with municipal local points for AICMA within the project with the governments of Antioquia and 24 municipalities.

The national reform of the VA legislation is ongoing. Key challenges include:

• Ensuring the sustainability of mine action at regional and municipal levels.

• Strengthening mine victims’ medical assistance at the emergency level and in long-term assistance.

Key objectives include:

• Strengthening the Mine Action Team of Montes de María by addressing gaps and building capacity for mine action in the region.
• Evaluating actions carried out in all three regions during 2006.
• Developing annual mine-action plans for 2007–2008 in all three regions.

Update from UNICF

Cambodia. In Cambodia, UNICEF continues to provide financial and technical support to national mine-risk-education, community-based-mine-risk-reduction, reconstruction and socioeconomic development plans. In order to accomplish this goal, the following must be attained:

• Support for a national mine-risk-education programme to children and women of landmines/UXO and other mine-affected communities.

From July-August 2006, 25 shelters were reported by the Cambodian Mine/UXO Victim Information Program. Bringing together related functions to better track and effectively manage these costs. Cost-effectiveness will also be partially achieved through the national Technical Survey and institutional enhancement plans by the National Demining Office.

• Focus on management and coordination capacity of the National Demining Office and the International Support Group to integrate mine action with other sectors and to generate resources.

Key challenges included the eruption of conflict in July 2006 in Lebanon, which has escalated the mine problem. At the time of writing, the number of UXO victims who were not yet fully identified, UXO has caused more than 300 deaths and missing people in the first six weeks after the cessation of hos- tirties (August 14, 2006) than in the previous four years combined. The majority of the contaminated communities are blocked from the productive use of their land.

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The majority of the victims are between 14 and 49 years old, and most of them were holding when the accident happened. Out of 582 contaminated communities, 41 percent have primary schools in the vicinity of contaminated areas, indicating that children are still at risk of landmines and UXO. The project was implemented by the General Directorate of Mine Action, which is the regional mine-action center for Sulaymaniyah governorate. Lao PDR, UNICEF has been working closely with Minas Advisory Group since June 2006 to conduct a UXO risk-assessment study. A stakeholders meeting was organized at the end of September to discuss the findings and recommendations.

In total, 1,312 adults completed a Knowledge Attitude Practice questionnaire, of which 54 percent were men and 46 percent were women. UNICEF and MAG selected a research team to have focus-group discussions with 14 groups of men and 12 groups of women. A total of 720 children over eight years of age completed the KAP questionnaire (495 boys and 225 girls), and the research team held 38 focus-group discussions with children, using UNICEF ethical guidelines.

The study distinguished between intentional (i.e., voluntary) exposure to live ordinance, in which actors aware of the risk purposely exposed themselves to live ordinance, and unintentional (involuntary) exposure. While some of the prevention activities may be the same, unintentional exposure is an important variable and particularly relevant in Laos, where UXO injury due to intentional exposure to live ordinance (for example, through the deliberate tampering of ordinance for the scrap-metal trade) is increasing. The assessment found a generally high level of UXO awareness and knowledge of risk-taking and risk-reduction behaviors; however, the assessment also found that many people, including women and children, continue to voluntarily interact with live, or potentially live, ordinance on an almost daily basis.

The findings from the study will be used in collaboration with the recently established UXO National Regulatory Authority to inform MRE strategy development as well as the development of new messages for at-risk populations—especially children—who are attracted to scrap-metal collection. The UXO Needs Assessment data provides a unique opportunity to assist the government in taking the next strategic steps to develop appropriate messages and responses that more effectively target areas and people.

Upcoming activities include a four-day UXO Risk Education Strategy Planning Workshop to be conducted by staff from the Geneva International Centre for Humanitarian Demining, UNICEF and the Laos Youth Union. In addition, finalization of the UXO Risk Assessment as well as translation of the IMAS Best Practice Guidelines will continue. UNICEF will also give support to the Community Awareness Technical Working Group of the NFA for the first technical working group meeting. The UNICEF office is seeking new funding to expand support in its collaboration with the UXO NFA and the development of new risk-reduction strategies.

See Endnotes, page 112
Brazilian photographers Vinicius Souza and Maria Eugênia Sá provide a glimpse of hope through their camera lenses in Angola—The Hope of a People. After many years of mindless civil war, these 48 powerful black-and-white and color images capture both the “new face of Angola” and the hope of the people to create a new identity. In September and October 2002, Souza and Sá traveled to Angola in hopes of photographing the oppressed Angolan people in the streets of Luanda, the schools and hospitals of different suburbs, and in the refugee camp of Huambo. They encountered older people who were apprehensive of being photographed, fearing in whose hands the photograph would end up, and adolescents who would often and enthusiastically asked, “Hey, friends! Could you take a picture of us, please?”

Each photograph expresses the different facets of the Angolans’ lives: from families walking for days to wait in line for food donations from the International Committee of the Red Cross, to children bathing under bridge crossings despite the dangers of the ever-present landmines. The photographers’ unorthodox style focuses on the eyes and facial expressions of the subjects, rather than where they are or what they are doing, and offers a glimpse of who these people are and what they have been through. Despite their hardships, the Angolans wear smiles of strength and courage, displaying the true face of Angola.

For more information on the project and the photographers, please visit this Web site: http://mediaversus.stevens.edu.br.

RESEARCH & DEVELOPMENT

Tissue-regeneration Research

The Defense Advanced Research Projects Agency has awarded a US$1.7 million grant to the University of Pittsburgh’s McGowan Institute for Regenerative Medicine and a $1.2 million grant to the University of Massachusetts Lowell. The grant money will fund research into the structure and functions of lost or damaged tissues.

Researchers are optimistic that the knowledge gained will advanced studies into the possibility for tissue regeneration. The teams will investigate how tissues and cells in certain animals, like salamanders, allow for the complete regeneration of lost tissue. Researchers will begin the large, multi-center program by examining the cellular and molecular processes that allow for regeneration—while humans respond to injury with scar tissue, salamanders and similar animals develop progenitor cells that will eventually develop into specialized cells of bone, muscle, skin and nerves.

To a certain extent, humans already are capable to repairing damaged cells—liver and red blood cells self-renew—but are incapable of reforming whole limbs.

reviewed by Katie FitzGerald | Mine Action Information Center

Katie FitzGerald works as an Editorial Assistant for the Journal of Mine Action and is in her last year at James Madison University, where she is pursuing her Bachelor of Arts in print journalism.

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Explosive Harvesting Program

The Explosive Harvesting Program is a research and development program funded by the U.S. Department of Defense Night Vision and Electronic Sensors Directorate Humanitarian Demining Research and Development Program. The concept was designed by Golden West Humanitarian Foundation and is being jointly developed with the Cambodian Mine Action Centre.

Program Background

The Explosive Harvesting Program was designed to alleviate this problem. The effort mobilized as a joint project between Golden West Humanitarian Foundation and the Cambodian Mine Action Centre in March 2005 with the following goals:

- Develop a deployable, cost-effective means to remove explosives from munitions such as artillery, anti-tank mines and area munitions;
- Develop the methodology to convert the recovered explosives into neutralization and/or disposal devices for demining and explosive ordnance disposal teams.

The initial concept involved using three 6-meter (20-foot) International Organization for Standardization shipping containers incorporating all the equipment required to conduct operations. The local support would be fuel, water, and an unpopulated location from which to work.

Instead of building the system in a Western country and shipping it abroad, Golden West elected to construct and develop the system in Cambodia, imposing only those critical items that could not be found locally. The reason behind this approach is simple: research and development efforts designed in developed countries sometimes fail once they are sent to the field. The most common reasons are logistics and spare parts. By assembling the system in Cambodia, it is possible to avoid some of these issues.

EHP Cutting Equipment

Based on recognized technologies utilized in the remote cutting of unexploded ordnance, we used available data and selected two systems: the BHR/Dajdr Osprey hydro-abrasive cutter and the metal-cutting saw.

We first selected the Osprey cutter, but after using it in a production role, as opposed to an explosive ordnance disposal role, it was determined that hydro-abrasive methods were actually not well-suited. We then discovered that some organizations had adapted commercial metal-cutting band saws for remote operation and successfully used this approach.

We then examined mixtures of TNT and other commonly available main explosives. Compared with our previous tests, an increase in production capability was evident. The exact time varies with the projectile sizes and fillers; however, for processing stockpiled ordnance and converting it into disposal charges, the initial results show a 75-percent decrease in capital equipment costs with a 150-percent increase in production capability.

Figure 3: Measuring the temperature of the projectile casing and main explosive material following cutting.

The sustainability in remote locations is greatly improved and training requirements for local staff are minimal. This approach also eliminates the over-concerns of the hydro-abrasive system, and the hazardous waste stream of the production line is all but eliminated.

EHP Operations

Explosive recovery. Along with reducing the time required to cut a single projectile, our Cutting, Melting and Casting Manager improved the steam shaper used to extract the explosives from the ordnance casing. Compared with our previous equipment, these improvements reduced the time for extracting the explosives by over 25 percent. The exact time varies with the projectile sizes and fillers; however, a broad average for TNT-Composition B-loaded projectiles between 122 and 152 mm (%–inch) in diameter is now only three minutes. The explosives drop free from the projectile casing as a solid piece. Once the explosives have been allowed to dry and cool, they are weighed and inventoried.

Casting operations. As cast TNT is not suitable for standard blasting caps, the team has analyzed mixtures of TNT and other commonly available main explosive charges to cast an ideal individual charge and to make the recovered explosives go as far as possible.

For larger charges, brassieres with detonator cord kits are first cast, then TNT is cast over the brassieres, which ensures full contribution of the TNT. Maximum use is being made of locally available, low-cost containers that allow the permanent marking system to be employed for accountability and reliability tracking. Once marked, the individual charge can be traced back to the date it was made, who made it, and from what type of projectile the explosive was recovered.

Since 98% of the cutting is being done with locally available tools, the team has found that the time required to cut a single projectile is greatly reduced, leading to increased efficiency in the recovery process.

Figure 1: An early prototype of the 100-gram (3.5-oz) “caseless” charges produced by the EHP.

The detonating cord initiation system is cast into the charge, so the demining operator only has to attach a slinging cap to the free end. The red arrow indicates which end to place facing the target to maximize the effect of the blast.

Micro cartoon/Art. M. Davis

Figure 2: Two views of a USSR 122-mm OF-462 TNT-filled projectile as cut in half with the Diajet Osprey hydro-abrasive cutter.

Micro cartoon/Art. M. Davis

Figure 3: Measuring the temperature of the projectile casing and main explosive material following cutting.
Pressed TNT-fitted projectiles. Our team noticed a substantial difference between the texture and density of Russian and U.S. TNT. Working on a hunch, our Explosive Ordnance Disposal Supervisor created a detonator well in a small piece of Russian TNT for a standard blasting cap and tested it against a 20-mm (1-inch) steel window plate. It detonated with full contribution.

Research revealed that the Russian manufacturers used a process called “screw loading” for filling large-caliber projectiles with TNT. This makes what the Western technician would call “period TNT.”

This fact was not referenced in any of our manuals, however when this specific type of ordnance is available, the harnessing process becomes far simpler. The recovered explosive can be quickly converted into half-moon or wedge charges without complete recasting, producing disposal charges that are extremely well-suited for explosive ordnance disposal and demining operations. As of October 12, 2006, the Cambodian Mine Action Centre and The Halo Trust have destroyed over 5,000 landmines with these charges, repurposing a nearly 100-percent-success rate.

EHP Achievements

Stockpile reduction. EHP’s working relationship with the Royal Cambodian Armed Forces is excellent, and they are fully cooperating with the program, treating our overall stock of their excess ammunition for processing. This not only identifies a good internal source of disposal explosives to support the long-term dismantlement efforts in Cambodia, but it also lessens the ammunition-storage risks for the general public and reduces environmental damage caused by bulk demolition of ordnance.

FFE Metal. As of October 2006, nearly 6,000 kilograms (6.6 tons) of “free from explosive” metal has been returned to the RCAF. The empty shells are heat-treated for four hours, exposing the metal to temperatures exceeding 1,000°C (1,832°F). This procedure ensures all explosive residues are destroyed and that metal is completely safe to reuse. The modified band saw already reduced our size, weight and cost requirements; however, the steam generator was the other major item that required attention. The current unit is 4 meters (6 foot) tall, weighs 400 kg (1.058 lbs), and requires a 110-kVa generator (see Figure 7 on previous page). Other commercial units were not suitable, so our Caring, Melting and Casting Manager built a system specific to the EHP needs that runs from a 10-kVa generator.

The smaller steam unit and generator reduce the overall costs, particularly shipping and fuel consumption. Figure 8 (see previous page) puts this into perspective: the unit in the track is 10-kVs, which is suitable for the basic fly-away kit.

Overall cost reductions. With the recent developments, the capital expense and logistical support required to assemble and support a “fly away” version has substantially decreased. These price reductions have brought this specific version to a level that is cost-effective for nongovernmental organizations to procure the required equipment and train their personnel in its use.

The Future of EHP

There are still some development issues required prior to the EHP becoming a functional, cost-effective package. Recognizing this, the U.S. Army Night Vision and Electronic Sensors Directorate has provided funds to continue the research and development through 2006 to complete these tasks.

The team has already made exceptional progress on the development of a “fly away” version of the EHP. The intent is to develop a smaller, less expensive package to support and supply small units. This system is designed to fit into a single 8x10-foot (2.4x3-meter) ISO shipping container for sea/air transport, or sent by individual containers in other locations around the world.

Long-term goals. Working with the U.S. Department of Defense NVESD, the U.S. Department of State Office of Weapons Removal and Abatement has recently committed funds to expand its explosive-ordnance-disposal capacity of the program in 2006 and to support EHP basic operation in the Cambodian province of Kampot Chhng in 2007. Between the support of NVESD and WRA, the Golden West EHP team can continue training its CMAC counterparts in proper explosive identification, ordnance cutting, main charge removal and charge production while providing support and assistance to the demining, EOD, and stockpile-reduction efforts in Cambodia.

Given the success of the initial Explosive Harvesting Program, there is an opportunity to construct a second EHP site in Kampong Cham specifically designed for processing large-capacity air-dropped bombs and to field mobile “fly away” kits, as well as permanent units, in other locations around the world.

Australia Increases Aid to Middle East

The Australian government recently announced it will increase humanitarian aid for relief and recovery efforts in the Middle East by AU$103.5 million. This will bring the total funding by Australia to the region to AU$219.5 million (US$208.2 million).

Four U.N. organizations will receive AU$2 million (US$1.57 million) directly because they are actively involved in immediate recovery efforts in Lebanon.

• The United Nations Development Program will receive AU$500,000 (US$390,000) for the Quick Delivery-High Impact Initiative, a high-impact fund that helps repair infrastructure and make other improvements to the restoration of civil functions.

• UNICEF and the World Health Organization will each receive AU$500,000 in funding for medical and health programs.

• Finally, the U.N. Mine Action Service will receive AU$500,000 for the removal of unexploded ordnance.

UNICEF will also receive AU$1 million (US$780,000) for emergency health services in the Palestinian territories.

Further reconstruction assistance will be forthcoming as the governments of Australia and Lebanon coordinate efforts.
The ITEP Work Plan 2006 compiles all test and evaluation activities that will be carried out during 2006 by the ITEP member countries, either as single-country activities or as ITEP collaborative efforts. The following summary provides an update on collaborative test initiatives started during 2005 and continuing in 2006, including also some of the new test and evaluation efforts envisaged.

by Franciska Borry | International Test and Evaluation Program for Humanitarian Demining Secretariat |

The International Test and Evaluation Program for Humanitarian Demining has conducted trials all throughout the world, testing and evaluating detectors that will help in the area of humanitarian de-mining. ITEP has partnered with different organizations to follow through with these various trials. Current activities include the testing and evaluating of various metal detectors and metal detector arrays described below.

Test and Evaluation Activities

Systematic test and evaluation of metal detectors (ITEP Project 2.1.2.9) The first two of the three originally planned regional field trials (Dith, Mozambique and Croatia) to evaluate the current fleet of available metal detectors were carried out during 2005 by the Joint Research Centre of the European Commission in cooperation with several ITEP partners. The corresponding final reports are available at the ITEP reports website. The third and last regional trial was originally proposed by the JRC/TEC and then cancelled. The Bundesanstalt für Materialforschung und -prüfung took on the responsibility of running the remaining STEMID trial during October 2006. They were assisted by participants from Belgium, the Netherlands and the Croatian Centre for Testing Development and Training. This last STEMID trial was combined with another trial (ITEP Project 2.1.2.8), evaluating two different test sites for humanitarian demining.

Evolution of metal-detector arrays for humanitarian demining (ITEP Project 2.1.2.5 and 2.1.2.6) Two metal-detector array trials have been in the works since the beginning of 2006. The first project (ITEP Project 2.1.2.5), which started at the beginning of the year, is still ongoing, and the remaining tests will happen whenever the equipment becomes available. This project is carried out by Canada in collaboration with the Netherlands and Germany. It consists of an evaluation of several vehicle-mounted metal-detection arrays (Elonger, Minelab, Schiebel, Vallon) in a controlled environment based on the General European Normalization (CEN) Workshop Agreement on Test and Evaluation of Metal Detectors, and the procedures developed by the International Pilot Project for Technology Co-operation. The second project (ITEP Project 2.1.2.6), to be led by the Netherlands (partners still to be defined), aims at continuing this testing in less controlled conditions (different soil types) and in mine-affected areas. The latter project will probably start in mid-2007.

ISTHMIDS operational field trials and demonstrations project (ITEP Project 2.1.2.8) The three planned field trials that started at the end of 2004 have been finalized. The main objective of the trial, to evaluate the performance and suitability of the Handheld Stand-Off Mine Detection System (HSTAMIDS) dual-sensor detector in multiple humanitarian-demining environments, was fully accomplished. Trials were carried out in Thailand, Namibia and Afghanistan. A final trial report was expected to be released at the end of June 2006. In the course of 2006, Long-term Operational Evaluations of the HSTAMIDS took place in Cambodia (started in April 2006), Afghanistan (started in July 2006) and Thailand (started in September 2006). During these evaluations, the system was operationally employed as a primary and sole detector for extended periods (up to a year) by local deminers in minefields in a variety of environments and with varying levels of threat. Local demining entities are collecting data on system and operator performance and will provide periodic status reports.

Assessment of the dual-sensor detector HSTAMIDS in Cambodia (2005). Photo courtesy of A. Carruthers/GICHD


Test and evaluation of available dual sensors for humanitarian demining (ITEP Project 2.1.3.8) Germany, in collaboration with other ITEP participants (partners still to be defined), plans to conduct the testing and evaluation of available dual sensors to be used in humanitarian demining. The objective of the tests is to include all available dual-sensor detectors that may be employed in humanitarian demining and it should allow for comparison of a “state of the art” report. The project has been conceived in two stages. The first stage started in fall 2006 with the preparation of an optimal reliability test design for dual-sensor detectors. The first draft of the designed test protocol will be presented and discussed at the Bundesanstalt für Materialforschung und -prüfung/ITEP Workshop on Reliability of Minehounds in Cambodia (2005). A photo of the Minehounds in Cambodia (2005). Photo courtesy of A. Carruthers/GICHD

ITEP Workshop on Reliability of Minehounds in Cambodia (2005). Photo courtesy of A. Carruthers/GICHD

Assessment of the dual-sensor detector MINHEOUND (ITEP Project 2.1.3.9) Three long-term trials of the MINHEOUND dual-sensor detector began in the summer of 2005 and ran partially in tandem in Cambodia, Bosnia and Angola. The main objectives of these trials were to determine the reduction in false alarm rate when a dual-sensor detector is used in the minefield and to gather data on the performance of the MINHEOUND with respect to depth and soil type. Almost all ITEP participants were represented on-site as “ITEP invigilators” during one or more of the regional trials. ITEP invigilators observed the testing of the detectors carrying out the main trial from the required safety distance and implemented additional tests to acquire more data on the performance of the detector. All trials have now been completed. The trial report was published in October 2006, while the lessons-learned report is due for publication by the end of 2006.

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ITEP Workshop on Reliability of Minehounds in Cambodia (2005). Photo courtesy of A. Carruthers/GICHD

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Visor Scratch Repair and Prevention

Severe eye injuries occur in 30 percent of demining accidents.1 Visors are known to be effective personal protective equipment when worn properly, but deminers often lift or remove their visors because scratches, glare or fog make them hard to see through, or because they are hot, heavy and uncomfortable to wear.2 Addressing each of these specific design problems could increase visor use and prevent a significant number of debilitating injuries. This paper presents methods for preventing and eliminating scratches on demining visors.

Since deminers rely heavily on their eyes, they have a natural concern when their visors become scratched. Either they leave the visors down and work with impaired vision, which could increase the chances of an accident, or they raise the visors, which breaks standard operating procedure. It reaps their eyes and face vulnerable to injury in the event of an accident. The following scratch visor story is one of many in the database of demining incidents and victims:

“It was August 10, 2000, in Iraq. Work started at the site at 05:45. The Section Leader had been conducting his duties for three hours when... a detonator exploded. [...]”

The Section Leader in this story was a victim of a scratch accident. Scratches, even if minor, can lead to serious consequences if not properly addressed. The authors of this paper have attempted to address both the effectiveness of household remedies for scratches, and the development of new surface treatments that can improve the performance of visors. This work is part of a larger effort to identify and develop protective clothing and personal protective equipment for demining.

The situation described by the Section Leader is not uncommon. It is estimated that 30 percent of deminers lift or remove their visors when not working.3 The reasons for this behavior are varied, but include comfort, increasing visibility, and avoiding scratches.4 Addressing each of these specific design problems could increase visor use and prevent a significant number of debilitating injuries.

This article explains our research in enough detail for people in the demining field to experiment with our procedures and make informed decisions about whether the methods described can help increase the effectiveness, ease of use and longevity of visors. This paper focuses on two methods for improving and maintaining visor clarity. The first is to repair scratches in the visors using a heating process, and the second is to use a protective roll bar to prevent abrasive objects from scratching the visor. Even with increased longevity, visors need to be replaced regularly, regardless of whether they are scratched or not, because the plastic becomes embrittled from extended exposure to ultraviolet light during use, which can reduce the level of protection provided. The authors did not investigate the effects of UV damage to visors or the effects of the repair techniques on this type of damage.

Visor Repair
Visor scratches are typically made of polycarbonate, which is relatively soft and easily scratched. Scratch-resistant coatings are difficult to use in demining visors because they harden the material, making them more brittle and likely to fracture in the event of an accident. Scratch-resistant polycarbonate is also difficult to thermoform into a visor shape.

This is a problem of knowledg
...
From a cost perspective, the equipment needed is not expensive. The heat gun was purchased for $US70, which is roughly the cost of one or two visors. If the heat gun treatments doubled the life of a visor, the payback time for this equipment would be as short as the time to treat two visors. The process requires some training and practice, but this cost could be spread out over many visors. A drying oven is not required for repairing haze and minor scratches, it could be as basic as a kitchen oven. A more elaborate facility, with a drying oven and a technician, could perform more extensive repairs, and allow more badly scratched visors to be used.

Scratch Prevention

The alternative to repairing scratched visors is protecting the polycarbonate from scratching. A natural way to remove a visor during a break or at the end of the day is to place it face down on the ground, yet this repeated action could cause severe scratching. The addition of a wrap-around rigid bar or “roll bar” (see Figure fa on next page) shows the demonstrator’s field of view can prevent scratches resulting from contact with the ground and the transportation and storage of the visor (see Figure fb on next page). Several geometries and materials for a roll bar were tried. Promising results were achieved using round aluminum tubing bent into a square shape and fastened to the visor using the bolts that secure the headband. A strip of polycarbonate was found to be too flexible to reliably protect the visor surface, and other shapes, such as a rounded end, allowed the visor to rock back and forth when placed face down. Rocking is undesirable because the visor could come to rest against an abrasive object, or possiblyumble out of a demining lane.

The roll bar as shown is easy to form, weighs 80 grams (3 ounces), and provides a central ground clearance of three centimeters (1.2 inches). Demining equipment should not further endanger a deminer in the event of an accident involving a blast, so the roll bar was bent around a dummy using a 240-gram (half-pound) charge of 50 percent TNT and 50 percent PETN to simulate a blast mine. As a result of the explosion, the roll bar was pushed up to the top of the visor, but did not deform or details, which shows anchoring it firmly to the helmet base is a secure enough location and the bar does not add to the slenderness or debris hazard of the blast.

The roll bar has advantages over some other methods for protecting polycarbonate visors from scratches. For instance, a thin sacrificial layer of plastic can be placed over the basic shield visor. Once this layer becomes scratched, it is easily removed, doubling the life of the visor. However, this method introduces extra material through which the demonstrator has to see. Sacrificial layers are especially problematic if dirt or moisture becomes trapped between the layers. Also, as the sacrificial layer gets scratched, visibility gradually degrades until the layer is removed. The roll bar reduces scratching on any optical surface, whereas the sacrificial layer collects the scratches on a disposable surface. Legs protruding from the sides of the visor have also been implemented in the past. However, the roll bar offers a protective geometry for a wider range of surfaces and situations than legs.

MIT “Design for Demining”

The research on this project was conducted in the “Design for Demining” class taught at the Massachusetts Institute of Technology. The primary goals of the course are to teach students about product design, increase their knowledge of the complex topic of demining and have them create and deploy products that are appropriate for the demining community. When the students develop a product or process that changes the status quo, they distribute it by publishing the details in the public domain so the idea can be used on a wide scale as possible. Giving away intellectual property is a fast and effective alternative to the more conventional route of patenting and selling an invention.

We would like to thank the National College Innovations and Innovator Alliance, the MIT Public Service Center and MIT Edgerton Center for funding the class, Trevor Thomson of Security Devices Ltd. for supplying visors, Andy Smith for technical advice, and other MIT demining students that worked on visors—Harmut Gill, Anna Ranista, Bepi Jones, Jeremy Wallace and Amy Smith. See Endnotes, page 112.
Throwing Out Mines: The Effects of a Flail

by Ian McLean, Rebecca Sargisson, Johannes Dirscherl and Havard Bach | Geneva International Centre for Humanitarian Demining |

The authors discuss a study conducted on flail machines to prove the effectiveness of this technology in destroying anti-personnel mines.

Recent tests and trials on the clearance capability of flail machines have shown that if machines are adequately operated and the operating environment is favorable, flails are able to achieve clearance rates approaching 100 percent. However, some field operators have experienced clearance rates as low as 50–60 percent. The main reason for the discrepancy is that a proportion of aged mines have faceted detonation mechanisms. Having failed to detonate, some also remain apparent intact after flailing. When found by quality-assurance teams, these mines are reported as missed because examining their firing mechanism is time-consuming and dangerous. The resulting under-representation of clearance capability suggests that flail machines should only be used as ground preparation for subsequent denuming, a conclusion that we believe to be inappropriate.

To satisfy the requirements of statistical analyses, tests on clearance capability of flail machines require a large number of mines. Real mines are scarce and dangerous, mine mimics are expensive, and testing may be constrained to using too few mines to support statistical analysis. Despite such resource constraints, a continued effort to test machines is desirable and should be prioritized. Clearly, any study designed to explore the proportion of mines that are initiated or broken up by a machine will need to use real mines. However, some researchers question allowing testing without using real mines (or real mine-mimics).

Here, we investigate the pattern of throw-out for mines that are not broken up or destroyed by a flail. The study used unbreakable "mine-mimics," so it explored issues of throw-out only. The results address issues about the direction and distance mines are likely to be thrown and their visibility after flailing, in relation to standard treatment factors in mine clearance (soil type and mine depth).

Methods

The study was conducted at the Swedish Explosive Ordinance Disposal and Demining Centre test site in Eskås, Sweden, in December 2005. All test fields were laid out in the same way: a strip 5 metres long and 80 centimetres wide within a soil ploughing 3 metres wide (see Figure 1 on next page). The "mines" used were made of a hard plastic material and similar in dimensions to hockey pucks or similar in dimensions to hockey pucks or small hockey pucks (4 cm in diameter and 1 cm in height). The "mines" used were made of a hard plastic material and similar in dimensions to hockey pucks or similar in dimensions to hockey pucks or small hockey pucks (4 cm in diameter and 1 cm in height). The angle (direction) of throw required some adjustment for statistical analysis and visual representation for the following reasons:

• The mean of several angles might not portray a sensible conceptual pattern. For example, if one mine is thrown forward (20 degrees) and another is thrown backwards (160 degrees), the average throw direction for these two mines (90 degrees) does not portray a meaningful direction in absolute terms. The data given in Table 1 are means and are useful for statistical comparison between treatments, but they should not be used to represent typical throw angles.

• A similar problem applies to mines thrown to the left or right. Mines thrown at 20 degrees and 340 degrees are thrown at equivalent angles in terms of forward direction, but the mean (180 degrees) is clearly inappropriate. To address this problem, the data were adjusted for analysis so that all mines were thrown on one side only.

The throw angle is therefore presented as frequencies rather than as means, calculated from equal-sized (45 degrees) sectors of one side of a compass.

Results Summary

A typical throw-out result, seen in Figure 2 (see page 102), is for 60-mm mines buried at 15 centimetres in the three soil types. In this figure, the (0,0) point is the original site at which the mine was laid, and the datum points indicate where the mine was thrown after flailing. Most mines remained close to and slightly behind where they were laid. If these were real mines, they would likely be compressed into the soil (although they might be exposed due to soil disruption).

The machine, a DOKING MV-4, is described in detail in the Mechanical Demining Equipment Catalogue and is shown in the picture above. It was run once only along the strip in one direction, which is treated as "north" for analyses of the throw angle. The machine has a clearance width of 1.725 metres, thus the test clearance strip of 80 centimetres gave a margin of error of about 45 centimetres on each side. Flail depth was set at 10 centimetres.

Table 1: Summary of data for throw distance (adjusted data for one side of the compass only). The flail moved north, thus 0º = N, 180º = S.

<table>
<thead>
<tr>
<th>Soil</th>
<th>Depth (cm)</th>
<th>Size (mm)</th>
<th>Mean Angle (degrees)</th>
</tr>
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<tbody>
<tr>
<td>Sand</td>
<td>0</td>
<td>60</td>
<td>110</td>
</tr>
<tr>
<td>Sand</td>
<td>10</td>
<td>60</td>
<td>120.0</td>
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<td>Sand</td>
<td>15</td>
<td>60</td>
<td>120.0</td>
</tr>
<tr>
<td>Sand</td>
<td>20</td>
<td>60</td>
<td>120.0</td>
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</tbody>
</table>

Table 2: Summary of data for throw direction (adjusted data for one side of the compass only).

<table>
<thead>
<tr>
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<td>120.0</td>
</tr>
</tbody>
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The machine's firing mechanism is time-consuming and dangerous. The results of several angles might not portray a sensible conceptual pattern. For example, if one mine is thrown forward (20 degrees) and another is thrown backwards (160 degrees), the average throw direction for these two mines (90 degrees) does not portray a meaningful direction in absolute terms. The data given in Table 1 are means and are useful for statistical comparison between treatments, but they should not be used to represent typical throw angles.

A similar problem applies to mines thrown to the left or right. Mines thrown at 20 degrees and 340 degrees are thrown at equivalent angles in terms of forward direction, but the mean (180 degrees) is clearly inappropriate. To address this problem, the data were adjusted for analysis so that all mines were thrown on one side only.

The throw angle is therefore presented as frequencies rather than as means, calculated from equal-sized (45 degrees) sectors of one side of a compass.

Results Summary

A typical throw-out result, seen in Figure 2 (see page 102), is for 60-mm mines buried at 15 centimetres in the three soil types. In this figure, the (0,0) point is the original site at which the mine was laid, and the datum points indicate where the mine was thrown after flailing. Most mines remained close to and slightly behind where they were laid. If these were real mines, they would likely be compressed into the soil (although they might be exposed due to soil disruption).
The proportion of 60-mm mines visible after flailing did not vary significantly in relation to depth (X²=2.6, df=3, P=0.45, see Figure 5).

**Results for All Mine Sizes**

Distances thrown. Mines of all sizes and depths, and sand and gravel, were equally effective at preventing long-distance throws. There are safety implications for the operators whether the machine is throwing mines or rocks, as this machine is routinely operated using a safety distance of 50 metres. Mines were more likely to be thrown forward, presumably due to the forward rotation of the chains and the protection behind the chains. Such mines could be thrown into previously cleared strips, or outside the minefield. Repeated passes are less likely to re-process such mines, particularly if the field is cleared in sectors. The MV-4 is

**Discussion**

The flail is designed to prevent mines from being thrown large distances, and the effectiveness of that design can be seen in the high proportion of mines left close to their original laying site. A proportion of these mines would likely be compressed into the soil without being initiated or broken up. However, repeated passes with the flail should ensure that mines left on the ground are likely to be effective; by deflected back downwards by the deflector plate or other components of the flail. Although many remained in the clearance strip, such mines are more likely to be visible than those that were compressed, because they were lifted out of the ground rather than broken into it. Mines that are pulled out of the ground are less likely to be broken up or initiated, might therefore be in better condition after flailing, and are potentially still live. A small proportion of mines were thrown big distances, presumably because the chains hooked the mine past the deflector plate. Clearly, the flail design is not entirely effective at preventing long-distance throws. There are safety implications for the operators whether the machine is throwing mines or rocks, as this machine is routinely operated using a safety distance of 50 metres. Mines were more likely to be thrown forward, presumably due to the forward rotation of the chains and the protection behind the chains. Such mines could be thrown into previously cleared strips, or outside the minefield. Repeated passes are less likely to re-process such mines, particularly if the field is cleared in sectors. The MV-4 is
a small machine. Whether larger machines could throw mines even greater distances than the maximum seen here of 65 metres remains to be tested, as throw distance is a function of length of chain, design of chain head, speed of rotation, and amount of protection around the flail head. Larger machines have longer chains but may use a slower rotation speed.

This flail tended to throw mines to the right. Given that it is impossible to prevent throw completely, it might be possible to adjust the action of the chains and design of the deflector plate to force an even higher proportion of throw to one side. Whether the laterality of throw is a characteristic of this individual flail or of the model generally does not matter. What matters is that with laterality of throw known, the machine can be deployed to ensure that the main direction of throw is into areas that are not yet processed. For example, this machine would be best deployed either in a clockwise direction from the perimeter of the minefield, or an anti-clockwise direction from the centre. With respect to mine throw, working back and forth along parallel lines would not be a good way to use this machine.

Soil type was the primary factor determining throw patterns. Mine size and depth were relatively unimportant. The depth setting of the flail is likely to affect some values in the data, but the overall trends found for mine size and depth should be similar.

Clearly, more tests of this sort on different makes and sizes of flails are desirable. The Geneva International Centre for Humanitarian Demining plans to continue these tests, but the manufacturers can also conduct tests so they can give advice to purchasers on laterality of throw, proportion of mines thrown beyond the flail, and likely maximum distance throw under different operating conditions. Consideration should be given to including information about throw patterns in the Mechanical Demining Equipment Catalogue, and eventually to developing a standard test to be incorporated into the International Mine Action Standards.

We thank the Swedish EOD and Demining Centre for supplying equipment, resources and the field site to support the study. Funding was provided by the governments of Germany, Norway and Sweden. See Endnotes, page 112.

MineWolf Flail and Tiller Machines: Testing the Differences between two Demining Technologies

MineWolf is the first demining concept, manufactured in Germany by Arthur Willibald Maschinenbau GmbH (AWMG), that overcomes the limitations of flail and tiller machines by combining the advantages of both systems. Extensive tests with live anti-tank and fragmentation mines were carried out at the German Army proving ground to determine whether the MineWolf meets the operational requirements for humanitarian demining. The aim was to discover the effects of detonations on the operator, MineWolf, clearing tools and cabinet, and to work out instructions for reparability.

By Heinrich Rath and Dieter Schröder [MineWolf Systems GmbH]

The MineWolf is a mine-clearing device developed especially for humanitarian mine-clearance. It is used for area clearing and cleans up to 2,800 square metres per hour (3,409 square yard/hour), allowing for fast quality control on a demined area. The MineWolf system consists of a fragment-proof AHWI crawler tractor, a protected driver’s cab and a mechanically driven mine-clearing device. Both a flail device and a tiller are available.

The flail is likely to initiate or destroy anti-tank mines. With the tiller, the remains of AT mines, the fuse and all AP mines left are crushed or initiated. Clearance depths of up to 30 centimetres (11.8 inches) in the soil are achieved with the tiller. Live AT mines, including DM 21, TM 57 and TM 62 mines, have been cleared.

The MineWolf was subject to extensive tests with live anti-tank mines, undertaken in Meppe, Lower Saxony, Germany, at the Army proving ground. The tests were conducted with a fully-operational MineWolf using both types of mine-clearing devices (i.e., flail and tiller). The vehicle was operated by both remote- and operator-control. During four tests an instrumented Anthropometric Test Device (fully instrumented test dummy) was placed on the driver’s seat. The measured values had to be evaluated to view possible risks to the operator during mine clearance.

A total of six mine clearance tests were conducted against live anti-tank mines. Four of these tests led to the detonation of the cleared AT mines and thus to measurable results that could be used to analyze the damage to the demining tool and the MineWolf. Two tests each with the two mine-clearing devices (flail and tiller) were conducted against one DM 21 and TM 57/AT mine each. In order to be able to rule out uncontrolled movements of the MineWolf, it was secured to a recovery tank during the tests by a steel rope. The mines to be cleared were laid one by one centrally and offset in front of the clearing device. After a detonation, the vehicle was stopped immediately and the effects were documented. If required, the clearing device was repaired prior to the next test run.

Test schedule. The testing of the method and timing were conducted in the following order:

1. MineWolf remote-controlled tests with flail and tiller and a fully instrumented test dummy (ATMD)
2. AT mine tests (DM 21, TM 57 and TM 62)
3. Biomechanical tests with an ATD
4. MineWolf manned tests with flail and tiller using three different operators
5. Fragmentation mine tests (DM 31)
6. Tests with three detonations without repair to investigate quality of demining operations

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4. MineWolf manned tests with flail and tiller using three different operators
5. Fragmentation mine tests (DM 31)
6. Tests with three detonations without repair to investigate quality of demining operations
Recording. Tests performed on the MineWolf included the following:
- Video recording from outside
- Video recording inside the driver's cab
- Blast pressure measurement inside the driver's cab
- Acceleration measurement inside the driver's cab
- Measurements taken by the ATD
- Pictures of damage to flail and tiller
- Pictures of flail and tiller repaired

Remote-control Tests
Tests performed remotely using the flail and tiller apparatuses were conducted with AT mines TM 57 (6.5 kg TNT), TM 62 P3 (6.5 kg TNT) and DM 21 (5 kg TNT). The remote-control tests were necessary to record the physical effects and potential risks for the operator and MineWolf. These effects were measured by means of an instrumented test dummy, in order to be able to perform a human-related biomechanical assessment.

To record the measured values, an ATD was placed on the driver's seat and was fitted with various sensors to measure human-relevant impact information. A total of six remote clearing tests were conducted against live AT mines. Four of these tests led to the detonation; two of the mines were crushed. Little or no flail repair work was necessary after the unmaneuver tests. Damage to the tiller device is shown in Figures 4 and 5. The repairs shown in Figure 6 are mainly welding work, which could be performed on-site the same day.

Biomechanical Results
The remote-control tests were a necessary prerequisite to performing the manned tests. The results of the biomechanical assessment and the blast-pressure measurement had to rule out any hazard to the operator when clearing live anti-tank mines.

The results of the biomechanical measurements with the fully instrumented dummy were within a very acceptable range. This statement applies to the examined AT mine types DM 21, TM 57 and TM 62 and refers to mine detonations that occurred in the area of the clearing device.

The assessment of the blast pressure load in the driver's cab showed that the blast pressure load is very low in the cabin and damage to the car is not expected if adequate car protection is worn.

In summary, it can be stated that the operator in the driver's cab of the MineWolf is not subjected to an intolerable risk of injury by the explosion of a DM 21 or TM 57 anti-tank mine if the mine detonates in the area of the mine-clearing device (both types were successfully detonated during the test). The risk of injury is very low and far below the allowed limits for mine-protected vehicles of the German Army, which are based on international standards. Even in the case of repeated successive loads, no serious consequences are expected. Temporary light disturbances like headaches or muscular pain, however, cannot be excluded.

During the four tests, all human-related criteria were tested to the extent that they could be evaluated. Due to the principle of operation of the MineWolf, the detonation of a mine underneath the vehicle hull or a track during mine-clearing is not very likely but cannot be ruled out. Based on the available data, it is unlikely that an explosion underneath the hull or a track would have on the vehicle and the mounted operator cannot be assessed. It is definitely possible, however, that this would lead to critical loads. It is therefore recommended that these cases be investigated—e.g., detonation underneath the vehicle hull or a track—by static contact detonation tests to ensure the highest degree of safety for the MineWolf operator.

Manned Tests
Test personnel conducted the manned tests with the AT mines TM 57 (6.5 kg TNT) and TM 62 P3 (6.5 kg TNT).

Tests performed the following:
- Static contact detonation tests to ensure the highest degree of safety for the MineWolf operator.
- Test personnel conducted the manned tests with the AT mines TM 57 (6.5 kg TNT) and TM 62 P3 (6.5 kg TNT).
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As the biomechanical measurements with the fully instrumented dummy did not show any risk, manned tests were approved by the fitting controller.

Tests were tightened by clearing mines off-centre—detonation occurred on the left- or right-hand side of the demining tool with both flail and tillers—to find out whether the drive train would suffer irreparable damage and whether the demining quality would be affected.

The three consecutive manned tests, using the tiller to clear live AT mines, were carried out, without repair after each detonation. Test personnel conducted the manned tests with the AT mines TM 57 (6.5 kg TNT) and TM 62 P3 (6.5 kg TNT).
Damage to the clearance machine included one worn chain and two bent cross-bars (the cross-bars, or suit braces, were deformed by an area of 30 by 130 centimeters [11.8 by 51.2 inches]). The damage seemed to be minor as compared to the previous tests with the TM 57. The mine crater in the ground was of normal size. There was no threat to mine clearance despite the damage it suffered. The TM 57 also demonstrated on-site up-to-date contact with the mine-clearing device. The tie was not affected by the fragment hits from the AP fragmentation mine DM 31.

The cabin glass. At a five-metre (16.4-foot) distance, the fragment hits were more severe: slight dents in the six-millimetre (0.24-inch) armoured plates. No fragment penetrations through the protected operator cab were detected. The operability of the MineWolf was not affected by the fragment hits.

Final Summary of Results

The complete and final summary of results from testing is taken from the German Federal Armed Forces Technical Center for Weapons and Ammunition and Final Report: MineWolf Clearing of Live Mines. The mine-clearing MineWolf system with both accessory devices is suitable for clearing live anti-tank mines. The use of the rail device for clearing anti-tank mines caused only minor damage that could be repaired with a limited effort so that did not necessitate any repairs at all. The use of the site clear against live anti-tank mines, however, resulted in considerable greater damage, which could only be repaired with a substantially greater effort than those caused with the rail. The reparation, main welding work would be performed on-site at the same day that the load was brought into the mine zone.

The load on the operator by mine zones is quite heavy, but well within the acceptable and acceptable. This finding is a result of the biomechanical evaluation of ATD dummy measurements and through questionnaires of the three operators. It applies to the examined nine mine zones. TM 62 and TM 57 only and then mine deminers that occur in the area of the clear zone.

In addition, taking into account the results achieved by MineWolf during operations in Bosnia-Herzegovina, Croatia and southern Sudan, these results confirmed that the new concept is the basis for developing the demining process from ground preparation to mine clearance and shows improvement over other methods and systems with regards to effectiveness, quality and cost. See Endnotes, page 112.

The Mine Action Expo - [Image 11x467 to 51x588] A3, Dornfeld, Ship and Harpersfield, 2006. "Protection: A Mine-free世界的оор") at 110. Protection of Inert Vehic in the Islamic Republic of Iran alone, E&I has conducted more than 100 EIAs, SIAs and baseline evaluations.


Some organizations consider mines and ERW to be two separate entities, since they are often explosive as multiple powerful power unit, is an explosive gas mixture, as an air pollutant.

The Europe Roadmap Towards a Zero Victim Target _ Demining Operations

1. A fully armed SCRM is normally designed to withstand moderate to severe landmine munitions (usually compliant to the standard of Standard 1000 Level II) in the United States, which can cause significant casualties and property damage, if, as reduced damage to the surrounding environment, can be caused to enable mapping of paved ground conditions. This provides additional protection against potential human and material injuries. When landmines are released on the environment of landmines, it is common to use a number of reasons.

Explosive Remains of War, Remnant and Thwart [Image 20x20]

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Explosive Remains of War, Remnant and Thwart [Image 20x20]
**Fact Sheet: Recent Use of Cluster Bombs in Lebanon**

**Background**
- **“Multifaceted” war** in Lebanon and northern Israel, occurring from July 22 to August 14, 2006.
- Israel and Hezbollah in conflict with each other.
- **Israel’s invasion** of Lebanon and occupation of south Lebanon.
- **Humanitarian consequences** of the conflict.

**How cluster munitions work**
- **Small bomblets** called submunitions are released from larger cluster munitions; these submunitions are designed to explode, rain, and kill or scatter them across a target area.
- **High fragmentation** makes it difficult for rescuers to reach victims quickly.

**How cluster munitions are used**
- **Small bomblets** called submunitions are released from larger cluster munitions; these submunitions are designed to explode, rain, and kill or scatter them across a target area.
- **High fragmentation** makes it difficult for rescuers to reach victims quickly.

**Canada’s position**
- **Not a user** of cluster munitions.
- **Supports an international ban** on the use of cluster munitions.
- **Participates in efforts** to prevent and respond to contamination.

**International recognition**
- **In December 2005**, a conference was held in Oslo to address the issue of cluster munitions.
- **Oslo Process** for the abolition of cluster munitions.
- **OSLO Process** results:
  - Seventy-seven **international states** committed to **reduce** the use of cluster munitions.
  - **Detonations** of submunitions.

**International pressure**
- **UN letter in December 2005** urging states to **reduce the use** of cluster munitions.
- **International states** urged to **reduce the use** of cluster munitions.
- **International states** urged to **reduce the use** of cluster munitions.

**Current situation**
- **Israel** has used cluster munitions in Lebanon.
- **Hezbollah** is believed to have used them in Israel.
- **Lebanese civilians** have been affected by the use of cluster munitions.

**Implications**
- **Significant implications** for humanitarian and environmental considerations.
- **Minimizing environmental footprint** of cluster munitions.
- **International cooperation** needed to address the issue.

**Conclusion**
- **Need for global action** to address the use of cluster munitions.
- **International cooperation** needed to address the issue.
- **Need for global action** to address the use of cluster munitions.

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**NOTE:** This information is based on a report from November 2006. For the latest information, please visit the **International Committee of the Red Cross** website.

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### Errata

The editorial staff of the Journal goes to great effort to make sure that what is printed in our magazine is accurate, properly documented and unbiased. However, in Issue 10.1, we expanded a short caption to the story and we should not have done so. In the editorial, “An Alternative Perspective on Landmines and Vulnerable Populations,” by Dr. Shelley Wadler, the caption of the photo, which was used with ICRC’s permission without ICRCS’s permission to state: “Minifields can be used to create barriers to defend vulnerable populations.” The original caption accompanying this photo read “Champs de mines,” and means “minifields” in English. We also failed to properly credit the photos used on the cover of issue 10.1. The phone was provided by Vincenzo Sonza and Maria Eugenia Sia. On page 34 of issue 10.1, we gave an incorrect URL for additional reference pertaining to the article by Danielle Reiker. The proper URL should be http://onirut.com/158pm.