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Understanding and Expanding the United States Military Role in Humanitarian Demining Operations

by

Dr. Gregory L. Bier, Dr. Stanley W. Grzyb and Dr. M. Merrill Stevens

Introduction

The U.S. humanitarian demining effort is currently one of the most widely publicized military missions. Much of the notoriety stems from a related issue, the international effort to limit the production, transfer and use of antipersonnel land mines (APLs). While the United States negotiates the issue of APLs it simultaneously demonstrates its commitment to relieve the suffering caused by these hidden killers. This is done through significant humanitarian demining programs. President Clinton plans to spend \$80 million for worldwide demining efforts in 1998. This is nearly as much as the international community combined is spending. These resources provide for research and development, training, and equipment. In the past five years the United States has provided more than \$150 million to train and equip demining units in 15 countries.

Along with an increase in funding, the United States is increasing the number of countries receiving demining training. Since 1993, Afghanistan, Angola, Bosnia, Cambodia, Eritrea, Ethiopia, Jordan, Laos, Mozambique, Namibia, Honduras, Costa Rica, Nicaragua, Rwanda and Yemen have received demining training. In 1998 the United States will expand its programs to include Chad, Zimbabwe and Lebanon. Additionally, Ecuador, Egypt, Falklands/Malvinas, Guatemala, Guinea-Bissau, Moldova, Peru, Sierra Leone, Sri Lanka and Vietnam are being considered for demining training by the U.S. Interagency Working Group on Humanitarian Demining. The extent of the problem varies in each of these countries. However, estimates indicate that 110 million mines are emplaced worldwide. There are approximately 70 countries plagued with land-mine problems. These land mines kill or injure nearly 26,000 people every year.

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The military impact of Humanitarian Demining Operations (HDOs) has already been substantial. The demining program in Namibia alone resulted in a 90-percent decrease in local casualty rates. In Cambodia, the death rate dropped 30 percent due to U.S. demining efforts. However, what is the impact of the presidential directive requiring the Department of Defense (DoD) to expand demining efforts? To truly understand this, one must understand the scope of the problem and its economic and human impact. Understanding this leads to an understanding of why HDOs are not defined the same as combat-countermining operations. Since humanitarian demining missions are dramatically different from well-established and rehearsed combat-countermining missions, how is the training conducted? What are the individual, collective and leader processes?

This paper addresses the scope of the land mine problem. It articulates the differences between the traditional combat-countermining role and the normative humanitarian demining role. Finally, this paper describes the efforts of the U.S. Army Engineer School (USAES), and particularly, the Countermining Training Support Center (CTSC) which has formed the nucleus of a new humanitarian demining training program.

United States Policy and Strategy for Humanitarian Demining

The U.S. Interagency Humanitarian Demining Strategic Plan establishes the vision, goals and objectives for the U.S. humanitarian demining effort.¹ The vision is stated as “Relieve suffering from the adverse effects of land mines while promoting U.S. interests.”

The established goals and objectives are:

Goal 1 – Promote human welfare through mine awareness and training.

- ◆ Objective 1 – Reduce civilian casualties.
- ◆ Objective 2 – Allow refugees and displaced persons to return to their homes and pursue lives free from fear of land mines.
- ◆ Objective 3 – Encourage international efforts to assist in medical infrastructure development programs.

Goal 2 – Promote U.S. foreign policy, security and economic interests.

- ◆ Objective 1 – Enhance the host country’s stability.
- ◆ Objective 2 – Establish sustainable indigenous demining programs.
- ◆ Objective 3 – Encourage international cooperation and participation.

Benefits to the Department of Defense. With these national goals in mind, it is important to understand the advantages offered to the U.S. military when conducting HDO. Foremost is the fact that demining missions allow the combatant commanders to gain access to regions and countries that pose a strategic opportunity. Additionally, demining deployments enhance the readiness and training of U.S. forces. Typically, this comes during technical predeployment training. Just as important, though, is the ability of the U.S. forces to practice cultural awareness and language skills.

Legislative Restrictions. Key legislative restrictions impact the execution of demining missions. Most importantly, is that United States Code 10, Section 401, stipulates that “no member . . . may engage in the physical detection, lifting, or destroying of land mines.” This restriction is the fundamental reason that U.S. deminers only conduct mine-awareness campaigns and demining

“train-the-trainer” programs. U.S. forces do not physically participate in clearing the minefields. Additionally, the demining mission must benefit the security interests of both the United States and host nation and promote specific skills of members of the armed forces.

Land Mine Problem

Despite the end of the Cold War, the worldwide proliferation of APLs remains a compelling problem. In spite of one of the most monumental mine awareness campaigns ever waged by the U.S. Army, several soldiers have become victims of land mines in Bosnia. Additionally, from 30 December 1995, to 13 March 1996, there were at least 15 mine incidents in the former Yugoslavia involving trained, professional soldiers. These incidents resulted in eight injuries including the amputation of both legs of one soldier, one foot of another soldier, and a part of yet another soldier’s foot. Equipment damage included 10 ground vehicles (one destroyed) and one helicopter.

However, the majority of people usually killed or maimed are not soldiers but civilians, many of them children. Since 1980, land mines have been used in 165 conflicts; 80-90 percent of these mines have been detonated by civilians resulting in death or severe injuries, usually amputations.

The significance of these indiscriminate killers is two-fold. First, the economic impact is severe because of the limited use of the land that APLs litter. Second, but no less important, is the human impact. APLs continue to blindly kill innocent civilians long after the conflict that caused their use is over.

Economic Impact. The major economic problem associated with the use of APLs has come in recent years as more small, regional, or internal conflicts and civil wars have spread the unconventional use of inexpensive but lethal APLs. This has had both a planned military and a psychological effect. The result is that many, often several million, indigenous civilians flee their land for the asylum of safer, neighboring countries out of fear of the indiscriminately killing and maiming mines.

The significance of the mine problem does not appear until the conflict has subsided and these refugees return home. Even then, APLs remain, often with absolutely no record of their location. The fear of the unknown whereabouts of these hidden killers caused 3.4 million Afghan refugees (7 percent of resident Afghan householders) to remain in neighboring Pakistan and Iran in the 1980s.² Three hundred thousand Angolan; 800,000 Mozambican; and 400,000 Somalian refugees remain in neighboring countries in Africa. Only after the United States cleared 100 kilometers of road did 370,000 Cambodian refugees return home from Thailand.³ Additionally, reports indicate that there are currently one million Bosnian refugees throughout their neighboring regions.⁴

The large number of refugees imposes a tremendous and immeasurable economic burden on their host countries as well as on the extensive matrix of relief organizations (International Committee of the Red Cross [ICRC], Doctors Without Borders, Save the Children, United Nations International Children’s Emergency Fund [UNICEF], World Food Program, and the United Nations). These refugees remain largely unproductive while escaping the effects of their own civil strife.

However, even when they attempt to return home they often meet with insurmountable odds. Often these refugees return to a country with little remaining infrastructure. In some cases all viable lines of communication (roads, bridges, rail systems and waterways) have been mined. This prevents any goods or services from reaching the returning civilians. The once productive farmland is often unusable due to mines. This usurps any effort to become self-sufficient again until the deadly mines are removed.

Agricultural productivity alone could increase by 88-200 percent in different regions of Afghanistan and 135 percent in Cambodia if there were no mines in the farmable land.⁵ In Bosnia, families would have 20-50 percent increased access to their land if not for land mines. It becomes nearly impossible for returning refugees, as well as for the government, to return to a normal life because of the lack of agricultural productivity and the inability to move workers and other resources around the country. For these reasons, many countries remain economically undeveloped and in a long-term state of political instability.

The collapse of internal lines of communication prevents any viable establishment of markets simply because goods cannot be transported over land. This in turn places a tremendous inflationary pressure on the national currency because of the artificial constraint on available products, even life-supporting staples. This has been clearly demonstrated in recent years. In Somalia, for example, only the warlords could safely move logistics around the mines (which they employed) even after the civil war was supposedly resolved.

According to the United Nations, after the civil unrest in Mozambique all 28 major roadways were unusable due to an estimated one million mines which had already killed at least 10,000.⁶ Even in early 1996 it was difficult to move logistics around the former Yugoslavia due to the significant mine-laying effort made by all three warring parties. These mines continue to maim approximately 48 civilians each week. Former Bosnian warlords have an enterprising business helping humanitarian groups move supplies around the extensive network of mines (which they employed). With no safe means of transportation it is difficult for governments, doctors, health-care workers, teachers, utility repairers, construction crews and nongovernmental organizations to make their presence felt in outlying areas of the country. This makes reconstruction difficult, thereby increasing the opportunity for renewed civil unrest.

In a southern region of Sudan, relief organizations report that thousands of people are held captive by an impenetrable barrier of land mines. The area is impoverished and drought-stricken. With no internal means to detect or remove the mines to clear a path for the movement of supplies, the relief organizations fear a slow starvation is ahead for these people.

When returning refugees are injured by mines, their health care costs are often more than their fragile government and economies can bear. The injuries caused by land mines, if not fatal, are extreme and can require amputation, prosthetics, rehabilitation, and/or long-term care. These treatments bring heavy economic burdens to countries that do not have the necessary resources. The ICRC which carries much of this economic weight, reported that in 1991 it funded 7,876 limbs and 11,116 orthopedic appliances for mine-injured amputees. The ICRC also reports that the average cost of treatment and rehabilitation is \$5,000 per surviving victim in Cambodia.

It is difficult for war-torn countries to invest in demining programs by themselves. The intimidating cost of demining is itself an impediment to economic recovery. The United Nations estimates that the cost of demining is approximately \$200 to \$1,000 per mine. This can take a significant toll on a fragile economy emerging from civil strife. When applied to the ICRC's numerical estimates of mines left over from various conflicts (figure 1) it quickly becomes apparent that these mines pose a global economic crisis. It is important to note that these figures do not include unexploded ordnance (UXO) problems.

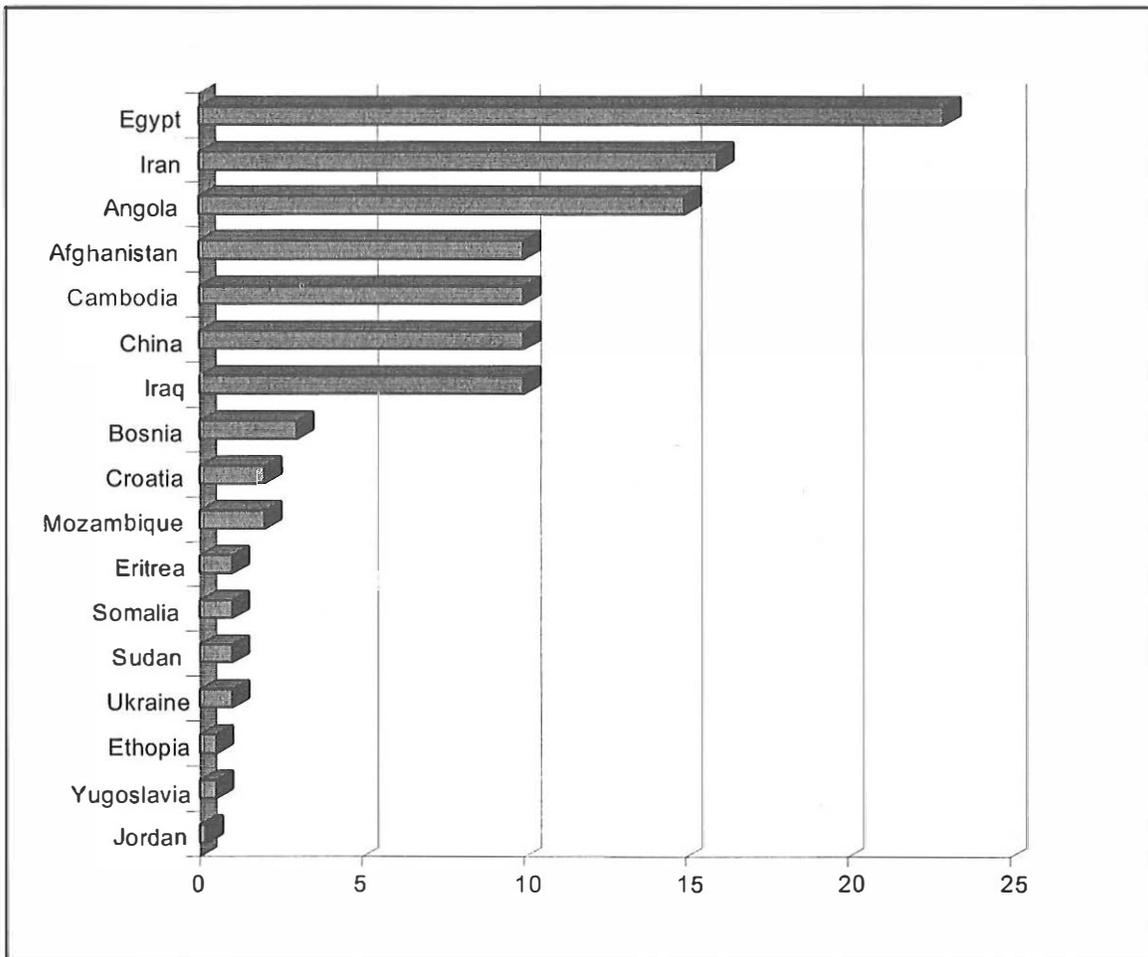


Fig. 1. Countries with the most antipersonnel land mines deployed (millions)

A UXO is different from a land mine. A UXO is any explosive munition that does not explode as designed after it has been fired at, shot at or dropped onto its target. Artillery shells that do not detonate when they impact their target are examples of UXOs. The U.S. Army estimates that 2-5 percent of conventional munitions fail to explode as designed. Some systems have even higher dud rates. Although the hazards associated with UXOs are similar to those of land mines, there are distinctive differences in dealing with the two that make UXOs significantly easier to detect. The primary difference is that UXOs generally end up on the surface of the ground, not buried like land mines. Additionally, UXOs generally have a high metal content, unlike many land mines.

The country that typifies the economic burden of demining is Cambodia. It was estimated that 8-10 million APLs remain in Cambodia, making one-half of the country unusable due to mines.⁷ Twenty-two percent of households in Cambodia have been forced to leave their homesteads because of land mines.⁸ There are currently 1,600 Cambodian deminers at work in their country. From November 1993 until September 1995 they had cleared only 15.5 square kilometers of the 324.62 square-kilometer confirmed mined area.⁹

The Cambodian demining effort is estimated to require somewhere between \$16 million and \$100 million to complete. Considering that Cambodia's third-world economy produces an annual per capita income of only \$200, it would take every Cambodian to spend every dollar earned, for at least four years, on demining programs. This is not realistic and, hence, Cambodia has been in stagnant economic development since the last mines were employed over 23 years ago.

The APLs used in Cambodia are not technologically advanced; they contain a fair amount of detectable metal which increases the speed and reliability with which they can be detected. Unfortunately, in the recent conflicts involving Iran, Iraq and the former Yugoslavia, more advanced APLs were used. These mines have a much lower metal content, making them harder and more expensive to detect and remove. It is apparent that demining will not be paid for by the annual Bosnian per capita income of \$500.

Due to the staggering costs involved in detecting the more advanced mines, Iraq was directed to report the locations of minefields that it left behind in Kuwait. As a result, DoD estimates that the Kuwaiti government has paid only \$1 billion to remove the nearly seven million mines left behind by Iraq.¹⁰

The Dayton Peace Accord requires all combatants in the former Yugoslavia to "mark or remove all land mines." As of February 1996, only 20 percent of the six million mines had been marked. This is primarily due to the fact that, as in the former Yugoslavia, these smaller, more modern wars are being fought by amateur armies who do not keep detailed records of land mines.

However, it is not imperative that all of the world's mines be removed today. Many of these mines are in remote areas, away from population centers, and therefore do not pose a significant threat. These areas can simply be marked and fenced off. The Department of State estimates that as many as 30 percent of the mines in the world fall into this group. This provides a temporary solution. Egypt marked off mined areas following World War II, and these areas have remained untouched since. But now, as the Egyptian population continues to expand, the Egyptian government is searching for ways to clear and develop the old battlefields into economically productive regions.

Human Impact. The Department of State estimates that mines cause 500 casualties worldwide every week. These are not battlefield statistics, but after-the-battle statistics. These statistics are somewhat misleading — the impact is far greater.

We must accept the fact that, with few exceptions, APLs are designed to wound (shattering or severing a leg or foot) rather than to kill. This effect imposes a significantly greater burden on the enemy. They must now evacuate, provide medical treatment and continued care, and perhaps rehabilitate these wounded individuals rather than simply bury them. Although the mines are not necessarily designed to kill, their lethality varies. In Bosnia, each mine blast killed an average of 0.54 people and injured 1.4 people. In Mozambique each blast killed 1.45 people and wounded 1.27 people.¹¹ Therefore, it is not appropriate to consider the impact as just 26,000 casualties per year. In Cambodia, for example, one in 236 persons is an amputee due to land mines and other debris of war. In Bosnia, given a sample group of 1,487 people, 165 had been disabled by the war.

How do APLs indiscriminately mutilate and maim without killing? Examine two common APL types: the blast and the fragmentation. The blast type (the Russian-made PMN-2, for example) may be detonated by as little as 11 pounds of pressure on top of the mine. The charge consists of 4.1 ounces of explosive.¹² The blast type usually results in amputation of a limb. The common, bounding fragmentation type (the Italian-made Valmara 69, for example) may be detonated by applying as little

as 13.2 pounds of tension on any one of three trip wires or by applying as little as 22 pounds of pressure directly on top of the mine.¹³ The detonation is a sequence of events. First, a canister containing 1,200 steel cubes (each 5 x 5 x 5 millimeters) is shot out of the ground and into the air to a height of approximately 1.5 meters, at which time a 1.3-pound charge at the center of the 1,200 steel cubes is detonated. This sends steel fragments out in an arc of 360 degrees killing anyone within 27 meters and injuring everyone within approximately 100 meters of the mine. The fragmentation type usually requires immediate surgery to remove the fragments and to repair any damaged tissue and organs.

It is interesting to note the increased use of APLs in current conflicts. They are inexpensive, often costing between \$3 and \$30. Therefore, they are often referred to as “the poorman’s weapon.” The economic advantage of these weapons is clear. Every mine that detonates, during the conflict or after, will mutilate, maim or perhaps kill somebody. That is a good investment compared to the 100,000 bullets that were fired in the Vietnam conflict for every casualty inflicted.¹⁴ Their utility is also obvious for more recent low-intensity conflicts such as the African and Balkan civil wars. The amateurish warring parties in these operations often move on foot, not in tanks, thereby making them easy prey for one another.

When the indiscriminate killers are left behind after the conflict, their prey often turns out to be children. While statistics are not available, it became apparent in Afghanistan that the curiosity of the indigenous children often draws them to the mines. The deadly devices, because of their resemblance to gadgets or toys, often fascinate children. Many of these accidents occur while children are tending to farm animals or doing other agricultural chores typical of their third-world, land-dependent lifestyle.

Although the human impact of mines is immeasurable, it is significant in that mines do not simply pose a threat during combat; they remain hidden long after the combatants who employed them have gone home. It is the effect of APLs after the conflict that is most troublesome. For this reason, U.S. Senator Leahy (D-Vermont) described demining efforts in third-world countries to the U.S. Senate in March of 1995 as “clearing mines . . . an arm and a leg at a time.”

Combat-Countermining Operations Versus Humanitarian Demining Operations

DoD describes HDOs as the complete removal of all land mines contained in a mined area. Demining is conducted after the armed conflict has been resolved.¹⁵ Countermining is typically defined as a combat operation with a focus on bypassing mined areas if possible. When a bypass is not feasible, the combat-countermining operation would hastily clear a breached path through the enemy minefield. These breached paths will serve to pass the forces through the mined area and allow them to continue with their larger mission.¹⁶ Demining is done to significantly higher clearance standards than countermining due to different time and risk considerations.

Figure 2 demonstrates the similarities and differences between combat-countermining operations and HDOs when Colonel A.R.R. McAslan, in *Minefield Clearance*, attempted to apply International Standards Organization 9000 systems to mine-clearance standards.¹⁷

Currently, the U.S. military services have no doctrinal mission for the normative state.¹⁸ Nothing documents how the demining service is provided. Previously, personnel qualifications and training were targeted toward combat-countermining operations, not HDOs. There are variations in the speed, conditions and reliability standards used in combat-countermining operations and HDOs. However, there are complimentary aspects of the two operations.

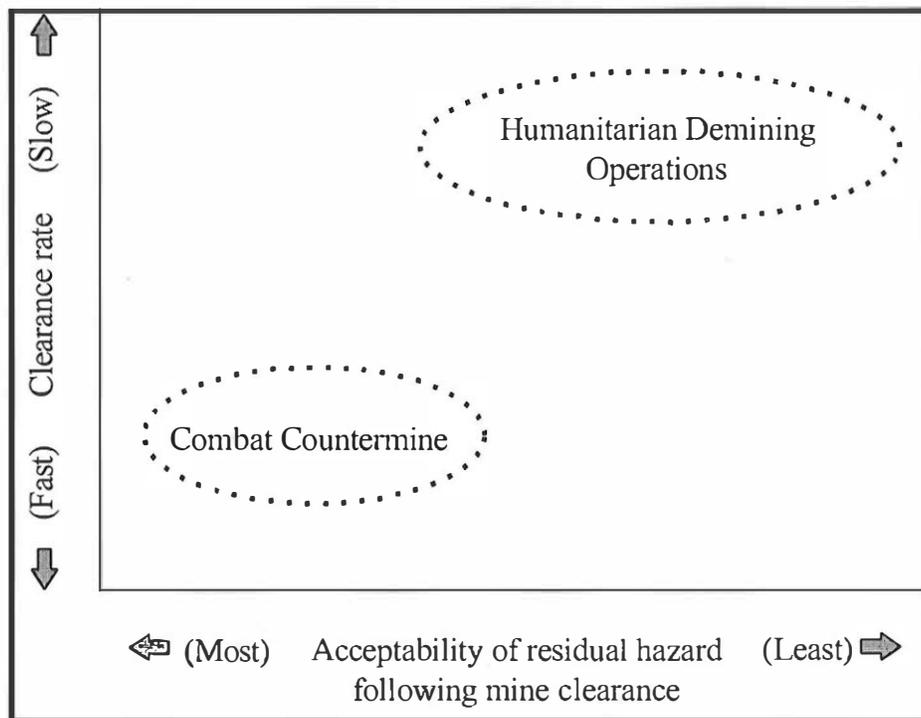


Fig. 2. Combat-countermine versus humanitarian demining clearance standards

The need to alter the training conducted by the USAES has become increasingly apparent since 1995, as the Army has become acutely aware of the threat that land mines posed to its soldiers. Additionally, the President was providing directives that the Army get more involved with the plight being caused by land mines. Table 1 introduces the current state of combat-countermine operations performance parameters and the normative state of humanitarian demining performance parameters.

Land Mine Trends

Historically, nonself-destruct land mines have caused a tremendous impact upon the way wars are fought. Since this paper focuses on shifting the training paradigm from a combat-countermine perspective to including a humanitarian outlook, it is important to have a brief overview of landmine use in past conflicts.

Based upon political rhetoric, training opportunities and increased funding, investment in HDO provides a substantial opportunity for the USAES. The USAES has an established combat-countermine training program. However, significant investment in HDO can only be done as a strategic expansion. In May 1996, the President of the United States directed the Secretary of Defense to expand humanitarian demining programs which train and assist other countries in developing effective indigenous, self-sustaining demining programs. Secretary William Perry approved DoD’s Humanitarian Demining Expansion Plan in August 1996.¹⁹

Combat-Countermine Operations	Humanitarian Demining Operations
Military necessity Support combat troops/soldiers	Support economic and humanitarian needs
Probable enemy contact	Mine-awareness training of returning refugees
Require rapid minefield detection 1. Anytime 2. Anywhere 3. Any environment	Individual mine detection and safety are critical 1. Flexible mission times 2. Wait out less than optimum conditions
Larger mission is driving factor	Returning land is driving factor
Mines not always destroyed	Detect and destroy all land mines Destruction rate near 100 percent
Avoiding mined areas Clearing and marking safe lanes	Reestablish economy and infrastructure Open lines of communication
Some casualties accepted	Casualties unacceptable Gain confidence of population
Continue the battle	Postconflict endeavor
Speed versus flexibility	Detection of mines more important than speed

Table 1. Combat-countermine versus humanitarian demining performance parameters

Expansion strategies must be based upon sound market and operational opportunities. The market and operational applications of this project were based upon two trends. First is the increase in land-mine casualties in wartime. This was based primarily on traditional combat-countermine operations. These combat-countermine operations impact the follow-on humanitarian operations. Figure 3 demonstrates the increasing trend in the use of land mines during combat operations.²⁰ Since the 1950s, land mines have caused a minimum of 50 percent of the damage to U.S. tanks.

Humanitarian Demining Training Program Development

The Secretary of Defense directed an expansion plan in 1996 to look at how additional U.S. resources could be effectively utilized in humanitarian demining programs. A portion of this expansion plan involved a study by the CTSC located at the U.S. Army Engineer Center and Fort Leonard Wood, Missouri. The CTSC conducted this study utilizing a customer-based quality function deployment model and a military-based systems approach to training model.²¹ Combined, the two models simplified the analysis and design processes while focusing on the customer's needs.

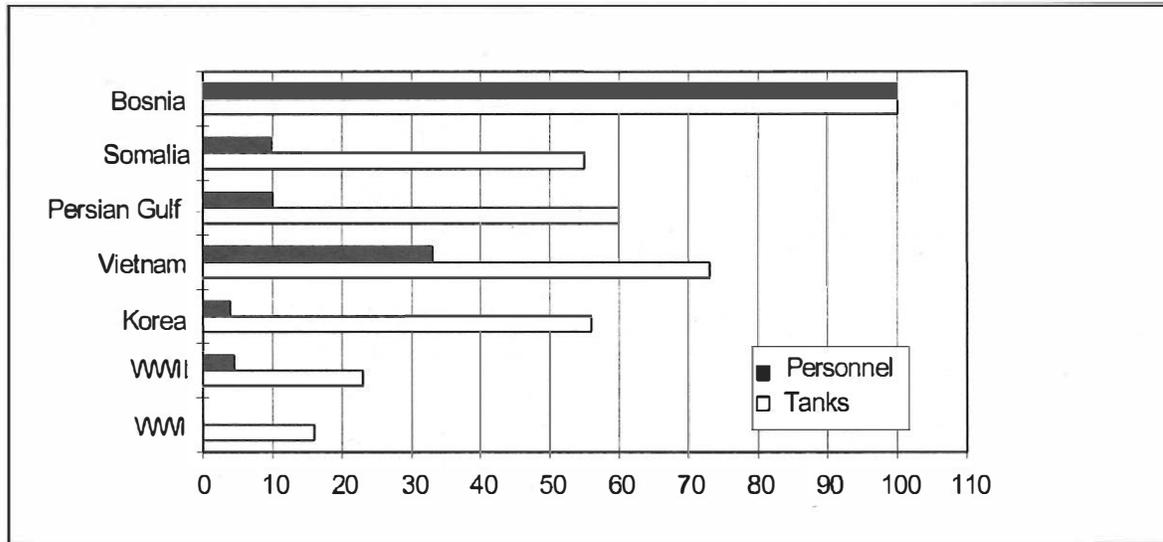


Fig. 3. Mine loss rates (percentage of total damage)

Individual skills and collective and leadership tasks were identified and analyzed. The humanitarian demining training program was developed as a result of this in-depth analysis.

A hallmark of the study is the ability to quickly develop the training required to meet diverse customer needs. For example, a two-week train-the-trainer course designed for Special Operations Forces (SOF) was structured specifically as a train-the-trainer module. This course is the primary, humanitarian demining training for SOF prior to their deployment to countries identified to participate in humanitarian demining efforts.

Program Aids

It was important to establish a “no-cost-to-the-unit, *one-stop*” demining training facility. The intent was to develop training and training aids that would preclude the students from having to conduct multiple predeployment trips to collect the most basic demining needs, intelligence and training aids. The program developed provides country-specific intelligence and training based upon that specific intelligence. An example of critical, specific intelligence would be the mines and employment techniques found in the target country.

Training Aids. Upon completion of the training, the students are provided with country-specific training aids prior to deployment. Based on the limited U.S. training-aid base, this was a major undertaking. Due to the desire to provide the training mines that replicate what is expected to be found in the numerous countries, several training aid development techniques were utilized.

First, contracts were established which allowed for training mines to be fabricated from inert mines obtained from a variety of sources including allied engineer schools. Second, contracts were established with technologically sophisticated vendors. These contractors designed training mines based solely on intelligence photographs of land mines. This served as a unique way to develop and manufacture training mines that did not previously exist in the United States. A third approach involved “toolable wax.” This contract was established with a vendor nearly colocated with the

humanitarian demining training facility at Fort Leonard Wood. This contract is critical because training mines can be designed and manufactured in a single day based simply on a scaled intelligence photograph. This capability provides students with training mines based on “real-time” intelligence reports or from photographs faxed to the USAES from the demining team’s advance party.

Additionally, the training aids utilized at the USAES are not simple pieces of plastic or wax. The training aids developed have the ability to be fitted with accelerometers provided by a local vendor. These accelerometers are activated by motion. Therefore, when pressure is applied to the training mine or the mine’s trip wire is pulled, the accelerometer activates a buzzer within the mine. This makes the training more realistic in that the students control their own fate during practical exercises. No instructor involvement is necessary to identify when a student steps on a land mine.

Mine-Awareness Boards. In addition to the necessary mine training aids, the students are provided with country-specific mine-awareness boards. These plastic, vacuum-formed boards were designed and fabricated under contract with the Corporate Information Center at Redstone Arsenal, Alabama, with input from the 4th Psychological Operations Group at Fort Bragg, North Carolina. The boards portray the specific mines and particular language of the target country.

Demining Toolbox. A demining toolbox used during the training process includes various items (probes, knives, hand rakes, scissors, notepad and so on) recommended for HDO activities. The students take these demining toolboxes with them when they deploy.

Summary

The involvement of the United States in the expanding humanitarian demining arena requires a clear understanding of the differences between HDO and combat-countermining operations. This paper compared and contrasted the characteristics of HDOs with combat-countermining operations. In addition, information was presented that illustrates the devastating effect on civilian communities as they try to carry on their lives in the midst of mined areas that exist after armed conflict ceases.

The development of a humanitarian demining training facility located at the U.S. Army Engineer Center and Fort Leonard Wood meets the presidential directive to improve and expand humanitarian demining programs. The one-stop training center design makes it possible for the CTSC to meet the needs of diverse groups seeking current humanitarian demining training. The CTSC has taken a rapid prototype approach to developing a holistic training program.

Undoubtedly, the future of humanitarian demining is in the hands of political leaders throughout the world. The commitment to provide training on humanitarian demining is an integral part of the ongoing process of ridding countries of the insidious threat to human life and economic well-being.

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