



International Committee of the Red Cross

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1-02-1998

The Silent Menace: Landmines in Bosnia and Herzegovina

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Executive Summary

Introduction

As a contribution to the ongoing international effort to address the worldwide scourge of landmines, the International Committee of the Red Cross (ICRC), in collaboration with the Office of the United Nations High Commissioner for Refugees (UNHCR), commissioned a study on the impact of these weapons in Bosnia and Herzegovina. The study indicates that although armed hostilities between the various factions officially ended in December 1995, mines continue to have severe human, social, medical and economic consequences for the country. A summary of the study's main findings and recommendations is presented below.

The current situation

The United Nations Mine Action Centre (UNMAC) estimates that there are at present over 30,000 mined areas in Bosnia and Herzegovina littered with some 750,000 mines. In general, during the conflict, mines were used by all sides in a fairly disciplined manner consistent with military doctrine. The devices tended to be deployed as defensive weapons in order to protect military positions, strategically important installations and avenues of retreat. Most mined areas are found along former front lines, now in the Zone of Separation (ZoS) between the Federation of Bosnia and Herzegovina and Republika Srpska (the two "entities" that make up the country), or in areas immediately outside the various ethnic enclaves. Today, most minefields remain unmarked and pose a threat in the post-war environment. Although the conflict has officially ended, mines continue to be used to prevent refugees and displaced persons from returning to their pre-war communities and to protect private property.

The human impact

ICRC records show that during the conflict the majority of those killed or injured by mines were soldiers. As mines were primarily used along front lines and civilians generally fled the fighting, soldiers were the group most directly exposed to the threat. Since the end of the war, however, this has changed dramatically. Today, 80 per cent of mine victims are civilians.

In the six months immediately after the war ended, an average of 50 people were killed or injured by mines every month. Since mid-1996, this number has gradually decreased. From August 1996 to August 1997, the ICRC estimates that there were 30 to 35 casualties per month. The typical mine victim in the post-conflict period is the male farmer.

Alarming, many organizations working in Bosnia and Herzegovina expect the number of mine casualties to increase in the near future. Pressure on land will grow in the coming year as refugees and displaced persons return to their pre-war communities, many of which are situated in the ZoS — the most heavily mined area of the country. Having been away from their homes, these people lack knowledge about the precise location of mined areas and the local markings used to identify them. For this reason, refugees and displaced persons will be particularly vulnerable to mine accidents.

These facts and figures indicate that even when used responsibly, if left uncleared, landmines will claim civilian victims long after the fighting has ceased.

Medical treatment

In Bosnia and Herzegovina, the percentage of mine victims who die from their injuries appears to be lower than in other mine-contaminated countries. This may be attributed to the widespread ownership of private cars and the well-developed road network, both of which facilitate evacuation. In many cases, rapid and good quality emergency medical attention is available. However, as a result of the war, a large number of hospitals have undergone damage to buildings and equipment and, particularly in Republika Srpska, suffer from a shortage of surgical supplies. Since mine injuries require multiple operations and prolonged hospital stays, they will continue to divert scarce resources from the treatment of other injuries and illnesses. Many Bosnian Serbs and Bosnian Croats requiring amputations are currently evacuated to hospitals in the Federal Republic of Yugoslavia or Croatia, respectively.

Physical rehabilitation

Overall, the quality of prostheses available to mine victims is good. Given the number and capacity of operational and planned limb-fitting centres in Bosnia and Herzegovina, the potential exists to meet the long-term need for prosthetics services. Most mine victims appear to have been fitted with an artificial limb at least once. Services can nevertheless be improved. Facilities and equipment in Republika Srpska need to be renovated and upgraded, and appropriate training provided to technicians. Furthermore, most centres only concentrate on lower-limb prostheses and there are no uniform policies regarding the financial contributions expected from patients.

Social reintegration

The survivors of mine explosions face shattered lives. There are few employment opportunities for amputees. In addition, the psychological consequences and the lack of an adequate State disability benefit cause further difficulties for them in most circumstances.

The impact on agriculture and economic reconstruction

Many of the mines still in the ground have contaminated fertile agricultural land, severely reducing food production while Bosnia and Herzegovina continues to rely on international assistance to feed its population. In addition, the US\$ 5 billion programme for economic reconstruction has been seriously impeded by the presence of mines. Many activities, from the restoration of water supplies to the resumption of the logging industry, remain affected nearly two years after the end of the conflict. Official assessments of the full impact of mines on agriculture and reconstruction are lacking and further research is required.

Demining

As of 31 July 1997, an estimated one per cent of the mine-contaminated land in Bosnia and Herzegovina had been cleared to humanitarian standards. The slow progress has been due to lengthy start-up requirements and in some cases a lack of funding and disputes over whether customs duties should be levied on demining equipment. There are a number of agencies and organizations involved in mine clearance, and several different approaches to the problem have been adopted. However, most activities focus on actual mine removal and there has been very little effort put into marking mined areas. In addition, the absence of an agency or a body that effectively coordinates demining activities means that each programme sets its own priority areas for clearance.

As required by the agreement that ended the war, the armed forces of the two entities are removing the mines emplaced by them. While "mine lifting" establishes an important principle, it has been criticized because it only involves the clearing of mines recorded on a minefield map, and does not require checking every square foot of ground to ensure total safety. Thus, it does not meet the demining standards used by humanitarian agencies. Greater pressure is now being put on the entity armed forces to adopt these higher standards.

The United Nations and the government of Bosnia and Herzegovina have concluded a Memorandum of Understanding whereby the government will take over the responsibilities and assets of UNMAC during 1998. With the establishment of the Commission on Demining and the Bosnia and Herzegovina Mine Action Centre (BHMIC), the national authorities will assume a prominent role in mine clearance and it is hoped that coordination among the various players and the pace of mine

clearance will improve in 1998.

Mine awareness Mine awareness

The mine-awareness programmes in Bosnia and Herzegovina have benefited from the experience acquired in other mine-contaminated countries, particularly with regard to methods of disseminating messages. The two major programmes are run by the ICRC and UNICEF, although smaller organizations are also involved. Nearly universal school attendance means that children can be reached through the classroom. However, informing adults is more difficult. In some areas, a lack of coordination among the various mine-awareness programmes has led to a duplication of effort and, in some instances, conflicting messages.

Banning the future use of antipersonnel mines in Bosnia and Herzegovina Banning the future use of anti-personnel mines in Bosnia and Herzegovina

Bosnia and Herzegovina joined 122 other States in signing the Convention on the Prohibition of the Use, Stockpiling, Production and Transfer of Anti-personnel Mines and on their Destruction, also known as the "Ottawa treaty". At the signing ceremony the government declared its intention to destroy its anti-personnel mine stockpiles and dismantle production facilities within four years.

Recommendations

On the basis of this study on the situation in Bosnia and Herzegovina, there are a number of measures which can be taken to limit the dangers posed by landmines, improve the situation of mine victims, and speed up reconstruction.

Protecting the civilian population

- To help protect civilians from the dangers of mines, demining agencies should focus increased effort on surveying and demarcation programmes, particularly in areas to which refugees are expected to return.
- To enhance the protection of returning refugees, mine-awareness programmes should be established in host countries.

Improving medical treatment

- To ensure that mine victims receive the most effective medical treatment available, the ICRC should disseminate information about the best surgical practices to all hospitals concerned in Bosnia and Herzegovina, Croatia and the Federal Republic of Yugoslavia.

Improving physical rehabilitation

- To ensure more effective provision of artificial limbs in Republika Srpska, donors should commit themselves to renovating and re-equipping prosthetics centres in the entity.
- To ensure an effective long-term programme, prosthetics workshops in both entities should use more appropriate technology and provide theoretical training to technicians.

Meeting the long-term social needs of mine victims

- To promote the social reintegration of mine survivors, especially amputees, the authorities and relevant organizations should seek to address their psycho-social needs.

Lessening the impact of mines on agriculture and economic recovery

- To address the impact of mines on agricultural production and economic recovery, the ministries concerned should conduct relevant research and they should improve the prioritization of land for clearance on the basis of their findings.
- To ensure safe and effective economic recovery, all reconstruction programmes should include a financial component for demining, where necessary.

Improving the pace of demining

- To ensure effective long-term demining, international donors should commit themselves to financing mine-clearance programmes in Bosnia and Herzegovina for a minimum of three more years.
- To ensure the effectiveness of mine lifting by the entity armed forces, the NATO-led Stabilization Force (SFOR) should insist on the use of humanitarian demining techniques at all times and employ sanctions where appropriate.

To improve the coordination of demining activities, a concerted effort should be made by all governments and organizations concerned to provide the Commission on Demining and the BHMACH with the necessary resources and political support to enable them to discharge their responsibilities under the Memorandum of Understanding.

Improving mine awareness

- To improve coordination among the organizations involved in mine awareness activities, it is important that agreement be reached by all those concerned regarding the messages to be spread and their respective areas of responsibility (both geographical and sectoral). The ministries of education of both entities should take the lead in coordinating the programmes, ensuring that there is no duplication of effort within the school system.

Ensuring a ban on the future use of antipersonnel mines

- To build confidence in the treaty, the entity governments should immediately conclude a binding agreement to destroy all stockpiles of anti-personnel mines currently being held by their armies.

I. Introduction

The conflict in Bosnia and Herzegovina began shortly after the republic declared its independence from the Socialist Federal Republic of Yugoslavia (SFRY) [1] in March 1992 and lasted nearly four years. As a result of the fighting, some 250,000 people are dead or missing [2] and 200,000 were injured [3] out of a population that numbered 4.4 million in 1991. In addition, approximately 3 million people have been displaced [4] and, as of mid-1997, 1.1 million refugees remained outside the country [5]. One lasting legacy of the war is the problem of landmines, which were used by all sides, even by civilians, during the hostilities. Today, nearly two years after the end of the conflict, these devices continue to claim victims, to frustrate socio-economic reintegration and to undermine the conditions necessary for a lasting peace.

The purpose of this report is to highlight the extent and ramifications of the mine contamination problem in Bosnia and Herzegovina and the efforts being undertaken to address it [6]. The effects of landmines are widespread and have an impact at all levels of society. Only through a concerted and multifaceted effort can the problem be comprehensively dealt with. In its final section, the report provides recommendations as to how this might be done more effectively.

II. Background

The use of mines during the conflict [7]

(a) JNA doctrine

For the most part, hostilities during the war were conducted by three distinct armies: the Bosnian government army (ARBiH), the Bosnian Croat army (HVO) and the Bosnian Serb army (VRS). Prior to the breakup of the SFRY, all men were required to complete one year of military service in the Yugoslav People's Army (JNA). Thus, many ARBiH, HVO and VRS soldiers had prior military training. JNA military doctrine relied heavily on the widespread use of mines as a deterrent against invasion and, while its engineering units had primary responsibility for mine-laying, all its soldiers were taught mine warfare techniques. Field engineering handbooks contained detailed instructions on how to lay various types of anti-personnel, anti-tank and mixed minefields. They also explained how to mark and record minefields. Consequently, the ARBiH, HVO and VRS had soldiers already trained and familiar with mine warfare doctrine and techniques.

(b) Mine-laying during the conflict

Unlike other recent conflicts, such as those in Afghanistan, Angola and Cambodia, the conflict in Bosnia and Herzegovina was characterized by relatively stable front lines and was fought between armies with some training in mine warfare. All sides used mines during the war and deployed them in a fairly focused fashion, predominantly to defend front-line infantry positions and withdrawal routes. The semi-discipline with which the devices were used is illustrated by the sophisticated laying patterns and the fact that the warring parties recorded many minefield locations on paper. In contrast, the use of mines by militia groups and individuals was less well controlled.

Generally, the three armies employed JNA mine-laying methods. To some extent, these methods evolved over the course of the conflict, and minefields were often laid far more densely than called for by JNA doctrine. The emplacement of mines was not the sole preserve of engineer units. In the HVO and VRS, the infantry were regularly responsible for laying anti-personnel mines to defend their

positions. In the ARBiH, mines were normally set by engineers or pioneers, although infantry soldiers were often taught how to neutralize the weapons.

While mines were primarily laid to protect front-line positions and avenues of retreat, demining organizations working in Bosnia and Herzegovina have also reported the following uses:

- *to protect transport infrastructure or prevent its use*: strategically important railways, roads, and bridges were mined;
- *to protect strategic installations*: mines were placed near power lines and stations, telecommunications relay stations, hydro-electric plants, water sources and water-supply infrastructure, and factories that were used as military bases or were located along front lines;
- *in support of ethnic cleansing*: the United Nations Mine Action Centre (UNMAC) confirms that mines were laid to prevent the return of minority inhabitants. In particular, anti-tank mines were used to destroy homes and anti-personnel mines and booby-traps were placed in the rubble to prevent rebuilding (see "Mine-laying to prevent returns", p.21);
- *to protect wartime prison camps*: mines were found around the perimeter of at least one such camp;
- *to destroy cultural monuments*: some churches and mosques were destroyed and then mined and booby-trapped to prevent rebuilding;
- *to protect private property*: people used mines to guard their homes and gardens.

(c) Types of mines used during the conflict

Marshal Tito's goal of a militarily independent Yugoslavia relied upon the development of a considerable arms manufacturing industry. Landmines were produced in large quantities both for export [8] and for domestic defence needs. Stockpiles of these SFRY-manufactured weapons were readily accessible at the start of the war and the mine contamination in Bosnia and Herzegovina has been created primarily through their use.

It has been reported that 85 different types of mines were used during the conflict. However, by 23 June 1997, only 30 types had actually been found by demining agencies. Of these, 18 were anti-personnel mines and 12 were anti-tank mines, most of which were JNA models.

Generally, the devices found were "second-generation" mines, which means that they were laid by hand and were not equipped with self-deactivating or self-neutralizing mechanisms. UNMAC officials have found no evidence that remotely delivered mines were used during the conflict. A descriptive list of the most common types of mines found in Bosnia and Herzegovina is given on page 49.

(d) The use of improvised mines

Since the warring parties were well supplied with SFRY-manufactured mines, UNMAC does not believe that locally produced "improvised" mines were deployed in large numbers. However, some improvised devices were nevertheless used during the war. The best known is the "Gorazde mine", a tripwire-operated fragmentation stake mine produced in small workshops in Gorazde during the siege of the city. While there is no estimate for the number of improvised mines produced, the mine-victim database managed by the Sarajevo delegation of the International Committee of the Red Cross (ICRC) lists 63 people killed or injured by improvised explosive devices, either booby-traps or mines, up to 31 July 1997. In one case, sea mines — designed to destroy ships, and usually anchored to the bottom of a body of water by a cable — were reportedly used as anti-tank mines by ARBiH soldiers to prevent VRS advances. [9]



ICRC/Ian Woodmansey
ref.BA- 286/22

During the war, many buildings were destroyed and mined to prevent reconstruction.

The rules of international humanitarian law governing the use of mines

As with all weapons of war, the use of mines is governed by the prevailing rules of international humanitarian law. Customary international law provides two general rules which must be followed by all the parties in any armed conflict:

(1) Parties to a conflict must always distinguish between civilians and combatants; civilians may not be the object of attack, and indiscriminate attacks and the use of indiscriminate weapons are prohibited.

(2) It is forbidden to use weapons which cause unnecessary suffering or inflict excessive injury.

Thus, the use of weapons designed to cause more severe injury than necessary to take a soldier out of action is prohibited.

In addition to these general rules, the use of mines is restricted by international treaty. Until recently, the primary instrument governing their deployment was the 1980 United Nations Convention on Prohibitions or Restrictions on the Use of Certain Conventional Weapons which May be Deemed to be Excessively Injurious or to Have Indiscriminate Effects (CCW). Protocol II of this treaty specifically restricts the use of all landmines, providing among other things that:

- Mines may be directed only against military objectives. Indiscriminate use of mines is prohibited and all feasible precautions must be taken to protect civilians.
- Remotely delivered mines may not be used unless their location is accurately recorded or each one is fitted with an effective self-destruct or self-neutralizing mechanism.
- Records must be kept of the location of planned minefields, and the parties to the conflict should also endeavour to keep records of the location of other minefields laid during the hostilities.
- At the end of the hostilities, the parties must try to reach agreement, both among themselves and with other States and organizations, on taking the necessary measures to clear minefields.

As the CCW is an international treaty, it only applies to those States that have agreed to be bound by its terms. Following the breakup of the SFRY, Bosnia and Herzegovina declared that it accepted the CCW and was hence bound by its provisions, including the rules contained in Protocol II.

In May 1996, the States party to the CCW agreed to amend Protocol II by adopting further restrictions and prohibitions on the use of certain types of mines. This Protocol is not yet in force, and Bosnia and Herzegovina has not yet formally agreed to be bound by its terms.

At an international conference held on 3 and 4 December 1997 in Ottawa, Canada, Bosnia and Herzegovina joined 122 other States and signed the Convention on the Prohibition of the Use, Stockpiling, Production and Transfer of Anti-personnel Mines and on their Destruction. This Convention comprehensively bans anti-personnel mines and will enter into force once 40 States have ratified or acceded to it. It is hoped that the government of Bosnia and Herzegovina will quickly ratify it and implement its provisions. At the conference, Bosnia and Herzegovina announced its intention to destroy anti-personnel mine stockpiles and dismantle production facilities within four years.

Mines and the peace settlement

The signing of the General Framework Agreement for Peace (better known as the Dayton Agreement) in December 1995 ended the war and marked the start of return movements and the rebuilding process in Bosnia and Herzegovina. The Dayton Agreement established a number of important principles designed to stabilize the country and allow the process of reconstruction and reconciliation to begin. Among other things, it recognized that the country was comprised of two entities — the Federation of Bosnia and Herzegovina (hereinafter referred to as the Federation) and Republika Srpska — and established an Inter-Entity Boundary Line (IEBL) and a 4-km-wide Zone of Separation (ZoS) between the two entities. It also recognized the need for democratic elections, a new constitution, human rights guarantees, rights for refugees and displaced persons and the mobilization of an International Police Task Force (IPTF). [10]

Military aspects were dealt with in Annex 1A, entitled "Agreement on the Military Aspects of the Peace Settlement," which addresses issues such as troop withdrawals from the ZoS, the arrival of an Implementation Force (IFOR) led by the North Atlantic Treaty Organization (NATO) to oversee compliance with the Agreement [11], and the redeployment of the entity armed forces [12] and restrictions on their future movements. It also includes specific obligations concerning the removal of minefields.

At the time the Dayton Agreement was signed, there were believed to be some 3 million mines scattered across Bosnia and Herzegovina. It was envisioned that soon after the Agreement came into force, the parties, monitored by IFOR, would take action to reduce the danger these devices would pose to post-conflict activities, such as reconstruction and the return of refugees and displaced persons. Specifically, Article IV (2)(d) of Annex 1A provides:

"The Parties immediately after this Annex enters into force shall begin promptly and proceed steadily to complete the following activities within thirty (30) days after the Transfer of Authority or as determined by the IFOR Commander: (1) remove, dismantle or destroy all mines, unexploded ordnance, explosive devices, demolitions, and barbed or razor wire from the Agreed Cease-Fire Zone

of Separation or other areas from which their Forces are withdrawn; (2) mark all known mine emplacements, unexploded ordnance, explosive devices and demolitions within Bosnia and Herzegovina; and (3) remove, dismantle or destroy all mines, unexploded ordnance, explosive devices and demolitions as required by the IFOR Commander.”

Annex 1A also gave IFOR, and its successor, the Stabilization Force (SFOR), the right “to monitor the clearing of minefields and obstacles” [13] and the right to conduct spot-checks at any time and destroy any undeclared stockpiles. [14]

In addition, all parties were required to declare the extent of their mine stockpiles and move them into officially agreed “cantonment” sites. The mines must remain at the sites and cannot be used or moved without SFOR permission. [15]

Implementing Article IV (2)(d) has been difficult. Mine clearance is at best a slow process and, given the estimated extent of the mine contamination problem, the devices have not been quickly removed from the ground or destroyed. As will be seen in the following section, many mines remain in place and many mined areas remain unmarked. However, the Dayton Agreement is notable for having established the important principle that the former warring parties are responsible for clearing the mines they laid.

In December 1996, a conference was held in London to review the implementation of the Dayton Agreement. At the conference, the Agreement’s sponsors (the European Union, France, Germany, the Russian Federation, the United Kingdom and the United States of America) expressed concern about the lack of progress in mine clearance and adopted new, practical and achievable steps to move forward the demining process. Specifically, they required the authorities in Bosnia and Herzegovina to:

- use their military forces for demining in accordance with internationally recognized standards;
- assist UNMAC by providing data and assigning priorities to proposed demining projects;
- support the demining effort by exempting all aspects of mine-clearance operations from taxes and customs duties.

The London conference also urged the authorities to formulate a plan to reduce anti-personnel mine stockpiles by 1 October 1997 and in the meantime not to acquire any additional mines.

The current landmine problem in Bosnia and Herzegovina

(a) The number of mines and mined areas

In early surveys and assessments, it was estimated that between three and six million mines had been laid during the war. This figure was based on the following assumptions: (1) that the JNA had stockpiled approximately three million mines before the war; (2) that mines acquired during the conflict accounted for another three million; and (3) that these stockpiles had been largely depleted during the war. As detailed below, UNMAC now believes the figure to be considerably lower.

Following the end of the hostilities, IFOR/SFOR were given a large number of minefield maps by the entity armed forces (see “Mapping”, p. 17). In addition, surveying has led to the discovery of additional mined areas. By 31 August 1997, UNMAC had records for 17,854 minefields containing a total of 286,000 mines. UNMAC believes that these records reflect roughly 50% of the actual problem. Extrapolating from this information, and assuming a margin of error, it estimates that there are over 30,000 minefields containing a total of 750,000 mines and contaminating more than 300 square kilometres of territory. Approximately 80% of the devices in the ground are believed to be anti-personnel mines and 20% anti-tank mines. The ARBiH laid 5,698 (32%) of the recorded minefields, the HVO 2,712 (15%) and the VRS 7,237 (41%). It is unclear which faction planted the

Mines in Bosnia and Herzegovina: facts and figures

- The country is contaminated by an estimated 30,000 minefields containing a total of 750,000 mines.
- Records are available for 17,854 minefields, and may exist for more.
- Most minefields were laid within sight of front-line positions, particularly in the Zone of Separation.
- By 31 July 1997, 1,243 people had been recorded by the ICRC as having been killed or injured by mines.
- Since the end of the war, four out of five mine victims have been civilians.
- Most mines were manufactured in the SFRY.
- Only 1% of mine-contaminated land has been cleared to humanitarian standards. [16]

remaining 2,207 minefields. [17]

(b) The location of minefields

During the conflict, as already stated, mines were generally used to protect front-line positions and avenues of retreat. In accordance with accepted military practice, which holds that minefields should be covered by fire from other weapons systems, most minefields are within sight of former defensive positions and are located either (a) no more than 4 km away from any former confrontation line or (b) on ground over which the former warring parties withdrew [18]. Since the IEBL and the ZoS roughly follow the wartime front lines, most minefields lie in these areas. Concentrations of mines are also found around many of the “ethnic pockets” besieged during the war. The map on the following page clearly shows the strong correlation between the former front-line areas and existing minefields.

All cantons within the Federation are mine-contaminated and, as shown in Table 1, some of the most populous cantons contain the largest number of recorded minefields. The densely populated Tuzla-Podrinje, Central Bosnia and Zenica-Doboj Cantons are the most severely affected. These areas account for 41% (7,349) of all the known minefields in the country. As will be shown, mines are hindering many post-war activities; in particular reconstruction and farming. They will also have a strong impact on the return of refugees and displaced persons.

There are fewer mined areas in Republika Srpska. Most of its 4,757 minefields are located in the ZoS, but a detailed breakdown of the problem is impossible since there is no cantonal administrative system. However, as in the Federation, minefields in Republika Srpska are severely disrupting reconstruction and food production, particularly in the fertile northern part of the entity (see “The impact on agriculture”, p.31).

(c) Mapping

In accordance with JNA doctrine, efforts were made by the warring parties, and particularly by their engineering sections, to record minefields on paper. After the conflict, many of these maps were turned over to IFOR/SFOR. UNMAC has stored these records, as well as the positions of non-mapped minefields discovered later, in a computer database in Sarajevo, which has become the focal point for all demining activity.

Generally, the accuracy of the minefield sketches on the maps is reasonably good. A map normally gives information on the general alignment and dimensions of the minefield, the number of mines it contains and the pattern in which the mines were laid. Importantly, many maps also include the name and unit of the individual making the record. This is valuable information for deminers, who may be able to locate the person if assistance or additional information is required.

While many maps provide accurate detail on dimension and content, often the coordinates identifying the exact location of the mined area are inaccurate. In some cases, the actual location of the minefield is over 1 km from that recorded on the map.

(d) Demarcation

Despite the existence of maps showing their location, the vast majority of minefields are unmarked on the ground. During the war, the authority to position minefields had devolved to a low level, often to that of the company commander. Under JNA doctrine, it was standard practice to mark the boundaries of minefields during mine-laying, and then remove the markings afterwards [19]. Often, there may not have been a perceived need to maintain them, as soldiers on a particular section of confrontation line were well acquainted with the dangerous locations in their area. In addition, since most mines were placed along front lines and the majority of civilians had fled the fighting, there was probably little concern about marking the area for the benefit of non-combatants. Anecdotal evidence suggests that soldiers would often verbally warn remaining residents of minefields. This may have further reduced the perceived need for marking.

Where minefields were marked, standard marking materials were in short supply and rarely used. According to minefield records, mined areas were often indicated by carvings on trees, red tape, crossed branches, felled trees or signs made out of various materials. While such signals may have been clear to soldiers, it is unlikely that they were adequate to warn civilians of the danger. Now, nearly two years after the end of the conflict, such markings are largely unrecognizable.

TABLE 1		
Number of Recorded Minefields and Population per Canton		
Federation:	Minefields*	Population**
Central Bosnia	1,879	252,617

Neretva	1,091	176,203
Posavina	388	38,666
Sarajevo	1,430	348,039
Tomislavgrad	751	78,750
Tuzla-Podrinje	3,141	615,673
Una-Sana	1,417	222,634
Gorazde	246	39,240
Zenica-Doboj	2,329	429,898
Republika Srpska:***	4,757	1,398,000
Location undetermined:	425	
Total:	17,854	2,851,852
<p>*UNMAC figures as at 31 August 1997. **UNHCR figures as at 31 August 1997 (based on statistics furnished **UNHCR figures as at 31 August 1997 (based on statistics furnished by entity authorities). ***No cantonal figures available.</p>		

(e) The use of mines since the advent of peace (e) The use of mines since the advent of peace

The signing of the Dayton Agreement in December 1995 did not end the use of mines in Bosnia and Herzegovina. Mines continued to be laid for various purposes. There have been several reports of mines being used to prevent the return of minority groups (see "Mine-laying to prevent returns", p.21). Some people have also deployed mines for their own purposes, especially to protect property. In the village of Knezevo, near Banja Luka, the owner of a wooded area on the edge of town is being prosecuted for the "criminal" use of mines. The owner mined his property to prevent the illegal cutting of wood by local villagers and posted no warning notices. As a result, at least one person was injured. In addition, SFOR reports that during the outbreak of a "café war" in Donji Vakuf, anti-tank mines were used to destroy rival cafés. [20]

UNMAC has no estimates on the number of mines in private circulation but believes it to be substantial. Mines were widely available to soldiers and civilians during the conflict, and many were not surrendered after it ended. While a considerable number of people continue to use mines to protect private property, some retain them in case there is a new outbreak of fighting or because they do not know how to dispose of them properly. During the summer of 1997, UNMAC deminers were called to the house of an elderly woman in Bihac who asked them to dispose of a supply of mines stored under her stairs. They had been used to protect her house during the war. In another instance, when a group of schoolchildren were asked if they knew what a mine looked like, one small boy told an ICRC mine-awareness instructor "I do, my father keeps one under the sofa".

Conclusions

In Bosnia and Herzegovina, mines have been used in both a disciplined and an undisciplined manner. The armies of the former warring parties often used the devices in ways consistent with JNA doctrine and training. Mines were used primarily for defensive purposes and the location of many mined areas was recorded. The existence of a large number of minefield maps indicates that it was standard military practice to record the emplacement of mines. In contrast, the use of mines by local militias, other groups and individuals was less controlled and records were rarely kept in these cases.

As landmines were generally deployed defensively and their locations recorded, many dangerous areas should be identifiable and predictable. Even in instances where records were lost, destroyed, never handed over or never kept, mines are likely to be found near former defensive positions in the ZoS, around the ethnic enclaves and close to important infrastructure. Potential minefields can be identified by analysing areas where heavy fighting occurred and by talking with the inhabitants, who are often familiar with the dangerous areas in their community. Consequently, relations with the local authorities, the staff of medical facilities and mine victims themselves are important factors in locating potentially dangerous areas. Defining the extent of the mines problem requires a multi-level and coordinated approach, in which local knowledge and involvement are essential.

The fact that many mined areas are identifiable and predictable distinguishes Bosnia and Herzegovina from other severely mine-contaminated countries, such as Afghanistan, Angola and Cambodia, where the devices were used in a more indiscriminate manner. However, in Bosnia and Herzegovina, most mined areas remain unmarked. As will be discussed below (see "The demarcation of minefields", p.38), minefield marking is not taking place for a variety of reasons and the risk of

accidents therefore remains high.

III. The human impact

As seen above, landmines are a serious problem in Bosnia and Herzegovina. People throughout the country live their daily lives under the threat of these weapons. Every month, civilians are killed or injured, refugees and displaced persons return to mine-contaminated communities and mine victims struggle to survive. Mines have had a tragic impact upon the lives of many inhabitants and will continue to do so until the devices are destroyed or removed from the ground.

Groups at risk

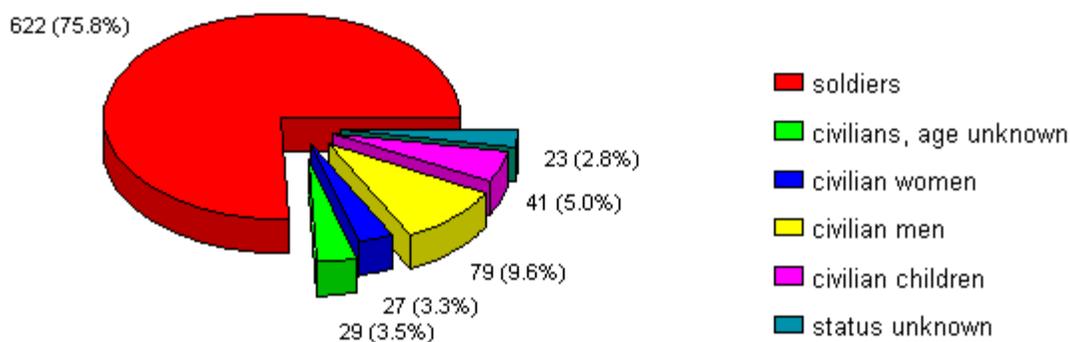
In Sarajevo, the ICRC operates a database where it stores information about people killed or injured by landmines during and after the war. The database provides details about the date and place of mine incidents, who was involved, what they were doing at the time and the extent of the injuries sustained. By 31 July 1997, it contained information on 1,243 people. Although the database is generally considered to be the largest and most detailed record of mine victims in Bosnia and Herzegovina, this figure represents only a fraction of the total number of people affected. This is because it is difficult to comprehensively record mine casualties and, especially during the war, few hospitals kept any such records. However, as the database includes information from all parts of the country, it supplies an important overall picture of the impact of landmines on the population. As in other conflicts, civilians in Bosnia and Herzegovina have suffered heavily from the use of these devices.

(a) Vulnerable groups during the war

During the war, the vast majority of mine casualties were soldiers. Of the 821 people known to have been killed or injured by mines between 1992 and 1995, 622 (75.8%) were soldiers, 176 (21.4%) were civilians and 23 (2.8%) were of unknown status [21]. The high percentage of military victims may be explained by the fact that most minefields were laid along front lines that remained fairly stable during the conflict. Civilians generally fled these areas, and since remotely delivered mines were not used, soldiers were the group most exposed to the threat.

Mine victims during the war

March 1992 to 15 December 1995



Source: ICRC database, Sarajevo

(b) Vulnerable groups after the war

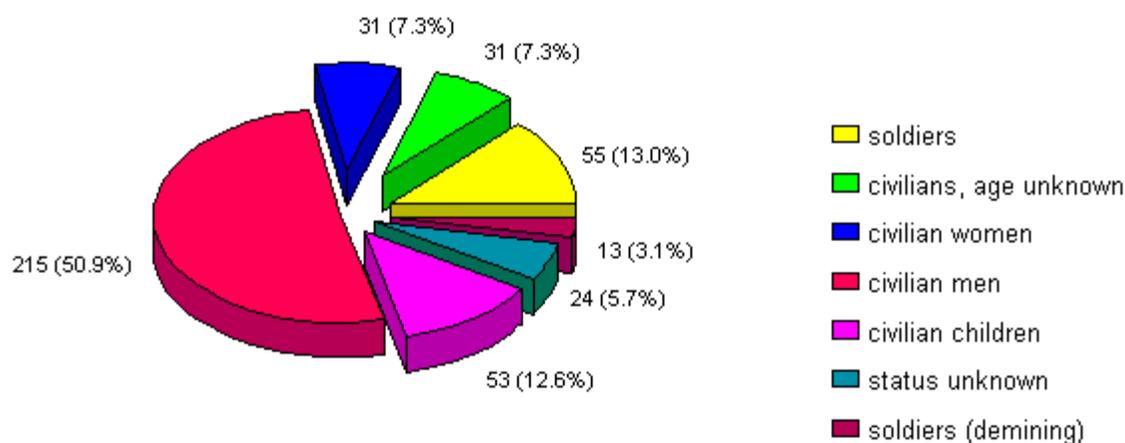
Since the Dayton Agreement was signed in December 1995, the pattern of victims has changed dramatically, with four out of five recorded casualties being civilians. Of the 422 people listed as

killed or injured by mines between 15 December 1995 and 31 July 1997, 330 (78.1%) were civilians, 68 (16.1%) were soldiers and 24 (5.7%) were of unknown status. Thus, the percentage of civilian casualties has risen from 21% during the war to 78% since the end of the hostilities. This can be explained by the fact that large numbers of people have resumed pre-war activities, in particular farming and gardening. In addition, many people are now travelling to areas where heavy fighting took place in order to assess the damage or return to their homes. The interviews with mine victims in a later section illustrate how these factors have increased the risk of accidents (see "The victims of mines", p.25).

A good half (50.9%) of all post-war accidents have involved civilian men, most of whom were injured while farming. Only 84 (20%) of the victims recorded were women or children. As women and children are generally not involved in agricultural activities and may be less likely to travel widely because of the unstable situation in the country, they may be at a lower risk for accidents. Of the 68 soldiers killed or injured since the end of the war, 13 (19%) were involved in demining at the time of the accident.

Mine victims after the war

15 December 1995 to 31 July 1997



Source: ICRC database, Sarajevo

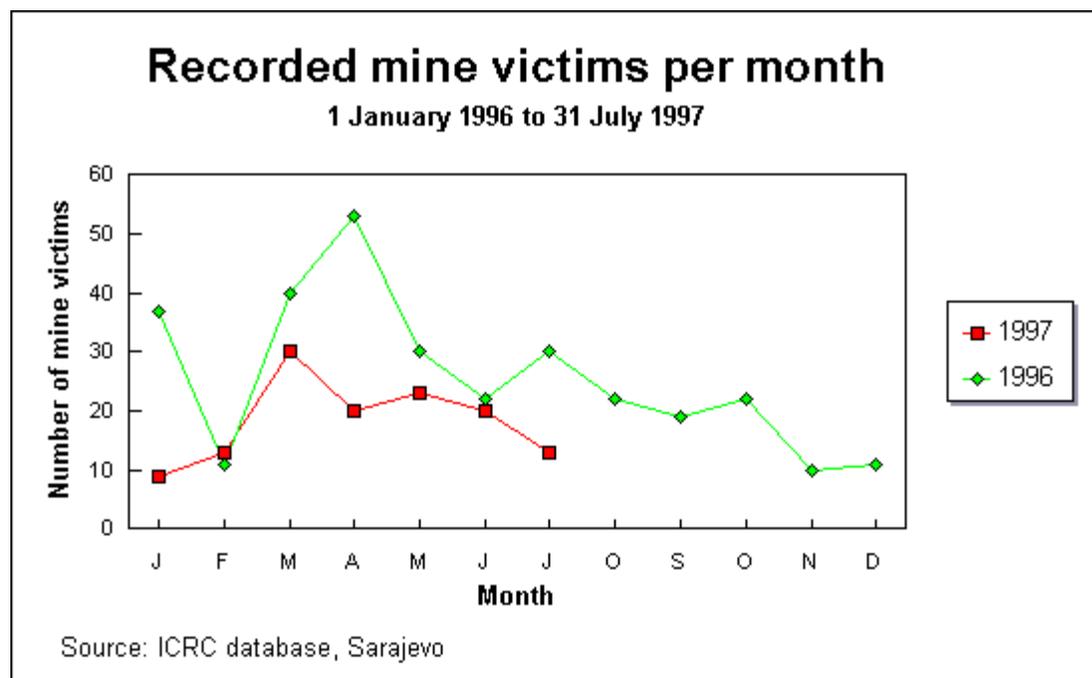
(c) Trends and observations

Immediately after the war ended, the number of recorded mine casualties increased dramatically. At that time, the ICRC estimated that 50 people were killed or injured by landmines each month [22]. However, from mid-1996 to July 1997, the number of recorded mine casualties decreased to an estimated 30-35 deaths or injuries per month. The reduction can be attributed to the fact that people have become more knowledgeable about the threat in their communities. However, the number of mine accidents is expected to rise again as pressure on land caused by the return of refugees and displaced people forces a repopulation of the ZoS (see "The particular vulnerability of refugees", p.21).

By 31 July 1997, the ICRC had registered a total of 690 military mine victims, 506 civilian mine victims and 47 victims of unknown status. While the number of military victims remains marginally higher overall, the picture is changing and civilian deaths and injuries will soon represent the majority. Clearly, the impact of mines has been quite indiscriminate.

According to ICRC statistics, relatively few people have been killed by landmines in Bosnia and Herzegovina: out of 1,243 mine victims, only 188 (15%) died from their injuries. Although it is difficult to know precisely how many deaths have been caused by mines, the statistics do suggest that the toll is considerably lower than for other mine-affected countries, where it is assumed that

roughly one person dies for every person who reaches a hospital.



The lower death rates are probably attributable to rapid evacuation from injury sites owing to ready access to vehicles and a well-developed road system. In addition, fairly good medical treatment is available upon arrival at a local health centre or hospital. Civilians have a higher death rate (22%) than soldiers (10%), possibly because military evacuation is quicker, and during the war field hospitals were often set up close to front-line fighting. For those who have survived a mine explosion, ICRC figures for 1996 show that 41% of victims suffered fragment wounds and 39% required the amputation of one or more limbs.

In 1996 and 1997, there was a dramatic increase in the number of mine incidents between the months of February and April as opposed to the rest of the year. In Bosnia and Herzegovina, this is the beginning of the farming season; the increase thus reflects the association between mine accidents and agricultural activity (see also "The impact on agriculture", p.31).

(d) The particular vulnerability of refugees

In mid-1997, 1.1 million refugees — roughly one quarter of the pre-war population — were still outside Bosnia and Herzegovina [23]. The Office of the United Nations High Commissioner for Refugees (UNHCR) estimates that 815,000 of these people are potential returnees, while the remainder are either in the process of acquiring a new citizenship or are being granted a permanent status in another country. UNHCR expected 200,000 people to return during 1997, the vast majority (160,000) to the Federation. At that time, it anticipated that many would go back to "priority repatriation" areas around the ZoS — the most heavily mined area in the country — and to cantons littered with minefields (see Table 2). However, the pace of repatriation has been slower than expected: only 110,000 people had returned by 31 December 1997 [24]. While many of these have gone back to cantons bordering the IEBL (see map p.22), a relatively small number have settled in the ZoS.

However, pressure on land will increase as people continue to return during 1998. Many will be forced into the ZoS and other mined areas, where they will begin rebuilding their homes and tilling their land once again. Because they have been away from their communities, they are often unaware of the precise locations of former front-line positions and the local markings used to identify dangerous areas. This has led to concern that in 1998 many returnees will be killed or injured in mine accidents.

If the aims of socio-economic reintegration embodied in the Dayton Agreement are to be achieved, large numbers of people must return to their pre-war homes. UNHCR is warning that unless an integrated approach is adopted, thousands of refugee families could return to high-risk areas. Reducing the danger will require further efforts in the areas of surveying, mine-awareness training prior to and on return to the country, mine marking and demining. The first recommendation in UNHCR's Operational Plan (presented to governments in Oslo on 8 March 1996) urged "the international community [to] encourage the Parties and experienced agencies to expand demining activities within Bosnia and Herzegovina, particularly in areas where threats to life and safety could

diminish the momentum of return". UNHCR, which has devised a strategy to boost international and local efforts to tackle the mine problem, recognizes the need for an integrated approach at the local and national levels.

TABLE 2 Number of recorded minefields and expected refugee returns per canton in 1997		
Federation:	Minefields*	Expected refugee returns**
Central Bosnia	1,879	16,000
Gorazde	246	2,000
Neretva	1,091	14,500
Posavina	388	12,000
Sarajevo	1,430	43,000
Tomislavgrad	751	5,000
Tuzla-Podrinje	3,141	23,000
Una-Sana	1,417	27,000
West Herzegovina		1,000
Zenica-Doboj	2,329	16,500
Republika Srpska:***	4,757	40,000
Total:	17,854	200,000

N.B. While the number of returns has been slower than anticipated, these figures still illustrate where future influxes are expected.

*UNMAC figures as at 31 August 1997.
 **UNHCR figures.
 ***No cantonal figures available.

• **Mine-laying to prevent returns**

Although the Dayton Agreement requires all the parties to allow minority ethnic groups to go back to their pre-war communities, there have been a number of incidents in which mines were laid to prevent this. For example, according to various news reports:

- On 22 January 1997, mines were laid to prevent the return of refugees to their former homes in Republika Srpska. The mines were reportedly put in place by Bosnian Serb police at a road crossing shortly before UN officials were due to take the refugees to their former homes. [25]

- On 20 August 1997, two refugees in the village of Divicani were injured in separate incidents. The blasts occurred in or around their homes. Both victims were part of a group which had just returned to the village. The mines were believed to have been planted recently. [26]

UNHCR and other organizations are concerned about such incidents, which they consider unacceptable. They will continue to work with local authorities to ensure that all aspects of the Dayton Agreement concerning minority returns are implemented.

• **Minority returns and the "Open Cities Initiative"**

Pursuant to Annex 7 of the Dayton Agreement, UNHCR is the principal United Nations agency in charge of facilitating the return of refugees and displaced persons. Its central programme for promoting returns is called the "Open Cities Initiative". Under this programme, cities or municipalities can voluntarily declare their willingness to allow minority groups to return to their former homes as full members of the community. Local authorities meet and work with UNHCR and other international agencies; when returns actually take place, the community is rewarded and supported with international assistance.

A growing number of cities and municipalities are showing interest in the programme. By mid-October 1997, four municipalities had been recognized as "open". However, all four are mine-affected. Bihac has 288 recorded minefields, Busovaca has 70, Konjic has 212 and Vogosca has 113. Large numbers of returns to these areas will increase the risk of accidents. Other areas with the potential to be "open" include Sarajevo Canton (1,430 minefields), Gorazde Canton (246 minefields), Lukavac Municipality (276 minefields) and Vares Municipality (171 minefields).

One of the criteria for becoming an "open city" is a willingness to accept mine-clearance activities. However, clearing these areas may take some time as the pace of demining throughout the country has been slow. UNHCR's mine-clearance partner, UNMAC, has not had the resources to undertake such widespread demining. To remedy this situation, UNHCR, in cooperation with UNMAC and the United Nations Development Programme (UNDP), is working to set up its own demining programme, which it hopes will be operational by 1 April 1998. This programme will focus on surveying, marking and clearing areas to which refugees and displaced persons are expected to return (see "Mine clearance: the Office of the United Nations High Commissioner for Refugees", p.37).

- **The dilemma faced by UNHCR**

The landmine situation in Bosnia and Herzegovina has created a dilemma for UNHCR: although the agency is aware that encouraging returns to some parts of the country will increase the risk of mine accidents, under the Dayton Agreement it is required to assist and encourage returns.

While there are ongoing efforts to warn refugees about the dangers of mines prior to repatriation, such warnings are often difficult to disseminate. Unlike traditional refugees, who tend to gather in camps set up close to the borders of their own countries, refugees from Bosnia and Herzegovina are widely scattered throughout Europe. They often live apart from other refugees and to a great extent have become integrated in the host country.

Furthermore, refugees are not returning as part of large repatriation operations but family by family, individual by individual, often without the aid of international agencies. UNHCR estimates that over 90% are "spontaneous returnees". Consequently, warning them of the dangers mines pose is difficult. In Germany and the United Kingdom, the National Red Cross Societies have undertaken programmes to disseminate mine-awareness information to refugees prior to their return to Bosnia and Herzegovina.

The psychological and socio-economic impact

While it is generally recognized that severe mine injuries cause psychological trauma and often destroy a person's or a family's wage-earning capacity, very little research has been done on the subject. This is also the case for Bosnia and Herzegovina, but some insight into the problem can be gained by examining early surveys and interviews with mine victims themselves.

Experts suggest that, as a result of the war, at least 15% of the country's population may have experienced psychological distress severe enough to require treatment [27]. While there are no figures specifically relating to mine victims, it can be assumed that there is a significantly higher incidence of psychological distress among this group than among the general population. The unexpectedness of the explosion, the violence and random nature of the injury and the likelihood of long-term disability can only add to the difficulty of overcoming the psychological effects of a mine accident.



ICRC/David Higgs Ref. BA-D49/8
Mines have an impact on the entire community. It will take children a long time to forget images like these.

Surveys conducted in Bosnia and Herzegovina in 1994 and 1995 by the Vietnam Veterans of America Foundation, in cooperation with UNHCR, found that 48% of mine victims and their families identified the psychological impact as one of the primary long-term consequences of a landmine injury. Families of mine victims reported that the victims often suffered from depression (66%) and loneliness (20%).

Similarly, a study conducted by Voluntary Relief Doctors found that half of the amputees treated at their facilities between June 1994 and March 1995 suffered from anxiety. To a lesser extent, patients also suffered from depression (20%), impulsiveness (10%), hypochondria (5%) and compulsive neurotic obsession (5%).

Although no research has been conducted on the subject, a psychological impact should also be expected among those who have not yet fallen victim to a mine but who are constantly exposed to the threat. Adults and children who have witnessed the violence of a mine explosion will carry the memory with them for the rest of their lives.

It will be particularly difficult for mine victims in Bosnia and Herzegovina to find work. Unemployment has been high following the war: in mid-1996, the jobless were estimated to

comprise 70% of the population in Croat majority areas in the Federation, 68% in the rest of the Federation, and 54% in Republika Srpska. [28]

Employment opportunities are generally scarce, and where they do exist, they often involve manual labour, a type of activity in which many mine victims are physically unable to engage. Furthermore, even if physically capable, many victims report that they cannot return to the jobs they held prior to the accident because their posts have been given to someone else by the time the rehabilitation process is completed.

In many families, the adult male is the sole breadwinner. An ICRC survey conducted in September 1996 found that four out of five households had only one income-earner, in 80% of the cases a man [29]. As pointed out earlier, it is also adult males who are the most likely to become mine victims. Since disability caused by a mine injury prevents the head of household from earning a living, the economic impact of a mine accident can be severe and dramatically affect the standard of living of the entire family. The following interviews illustrate how landmines affect the psychological well-being and socio-economic status of the victims and their families.

The victims of mines

Hurem Covic (age 46, former soldier)



ICRC/Ian Woodmansey
Ref. BA-D49/17

On 24 March 1994, Hurem lost his right leg in a mine explosion during a reconnaissance mission for the ARBiH in the hills just outside the town of Hadzici, near Sarajevo.

There were six men on the reconnaissance team. Four agreed to stay behind while Hurem and another man went forward to see what they could learn about enemy positions. They took a frequently used path through the hills, in an area that was not suspected to be mined.

When Hurem stepped on a pressure mine, his companion ran away. Hurem tied a tourniquet around his leg to stop the bleeding. He then crawled 900 metres until he was close enough to his own side of the front line to shout for help. Hurem was rushed to the war hospital in Suhodol, where he remained for 48 days.

Five months after the mine explosion, Hurem was fitted with his first artificial leg, made for him by Neretva, the prosthetics company in Sarajevo. Afterwards, he spent time at the Fojnica rehabilitation centre, where he received hydrotherapy (exercises in water to strengthen the muscles and improve flexibility) and did other physical exercises, learned how to use his new leg and learned about stump massage. Hurem explains that massage is essential to stimulate blood supply and maintain a healthy stump.

However, it soon became apparent that, although the wound looked well healed, the amputation was unsuccessful and the bone was too long. Although the prosthesis was well made and properly fitted, it was extremely painful to wear and caused his wound to bleed.

To correct the problem, Hurem entered the Kosevo orthopaedic clinic in Sarajevo on 2 May 1996 for a second amputation. After this surgery, the bone became infected, and 28 days later he had a third amputation. Although his stump was then in good condition, the bone began to grow again and he needed further surgical work seven months later.

In April 1997, Hurem received his second artificial leg from the Merhamet prosthetics workshop in Sarajevo. However, wearing the prosthesis is still painful. He considers it to be of poor quality and does not use it regularly.

Hurem's stump continues to hurt him. He finds it difficult to sleep and becomes very nervous thinking about the explosion. He says he sometimes feels as though ants were crawling all over his body.

All of the medical attention Hurem received, including the prostheses, was free of charge. He believes that the first artificial leg was paid for by the Sarajevo cantonal authorities and the second by international organizations. His rehabilitation treatment was also free of charge. He thinks that he will have to pay for any future treatment or prostheses himself.

Prior to the war, Hurem was a construction worker. Although the building industry now employs many people in the country, Hurem is unable to get a job in his old profession because of his injury. No one has offered him alternative employment.

Hurem receives a military disability benefit of US\$ 120-150 per month. However, this is not enough to lead a normal life, in particular to support his wife and two daughters, to pay for the schooling of his children and to cover his future medical treatment and medical travel expenses. Because his working life has been cut short, he will never receive a government pension — he would have to work at least another 10 years to qualify.

Adem Salimovic (*age 15, civilian*)



In August 1994, in the hills above the town of Cazin, Adem was working in the fields harvesting wheat with his younger brother. On his way home, he passed a friend who handed him a fragmentation mine found in a nearby cornfield and believed to be a dud. As he walked towards his house, he scraped the mine against a rock and it exploded. His younger brother witnessed the accident and ran to get help from neighbours, who came with a truck and rushed Adem to the Cazin hospital.

The doctors at the hospital referred Adem to a larger facility in Bihac for treatment. He was transferred there by ambulance. Upon arrival, he was unconscious. When Adem woke up a few hours later, surgeons had amputated his right leg at mid-thigh and the lower part of his right arm. The amputations were immediately closed and bandaged. He stayed in the hospital for 15 days.

ICRC/Ian Woodmansey After being discharged, Adem spent 10 days at home, then nine days at the Gata rehabilitation centre. At Gata, he was taught how to move his remaining limbs and was shown exercises to build up the muscles.
Ref. BA-D49/15

After three months at home, he was driven to Germany by his uncle to be fitted for artificial limbs. Doctors in Germany were concerned that a lower-limb prosthesis would not fit properly unless his femur was shortened. Adem therefore underwent a second amputation in Germany and convalesced there for three months. Later, his two prostheses were fitted and he was taught how to use his new arm and how to walk.

The prostheses cost US\$ 15,000. They were comfortable, and Adem used them a great deal. The arm was so sophisticated that he was able to hold a glass of water. But now Adem has outgrown them. He hopes to get another prosthesis for his leg at the local orthopaedic centre in Cazin, where they are free.

Adem feels no pain from his stumps. However, he thinks about the accident every day, and sometimes wakes up from sleep in a panic. He is very sad that he can no longer do many of the things his friends do, especially play football. Adem has never returned to the forest where the accident happened.

B. (*in his 50s, civilian, wished to remain anonymous*)

B. was injured in his garden on 26 June 1992, early in the war. At the time, he was a teacher at a local school. The fighting had been growing worse and supplies had become scarce, so he had decided to grow his own food on land not far from his house.

Since the area was close to a front line, he had approached local soldiers to make sure that it was clear of mines (he had been an army engineer during his compulsory military service and had received training in mine-laying). The soldiers had assured him that the land was clear and had showed him a mine map of the area. Since the map indicated that all of the mines laid had been cleared, he had assumed the land was totally safe. In retrospect, he says it was a foolish mistake.

The next day, he began working in the field. He remembers that it was abnormally hot, and when he escaped into the shade of a fruit tree he disturbed a mine. The explosion threw him into the air.

He remained conscious throughout the experience. He saw that his right leg was completely mangled and his left leg had suffered severe shrapnel injuries. He screamed for help and attempted to stop the bleeding with his hands. Some people came to the rescue, bringing a large piece of material which they used as a hammock to move him onto the back of a truck. He was immediately taken to the hospital, where his right leg was amputated at thigh level.

Before returning home, he spent 20 days in the hospital. He stayed at home for five months,

teaching himself to walk proficiently with crutches and training his muscles for his new lifestyle. Initially, he lost his sense of balance and fell over frequently. He had to teach himself basic things again — how to walk, even how to sit.

After the amputation, he could not sleep for months. He would feel the blood pushing to the end of his stump and building up pressure when there was nowhere for it to go. He thought that he would never sleep well again, but gradually he began to sleep more soundly.

After this period he stayed for three months at an orthopaedic clinic where he received a prosthesis and training in how to use it properly. The prosthesis was provided free of charge.

He is satisfied with his prosthesis. He says that it is not the best that money can buy, but it was provided free, so he shouldn't expect a prosthesis like the ones being produced by commercial firms in the country for US\$ 2,400. It does the job adequately. At the thought of paying for a prosthesis, he is indignant: "I'm not guilty because I stepped on a mine — so why should I be asked to pay?".

The accident caused him to lose his job at the school. Nobody invited him to return after the injury, and he does not want to beg for his job back. He is an educated man and now works for a humanitarian organization, which gives him the chance to help others in a similar predicament. This gives him immense satisfaction. He receives no disability benefit from the State.

He feels well adapted to his injury and continues to do everything he possibly can to lead a normal life. He is happy that the town is small because he can get around on his prosthesis and his crutches. He especially tries to play with his children. He does not want pity from others, he wants to be treated normally. He says the biggest problem for mine victims in Bosnia and Herzegovina is that people either ignore them or treat them differently. He thinks this is the biggest problem for disabled people in all countries.

B. still farms the garden where the accident took place. One year later, he found an anti-tank mine in the garden while using a hoe. He says he was lucky he didn't strike the detonator with the hoe. He moved the mine out of the garden.

Dragica and Mirko Ivankovic (age 68 and 76, civilians, displaced persons)



ICRC/Ian
Woodmansey
ref.BA- D49/114

The first thing that Dragica Ivankovic says when asked about her mine accident is: "We were completely innocent: we didn't do anything wrong". Dragica and her husband, Mirko, were civilians during the war, living in a house in the Muslim area of Konjic. They became more and more afraid of ill-treatment by the troops who controlled the area, and decided to flee from Konjic to the Croat part of Mostar.

On the night of 30 September 1993, they left Konjic. The chances of being shot on the road were too high, so they decided to pass over the mountains on the outskirts of town. At 1 a.m., on the mountainside above Zabrdje, a suburb of Konjic, Dragica stepped on a mine.

Immediately, Mirko rushed over to help her, and there was a second explosion. Neither Dragica nor Mirko know what type of mine tore off their legs. It was too dark and they were too confused. Both lay bleeding on the hillside for close to an hour. At about 2 a.m., HVO soldiers arrived to see what had happened. They had been afraid to come up and check because they knew the area was heavily mined. The soldiers carried Dragica and Mirko down the mountainside on their backs, which took them several hours, and tried to help, but they had no access to first-aid supplies.

Because the area was along the front lines, it was impossible to take Dragica and Mirko to a hospital in Croat-controlled territory. The HVO troops negotiated with VRS troops nearby, and the Serbs agreed to take Dragica and Mirko to a local Serb-controlled hospital in the town of Nevesinje, where they arrived at 5 p.m., some 16 hours after the accident.

Dragica and Mirko received good care in the Serb hospital. Both were given blood and underwent immediate amputations, and Dragica had surgery to remove mine fragments from her lips. Dragica's right leg was amputated below the knee and Mirko's left leg was amputated at the same level. The wounds were left open, waiting for delayed primary closure. Later, in a hospital in Zagreb, staff refused to believe that Serb medical personnel had taken care of them.

Eventually, after spending three days in the Mostar hospital and another day in the Split hospital, Dragica and Mirko were transferred to the Nova hospital in Zagreb by helicopter. In the meantime, however, the wounds had remained open and had continued to be cleaned and bandaged by hospital

staff. Upon the couple's arrival in Zagreb, Mirko's wound was successfully closed, but owing to the long delay Dragica's stump had become infected and surgeons were forced to perform a second amputation at mid-thigh level. Immediately afterwards, the wound was closed.

After two months in Zagreb, Dragica and Mirko were transferred to the Opatija rehabilitation centre in Croatia, where they both received physiotherapy, including massage and electrotherapy, and were taught how to walk with crutches. They spent 40 days at the centre. From there, the couple went to stay as refugees in a hostel in Gradac, Croatia.

Since returning to Bosnia and Herzegovina, they have received no further medical attention. Dragica still has shrapnel in her left leg which gives her pain, and she finds it difficult to walk.

Mirko has a prosthesis, but the one Dragica had is now broken. She collected money from friends and relatives to pay for a new prosthesis from Austria in 1994, but she put on weight and the second prosthesis is now also broken. They do not have money to travel to Split, where prostheses are made for free, so Dragica has little hope of getting a new one. She finds life without a prosthesis extremely difficult. They now live in a third-floor apartment, and getting up and down the stairs is very difficult for them.

The stories told in this section illustrate the severe impact of mine injuries on people's lives. Mine victims frequently lose their jobs and are unable to find new employment after their period of rehabilitation is over: Hurem is unable to work effectively, and B. has lost his job owing to his long absence from work. Furthermore, Hurem and Adem have suffered psychological trauma that is unquantifiable but has severely affected their ability to sleep, function and relate to others. B. says his biggest problem is that, because of his disability, people treat him differently or don't know how to relate to him. Dragica and Hurem still suffer considerable pain from their injuries. While all those who needed an artificial limb managed to get one after their accidents, Hurem complains that his is painful and B. says that his could be better. Dragica and Adem do not currently have a prosthesis, but both of them would significantly benefit from one.

Conclusions

There are several important observations to be made concerning the impact of landmines on the population of Bosnia and Herzegovina. Firstly, as ICRC statistics show, nearly two years after the end of the conflict mines continue to claim victims every month, and four out of five post-war casualties are civilians. During the war, relatively stable front lines and the absence of remotely delivered mines reduced the risk to the civilian population. The fact that mines were not used indiscriminately by the warring parties distinguishes Bosnia and Herzegovina from Angola and Cambodia. However, the post-war victim patterns in all three countries are similar. The more disciplined approach to mine-laying during the Bosnian conflict has had little effect on civilian casualties since the end of the hostilities. However responsibly they may be used, if left uncleared, landmines will claim civilian victims as people return to their homes and fields long after the fighting has ended.

Secondly, the return of refugees and displaced persons is a vital component of the Dayton Agreement and the long-lasting peace it seeks to achieve. As returns continue and the pressure on land increases, people will settle in riskier areas, including the ZoS. Deaths and injuries due to landmines are therefore expected to rise. The ZoS remains the most heavily mined area in the country, and efforts to improve the quality of life for returnees will obviously be hindered by the presence of mines. Among other things, reconstruction, farming, travel and, for children, playing are difficult in a mined environment. In order to allow people living in the ZoS to rebuild their lives, and to encourage additional returns, dangerous areas have to be marked and mines destroyed or removed from the ground. Yet, as the pace of mine surveying and mine clearance has been slow in Bosnia and Herzegovina, returnees will continue to be threatened by mines long after they have gone back to their communities.

Mine victims, and to some extent their families, have specific psychological, social and economic needs, both in the short and the long terms. The profiles in the above section poignantly reflect the suffering and anguish many of them experience. Complete rehabilitation is multifaceted, requiring several levels of treatment and assistance. While the provision of artificial limbs is an essential component of victim assistance, physical rehabilitation, psycho-social counselling and job training are also important and must be addressed. Some of these are long-term requirements and will necessitate close coordination among the authorities, non-governmental organizations (NGOs) and national and international agencies in order to ensure that the necessary services continue to be provided once the threat of mines has been reduced and international agencies have left the country.

IV. The impact of mines on living standards

The cost in terms of health care [30]

(a) The healthcare sector before the war

By the end of the 1980s, Bosnia and Herzegovina had a well-developed health-care system. Serious inroads had been made against infectious diseases, and the population enjoyed reasonable access to a wide range of services. Medical facilities were well staffed as compared with similar income countries: there were 7,032 doctors (2.6 per 1,000 inhabitants) and 18,257 nurses for a population of 4.4 million [31]. In addition, there were 5.8 hospital beds per 1,000 people, and infant mortality had declined from 56 per 1,000 live births in 1970 to 21 per 1,000 in 1991. [32]

(b) The healthcare sector after the war (b)

The war caused a severe deterioration in the provision of health care. Currently, damage to medical infrastructure and equipment is widespread, although unevenly distributed throughout the country. War-related structural damage is heavier in the Federation while the failure to maintain medical equipment is more pronounced in Republika Srpska. According to the Ministry of Health in Republika Srpska, 60% of important medical equipment either was damaged during the war or has fallen into disrepair, often through overuse. In addition, the war caused the collapse of the centralized health-care system, ended the mechanisms for financing of medical treatment and referrals, and destroyed important logistical supply routes.

The impact of the war on health care [33]

- More than 200,000 people wounded (including 50,000 children).
- More than 13,000 people permanently disabled.
- A two- to five-fold increase in the number of people with communicable diseases.
- A dramatic rise in infant mortality and premature deaths (doubled in some areas).
- 35-50% of medical infrastructure damaged or destroyed.
- About 35% of hospital bed capacity lost.
- Critical shortages of essential drugs and supplies.
- A 50% decrease in the number of active medical personnel.

(c) The impact of mine injuries on the healthcare system as a whole

Since there are no figures for the total number of mine victims in Bosnia and Herzegovina, the effects of caring for them are difficult to measure. The Federation's Ministry of Health believes that there are 4,500 to 5,000 amputees in the entity, but this includes amputees not injured by mines. Although there are no official figures for Republika Srpska, the ICRC's preliminary estimation is that there are 2,000-2,500 amputees there. During the war, very few clinics and hospitals kept accurate records, and where records were kept, mine injuries tended to be included with gunshot and shrapnel wounds under the category of "explosive injuries". However, detailed records kept at the Zenica hospital show that 445 out of the 711 (62.6%) amputations performed there between 15 June 1994 and 31 March 1995 concerned mine victims. [34]

It is well established that the treatment of landmine injuries puts a substantial strain on the health-care system of a country. Mine injuries require at least twice the amount of time and resources than are necessary for the treatment of other war wounds. Generally, a blast-mine injury will require four separate operations and patients remain hospitalized for an average of 32 days. This compares with an average of two operations for patients with bullet or fragmentation wounds and hospital stays of 19 and 14 days, respectively. Similarly, a mine victim normally needs 320 units of blood, whereas the treatment of bullet or fragmentation wounds usually requires only 50 units of blood [35]. Heavier demands are also placed on other surgical supplies and materials.

While further research may be needed to provide a more detailed assessment of the wider effects of treating mine victims on the health-care system, the impact is undeniable. Although the medical infrastructure and the availability of supplies have improved since the end of the hostilities, many hospitals still lack basic resources. Hospitals in Republika Srpska, in particular, report shortages of renewable materials and equipment. As people continue to be killed and injured by mines, scarce supplies and resources will be diverted from the treatment of other illnesses and injuries.

Assuming that each of the current 7,000 amputees needs a new prosthesis every four years, the annual expense of producing the 1,750 prostheses (excluding all medical, rehabilitation and support costs) is estimated from US\$ 1.8 to 3.2 million. As many patients may be less than 30 years of age when injured and have a virtually normal life expectancy, this will have a long-term effect on medical and social services. Significant resources will be diverted to rehabilitation whereas the stated aim of the ministries of health is to concentrate on preventative primary health care.

The impact on agriculture

Bosnia and Herzegovina is not an agriculturally rich country and it therefore depends on food imports. Since 57% of the territory is classified as mountainous, there is heavy reliance for strategic food production on the scarce fertile land in the north. Traditionally, the average yield for wheat and maize in the north was much greater than in other areas. This region makes up only 30% of the territory [36], yet in 1982 it accounted for 85% of all wheat production (276,000 tonnes) and 88% of all maize production (561,000 tonnes). It also accounted for 49% of the country's cattle, 75% of its pigs, 15% of its sheep and 74% of its poultry. [37]

Unfortunately, there is a lack of official data concerning the effects of mines on agricultural production as neither the Federation nor Republika Srpska have undertaken an assessment of the problem. However, the Federation's Secretary of Agriculture, Waterpower and Forestry estimates that 10,000 hectares of agricultural land throughout the country are unusable due to mine infestation and damage caused by trenches and bombardment. The extent of the impact should become clearer once UNMAC has completed entering records of known minefields into its database. Since minefields are classified according to terrain, UNMAC will be able to provide precise numbers for those found on agricultural land and those found on urban, industrial, wooded or rural land.

However, as the map on the following page suggests, many areas in the fertile northern part of the country, through much of which the ZoS runs, have been contaminated by mines. It is therefore likely that domestic food production has been affected. Indeed, many communities remain reliant on foreign food aid. Before the region becomes agriculturally productive once again, mine clearance must take place. Even after the mines have been cleared, large swathes of land will require extensive work since once-fertile fields have now reverted to wilderness.

The impact at the individual level illustrates the wider problem. Mita Tesanovic owns a farm in the village of Unka, Brod Municipality, in the northern part of Republika Srpska near the border with Croatia. Mita has been working this land since before the war. His farm used to be a large one for the region: he owned 10 hectares and rented another 10 from a neighbour, and he also had a vegetable garden. The farm was used for intensive livestock production, with an annual turnover of 1,200 pigs and 120 cows; 70% percent of the fields were used for growing fodder and 30% for cash crops (wheat and soya beans) to buy fertilizer and equipment. The farm was one of the main suppliers of pigs and cows to the large abattoir in Brod, which in turn supplied numerous local butchers and supermarkets with meat.

During the war, the farm was on the front line in clashes between the VRS and the HVO, and large defensive minefields were laid on Mita's land. When the fighting stopped, Mita approached the local commander of the VRS and asked him to demine the land. As a favour, the VRS cleared two hectares at the beginning of 1994. Mita burnt off one more hectare himself, using a tyre to detonate the mines made visible by the fire. He knows that this method of clearance doesn't guarantee safety, yet all of his neighbours have used the same approach. Thus, Mita now cultivates only three hectares, just enough to grow maize to feed his family. Because of mines, he is unable to use the remaining seven hectares he owns. He is no longer engaged in animal farming and no longer supplies meat for the local community.

Mita believes that in the whole of Brod Municipality, there are approximately 12,000 hectares of agricultural fields. In the area around Unka (which includes the villages of Vinska, Kolibe and Lijesce), 1,000 hectares are unused because of minefields laid during the fighting. There are an additional 923 hectares in the municipality, along the banks of the river Sava, that are unused on account of mines. This land has become fallow, and it will take some work to return it to agricultural production once demining has taken place. In particular, the trees and bushes which have grown there will have to be cut down, and the irrigation systems repaired.

The economic impact

The economy in Bosnia and Herzegovina has been shattered by nearly four years of war. Industrial production has collapsed because of direct damage to facilities and the disruption of supplies and payments. There is a desperate need for industrial growth and greater employment. By the end of the war, the average per capita GNP was US\$ 500, down from US\$ 1,900 in 1990. [38]

Reconstruction in Bosnia and Herzegovina focuses on a number of key areas, including not only industry and employment, but also transport and telecommunications, electric power and coal mining, housing, water and waste management, district heating and natural gas. Work in all of these areas is currently being either hampered or prevented by mine contamination. A number of specific examples, taken from potentially thousands, illustrate the problem:

- SFOR officials report delays in the rebuilding of Republika Srpska's telecommunications links owing to mines. The 5.2 million ECU Telecommunications Emergency Reconstruction

Programme has been held up by the presence of mines at several relay stations.

- UNMAC reports continuing problems with mined rail links, which are creating difficulties for the transport of raw materials and manufactured products. For example, mined railway lines are preventing the delivery of six new locomotives from Croatia which are to be used to restart freight and passenger services.
- UNHCR reports problems with the reconstruction of houses intended for refugees and displaced persons. The German Federal Agency for Technical Relief, which is funded by UNHCR, is implementing a US\$ 19 million programme to rehabilitate 637 houses in 45 villages and mines are causing delays and preventing the delivery of building materials.
- Republika Srpska's Project Implementation Unit for Demining reports that a number of factories and suppliers of raw materials are unable to operate on account of mines.
- The Federation's Ministry of Agriculture, Waterpower and Forestry reports that the impact of mines on forestry — an important part of the economy — is severe [39] and that logging and other related activities are not being undertaken. Furthermore, insects (familiae Scolitidae) are attacking trees in war-affected parts of the forests and mines are preventing the removal of the infested trees, which pose a serious threat to the healthy parts of the forests.

Conclusions

All sectors of the economy in Bosnia and Herzegovina have suffered heavily as a result of the war. Nearly two years after the end of the hostilities, landmines continue to have a negative effect on living standards. So far, however, there has been very little research on their full impact.

The provision of health care has clearly been affected since a substantial number of landmine injuries diverts significant resources and supplies from the treatment of other illnesses and injuries. As the number of mine victims is expected to increase with the return of refugees and displaced persons, the drain on valuable resources will continue. The impact may be felt more strongly in Republika Srpska, where the shortage of basic medical supplies is more pronounced. However, since the problem is a material one as opposed to a lack of trained staff, it can be addressed with the provision of increased aid and resources.

Landmines are also hindering reconstruction and agriculture. Restarting the industrial and agricultural sectors of the economy depends upon mine clearance. Removing or destroying mines will help generate new employment opportunities by allowing activities to resume at many worksites. In the northern region, mine contamination is having an impact on farming, which affects the ability of the country to feed itself. It is aIso making the return of refugees and displaced persons to that area hazardous, especially since many of these people will inevitably take to farming to meet their dietary needs.

There is clearly a lack of detailed information about the effects landmines are having on the various sectors of the country's economy. The entity governments are unable to provide any information on the scope of the problem, and the dearth of recent facts and figures is hindering recovery activities, and slows the response to mine contamination. It is difficult to develop reconstruction strategies and programmes, and to ensure their implementation, when the extent to which mines will affect a project is unknown. Research not only indicates the extent of the problem, it also helps identify priority areas for mine marking and mine clearance. To facilitate economic recovery, greater research should be undertaken by the relevant government ministries or other concerned agencies.

V. The response to mine contamination

As highlighted above, it is only through a multifaceted and coordinated approach that all aspects of mine contamination can be addressed. A comprehensive "mine action plan" consists of three components: mine-clearance, mine-awareness and victim-assistance activities. However, the existence of all three components does not necessarily guarantee effective and efficient risk reduction. In Bosnia and Herzegovina, particularly with regard to mine clearance and mine awareness, there are different actors and different approaches to achieving this objective.

Mine clearance Mine clearance

Demining has been slow to take off in Bosnia and Herzegovina: United Nations sources report that by July 1997, only an estimated 1% of mine-contaminated land had been cleared to

humanitarian standards. The slow progress can be put down to a number of factors. Large mine-clearance programmes have been unable to begin operations quickly. Time has been required to conclude agreements with the authorities, establish offices and logistical supply lines, recruit and train employees, prepare contracts and standard operating procedures, and make other initial arrangements. Smaller operations have been able to begin work more quickly, but in Bosnia and Herzegovina these are the exception rather than the rule. Furthermore, political wrangling between entity governments over the control of demining resources and a short demining season have prevented rapid progress (harsh winters make demining impossible between December and March).



*ICRC/Ian Woodmansey
ref.BA-286/31*

Demining is generally a slow and difficult process.

UNMAC officials believe that, with the help of 2,000 humanitarian deminers, the mine problem in Bosnia and Herzegovina can be "brought under control" within three to five years. As of 31 August 1997, there were fewer than one third of that number working in the field. However, with much of the preparatory work completed and the demining programmes of the World Bank, the European Union (EU), UNMAC and UNHCR now becoming operational, it is hoped that considerably more progress will be made in 1998. [40]

(a) The financial cost of responding to the problem

No agency has advanced an estimate of the total cost of clearing Bosnia and Herzegovina of mines. However, the budgets of the major humanitarian demining programmes give some indication of the funds required. The World Bank has calculated that it needs US\$ 67 million to continue its operations through 1998; UNMAC has a 1997 budget of US\$ 7 million (but this is less than one third of the funds it has requested); and the European Union programme has a 1997 budget of US\$ 7.7 million. Demining in the country is generally expensive, largely on account of the relatively high average wages paid in Europe. Norwegian People's Aid (NPA) pays a deminer in Mozambique roughly US\$ 100 per month, while in Bosnia and Herzegovina a deminer is paid around US\$ 660 per month. However, in comparison with the projected cost of rehabilitating transport systems (US\$ 300 million) or the national electricity grid (US\$ 140 million), the funds required for demining are relatively small. Indeed, pledges of humanitarian assistance to rebuild the country amount to a massive US\$ 5 billion over five years, the biggest humanitarian aid package in Europe since the Marshall Plan. It has been shown that mines affect and hamper all aspects of reconstruction: demining should therefore be an integral and vital part of any reconstruction strategy. As mine-clearance programmes become operational, it is hoped that adequate funding for their activities will be provided.

(b) The main organizations: a myriad of approaches to demining

There are a number of different agencies and organizations involved in demining in Bosnia and Herzegovina. In addition to the well-established and experienced ones, such as the United Nations and Norwegian People's Aid, newcomers such as the World Bank, the EU and UNHCR are also lending their support to the cause.

• The United Nations Mine Action Centre

On 12 January 1996, the government of Bosnia and Herzegovina formally requested the United Nations Department of Humanitarian Affairs (UNDHA) to assist with the removal of mines in the country and to set up an interim structure for developing, coordinating and implementing a mine-clearance programme. As a result of this request, the United Nations Mine Action Centre (UNMAC) was established, with a head office in Sarajevo. It was envisioned that UNMAC's role would be temporary and that the government would take over the agency's responsibilities and assets in 1998 (see "The future and the Commission for Demining", p.39).

Since its establishment, UNMAC has faced huge funding problems because two of its primary sources of money, the EU and the United States of America, have not provided the anticipated levels of funding. Instead, each adopted their own independent approaches to demining and chose not to commit themselves fully to UNMAC. On 13 August 1997, UNMAC reported that only US\$ 7 million out of a requested total of US\$ 23 million had been received to fund its activities until the end of 1997. As a result, only 120 deminers have been trained and are working in the field, instead of 1,200 planned in the event of full funding.

Among the major agencies and organizations involved in mine clearance, UNMAC is the only one with the primary aim of establishing a permanent indigenous demining capacity in Bosnia and Herzegovina. The World Bank and the EU have adopted a different approach, focusing on the hiring of commercial contractors. Thus, because of UNMAC's funding problems, there is concern that a

substantial non-commercial indigenous demining capacity will not be established by the time the government takes control of the agency.

In spite of financial constraints, UNMAC expertise has played an important role in demining the country. In addition to carrying out its own field activities, UNMAC advises and monitors other demining programmes. It assists the World Bank and the EU in choosing priority areas for clearance, in helping to implement standard operating procedures and in ensuring respect for safety procedures through on-site spot inspections. UNMAC also provides advice on improving the safety and quality of work in the minefields, and can as a last resort close down a consistently unsafe operator. Its database of minefield records makes it the focal point for demining activity.

- **The World Bank programme**

The World Bank does not itself directly engage in demining activities but instead provides funding to the governments of the Federation and Republika Srpska for the implementation of commercial demining projects. This enables the governments to hire international demining companies to remove mines and to train, manage and monitor fledgling local demining companies. The preference for international companies is based on the belief that developing a purely indigenous capacity for mine clearance would take months - even years - and that such delays would be both dangerous and expensive. The World Bank also believes that it has a vital interest in assisting the governments to link their mine-clearance projects effectively with the requirements of priority reconstruction sectors.

After signing an agreement with the World Bank in June 1997, the entity governments were provided with US\$ 13.9 million for mine clearance. The credit was granted to promote reconstruction and economic recovery and to facilitate the reintegration of displaced people and refugees. The Bank has made an additional US\$ 2.3 million available specifically to help in the demining of roads and railways.

To compensate for its lack of technical expertise in mine clearance, the World Bank has concluded an agreement with UNMAC allowing the latter to monitor the implementation of its demining programme. UNMAC is authorized to develop standard operating procedures, supervise mine-clearance contracts and carry out quality-control checks.

To implement the World Bank programme, both governments have established Project Implementation Units (PIUs) which oversee the granting of contracts and the distribution of funds. In June 1997, these PIUs signed seven contracts worth US\$ 10 million with three international demining companies that use manual demining and dog-handling teams. Five contracts were awarded for demining in the Federation: three for surveying and two for clearance. In Republika Srpska, one contract was awarded for surveying and one for clearance [41].

Current PIU demining priorities include quarries, roads, wooded areas, railway lines, a lime factory, an airport, water-supply installations, a hydro-electric power station, power lines, a telecommunications relay station and land near a sports field. In the future, mine clearance in support of safe returns should also figure high among PIU demining priorities.

- **The European Union programme**

Like the World Bank, the European Union (EU) is also new to demining and provides funding for the work of international demining companies. However, it employs them directly: it has hired two British commercial demining firms, DSL and Bactec, to train and monitor local deminers. Thus far, 18 clearance teams of 12 members each and 9 explosive ordnance disposal (EOD) teams of four members each have been trained. After delays resulting from customs issues were resolved in November 1997, the EU was expected to begin operations in the field.

In addition, the EU is making the following contributions:

* US\$ 5.3 million to UNMAC in Bosnia and Herzegovina and Croatia, funnelled through the United Nations Voluntary Trust Fund for Assistance in Mine Clearance;

* funding for two demining NGOs (HELP and Oktol) that are clearing mines in connection with the reconstruction of the Dobrinje residential suburb of Sarajevo (US\$ 575,000), the Bacevo water-supply system (US\$ 460,000) and the Samac bridge (US\$ 400,000).

- **The Office of the United Nations High Commissioner for Refugees**

In view of the need to increase the pace of demining, particularly in areas to which large numbers of refugees and displaced persons are expected to return, UNHCR has been working with UNMAC and UNDP to create a local demining capacity in Bosnia and Herzegovina. As part of this project, UNDP

and the Bosnia and Herzegovina Mines Action Centre (BHMACE), the national successor to UNMAC will set up, train and equip a demining force made up of local people recruited from each national community. The force will consist of six teams of 35 deminers and five support staff. Training will begin on 1 March 1998 and teams will be operational for the 1998 demining season. Each team will have clearance, surveying, EOD, mine-marking and mine-awareness capabilities. They will be administered by UNDP.

- **NGO demining**

Norwegian People's Aid

NPA was one of the first organizations to begin demining operations in Bosnia and Herzegovina. It started manual clearance with two teams in August 1996. A year later, NPA was working in Tuzla Canton to make 810 houses safe for the return of some 4,500 people. The organization is also involved in training sniffer dogs to help manual deminers with their work.

Handicap International

Handicap International, with technical support from UNMAC, is running a one-team demining programme in Bihac. It oversees the administration and general management of the programme and UNMAC provides the technical expertise for recruitment, training, monitoring and quality control.

- **"Mine-lifting" by the entity armed forces**

Under the Dayton Agreement, the entity armed forces are required to remove the minefields they laid. SFOR has been given a mandate to oversee and monitor this activity, and to ensure that an effective effort is being made by the parties concerned.

As a result, each entity armed force has established specific units responsible for "mine-lifting", comprising a total of 450 deminers. "Mine-lifting" differs from humanitarian mine clearance in that it involves removing all the mines recorded on a minefield map, but does not involve checking every square metre of ground to ensure that it is safe. However, all mine-lifters have received training in humanitarian mine-clearance techniques. Between 10 March and 3 August 1997, entity armed forces deminers removed 9,347 anti-personnel mines and 2,404 anti-tank mines from the ground.

Some deminers have questioned the utility of mine-lifting, arguing that since it does not involve comprehensive clearance — teams frequently do not use the humanitarian mine-clearance techniques they were taught — it provides little guarantee that an area is safe. However, SFOR officials believe that mine-lifting should complement humanitarian demining as a means of reducing the threat in low-priority areas. They therefore support the principle of "clearance commensurate with land use". In other words, while mine-lifting is not suitable for clearing villages where returnees are expected, it may be an acceptable means of reducing the danger in less frequented areas, such as forests. Nevertheless, in an effort to increase the pace of mine clearance in high-priority areas, SFOR is pressuring the entity armed forces to demine in accordance with humanitarian standards and to focus on areas that complement civil demining programmes.

(c) The demarcation of minefields

ICRC statistics show that 74% of mine victims did not know they were in a minefield before they were injured. This illustrates the urgency of minefield demarcation. However, in spite of the number of organizations involved in mine clearance, there has been little effort made to mark dangerous areas. Where marking does take place, the equipment is often stolen to build garden fences or dog kennels, or is burned as firewood.

The approaches to mine clearance adopted by the various organizations have not encouraged large-scale surveying and marking. Where commercial companies are employed, minefields are usually cleared immediately after surveying. These companies are normally hired to work in a specific area and are not required to demarcate anything more than the land they are paid to clear.

Officials confirm that SFOR does not require or encourage the entity armed forces to mark minefields as part of their mine-lifting activities. SFOR is concerned that marking certain areas and declaring them unsafe would imply that areas outside the markings are safe. Since many minefield maps dating from the war are inaccurate or imprecise, SFOR has been hesitant to encourage demarcation. IFOR and UNMAC were initially reluctant to issue maps of minefields to aid agencies, for the same reason.

UNMAC would be the obvious focal point for demarcation activities, but underfunding and lack of staff have prevented it from carrying out such work on a wide scale.

(d) Coordination of demining activities

As the international community becomes comfortable with the idea of mine clearance as a humanitarian response, a growing number of organizations are setting up demining programmes. While the involvement of the World Bank, the EU and UNHCR is a welcome development and

potentially likely to increase the pace of mine clearance, there is some concern that differing mandates, approaches and priorities in an atmosphere where funds are limited and the demand for action high, will lead to competition and friction that may undermine the efficient use of demining assets.

In order to avoid such difficulties, the main organizations involved agreed in early 1996 to establish a policy-setting body known as the Mine Clearance Policy Group (MCPG). MCPG was chaired by the Office of the High Representative (OHR) and included representatives of the international community and of the entity governments. It was to determine the priorities for mine clearance and allocate responsibility for implementation. However, because of political wrangling between entity representatives, MCPG became deadlocked and accomplished little.

In the absence of any coordination by the authorities, UNMAC has, to some extent, taken on this role. The United Nations has enormous experience in the area of humanitarian demining, having run large programmes in both Afghanistan and Cambodia. Its coordinating role in Bosnia and Herzegovina ranges from providing advice on prioritization to fully monitoring the World Bank and EU programmes. However, UNMAC's activities remain limited by a lack of funding, and its responsibilities and assets will be handed over to the national authorities during 1998.

(e) The future and the Commission for Demining

With the phasing out of UNMAC, new arrangements for demining have been agreed upon and will become operational in 1998. Under these arrangements, the entity authorities will play a more prominent role in mine clearance. On 15 October 1997, the Council of Ministers of Bosnia and Herzegovina and the United Nations signed a Memorandum of Understanding (MOU) concerning a national Mine Action Plan to address the problem of landmines.

Under the MOU, all the assets developed by UNMAC for the government of Bosnia and Herzegovina and/or the entities will be handed over to the Bosnia and Herzegovina Commission for Demining (BHCD), whose primary role will be to oversee the work of the Bosnia and Herzegovina Mine Action Centre (BHMIC). BHCD will also channel resources to the entity governments, which are responsible for implementing the Mine Action Plan, facilitate cooperation between the Federation and Republika Srpska and report on progress in demining operations. For its part, BHMIC will maintain and operate the central minefield database and mapping facility; propose technical, safety and quality-control standards for mine-clearance operations; and prepare proposals for mine clearance work across the Inter-Entity Boundary Line.

The MOU also requires the entity governments to develop an integrated plan for civilian mine-clearance operations on their territories. The Entity Mine Action Centres (EMACs) will conduct mine-awareness, demarcation, surveying and clearance operations; provide information to the central minefield database; coordinate demining activities with other operational agencies, ensuring that they address approved priorities and meet approved standards; and propose a list of urgent tasks within the entity, based on priorities set by local authorities and UNHCR, for approval by the government. The Project Implementation Units (PIUs) established to carry out projects financed by the World Bank will continue to function and are expected to coordinate their work closely with the EMACs.

At the international level, a board of donors will provide guidance to BHCD, BHMIC and the EMACs.

Mine awareness

Bosnia and Herzegovina has a level of infrastructure that facilitates the dissemination of mine-awareness information. School attendance is virtually universal, making it possible to reach almost every child with the message about the dangers of mines. Many people own televisions and radios, especially in the larger towns and cities, so the mass media can be used to alert the general public to the problem [42]. Moreover, the rate of literacy is high and newspapers are widely read. The country clearly has an educated population capable of absorbing information in many different forms.

The largest mine-awareness programmes in Bosnia and Herzegovina are run by the ICRC, which is working together with the local Red Cross structures and the United Nations Children's Fund (UNICEF). UNICEF's efforts are concentrated on reaching children in primary schools. The ICRC programme began in March 1996, soon after the war ended. At the time, it consisted mainly of a nationwide emergency mass-media campaign involving radio advertisements, TV spots, leaflets and posters designed to inform the greatest

ICRC mine-awareness programme in Bosnia and Herzegovina as at September 1997

- Mass-media campaign using posters, and TV and radio spots.
- Eleven mine-awareness officers working in Bihac, Bijeljina, Banja Luka, Gorazde, East Mostar, West Mostar, Pale, Sarajevo, Trebinje, Tuzla and Zenica.

number of people as quickly as possible about the dangers of mines.

Since then, the ICRC has added a more community-based approach: it now has 11 mine-awareness officers at regional level, each of whom oversees 10 to 20 instructors. These mine-awareness instructors are recruited from among the local Red Cross structures to gather information about the problem of mines in their communities, and to educate people about the dangers they face through meetings, conversations, presentations and other means. The involvement of the local Red Cross structures as implementing partners ensures that the programme is indigenous and sustainable.

Dissemination of information on landmines throughout the country by 123 Red Cross volunteers.

- Community-based work, including:
 - summer/winter camps, and theatre shows for children;
 - mine-awareness seminars for local communities;
 - discussions with farmers and others in mine-affected communities;
 - distribution of mine-awareness leaflets.
- Data-gathering on mine victims.
- Project designed to target all primary schools.

Both the ICRC and UNICEF are cooperating with the Ministry of Education in the Federation to conduct mine-awareness training in all of the entity's 300 primary schools. This training is being integrated into the school curriculum, with the two organizations providing mine-awareness materials such as badges, T-shirts, notebooks and posters, and showing teachers how to use them.

In the Republika Srpska, the Ministry of Education has taken a coordinating role in the teaching of mine awareness within its school system. With the assistance of the ICRC and UNICEF, the Ministry designed a mine awareness curriculum for primary schools and organized seminars for school teachers in November 1997. A similar project for kindergarten and secondary schools is also being developed.

There are also a number of other organizations and agencies involved in raising public awareness about the dangers of mines. Most of these are NGOs, whose programmes focus on a particular area or means of conveying the message.

Handicap International runs a school programme in Bihac; Spirit of Soccer (an NGO headed by a former professional footballer from England) provides 90 minutes of football practice followed by 30 minutes of mine-awareness training to children around the country; the Italian NGO Amici dei Bambini has produced a mine-awareness video for use in schools; Norwegian People's Aid is distributing leaflets and other mine-awareness information; the Soros Foundation and Amphibia have produced banners and cardboard models of mine explosions for use in open fields.

In addition, UNMAC and SFOR have conducted mine-awareness training at the request of local communities, groups and schools throughout the country. The Entity Mine Action Centres (EMACs) will also be conducting mine-awareness activities.

(a) The need for a coordinated approach

While the mine-awareness programmes in Bosnia and Herzegovina have been able to build upon the experience gained in other mine-contaminated countries and are notable for the extent of their coverage and the range of information they spread, there are several important concerns which still need to be addressed. Put simply, coordination among those involved is clearly lacking.

Indeed, there is no single organization entrusted with the task of coordinating the content of the messages, the geographical spread of the work, the primary target groups and the means of communication used. While the various organizations meet each month to exchange information, little is done to harmonize their activities. Consequently, they tend to work in very different ways — from the technical approach of SFOR to the "non-technical" approach of the ICRC and UNICEF. In some areas, there is a danger that work may overlap or be duplicated: in Bihac, for example, schoolchildren may at different times have received mine-awareness training from the ICRC, UNICEF, Handicap International, UNMAC and SFOR. While reinforcing messages is beneficial, excessive dissemination may inure the audience and hinder future efforts to put across new messages. Moreover, some organizations are spreading contradictory messages. Greater involvement of the ministries of education is addressing some of these concerns. However, there is no coordination in the dissemination of messages outside of the respective school systems.

(b) Reaching adults

While mine-awareness programmes are becoming part of the national school curriculum, adults are a more difficult audience to reach. Red Cross mine-awareness instructors report that many adults have an indifferent or blasé attitude towards mines, believing that because they survived the sniping, gunfire, heavy shelling and threat of mines during the war, they now have little to fear from mines alone. It is true that adults frequently know what mines look like, how they work and where dangerous areas are, and mine-awareness lessons which simply repeat this information are of little

value to them. Many people consider that they already have sufficient knowledge about the threat and have no need for further instruction.

A different approach to mine-awareness training for adults is therefore becoming necessary. It is especially important to address the reasons why people continue to take risks. A lack of concern for personal safety is often the result of economic necessity, peer group pressure, bravado, trauma suffered during the war or plain over-confidence around mines. Rather than repeating messages about the dangers, mine-awareness training must focus on changing high-risk behaviour and giving people realistic options for living safely in a mined environment. To this end, efforts to improve mine awareness could include discussing economic alternatives to using dangerous land, encouraging traumatized people to attend psycho-social centres or attempting to stigmatize bravado around mines. Local Red Cross structures are trying to respond to this more complex need and a number of agencies are starting to recognize that a more sophisticated approach must be taken towards adults.

Treating and assisting survivors

In Bosnia and Herzegovina, the backbone of the health-care system is the local health centre (*dom zdravlja*). Generally, there is such a centre in every municipality, and it provides the diagnoses, basic treatment and referrals for injuries and illnesses. Health centres normally have a team of general practitioners, resident nurses and visiting nurses, and they act as the local focal point for all health issues, generally serving 20,000 to 50,000 inhabitants. After a mine accident, the injured person is likely to be brought to the local health centre for immediate first-aid treatment.

If access to the victim is possible, the evacuation time from the place where the injury occurred to the health centre should be relatively short. As there is a health centre in every municipality, the distance to be covered should be no more than 30 kilometres. In addition, most people in Bosnia and Herzegovina have access to a private car [43] in an emergency and the roads are generally in good condition (50% of the national network is paved).

During the war, evacuation times were much more unpredictable as they depended on the proximity of the front lines, the availability of vehicles and the presence of a military hospital nearby. Soldiers were normally evacuated rapidly to temporary military hospitals, while other people were generally forced to seek treatment at civilian hospitals, which often made evacuation lengthy and difficult. Indeed, accident statistics during the war show that civilians were more likely to die from their injuries than soldiers (see "Trends and observations", p.20).

At the local health centre, a mine victim will receive emergency medical care and first aid from a general practitioner. This will include efforts to prevent further blood loss, to clean and bandage the wounds and to treat symptoms of shock. If necessary, sedation can also be given. However, health centres are not equipped to deal with traumatic surgery nor do they have the facilities to provide blood. Normally, while emergency first aid is being administered, health-centre staff will request an ambulance from the nearest surgical hospital.

(a) Emergency surgery

There are 12 surgical hospitals in the Federation and 15 in Republika Srpska that are capable of performing amputations. Transport time between the local health centre and the nearest surgical hospital should never be more than two hours. In the Federation, in the area served by the Mostar hospital, the travel time from the furthest health centre (50 km away in Ravno) is about one hour. In Republika Srpska, the greatest distance between a local health centre and a surgical hospital is 90 km.

The ministries of health in both entities report that they now have the necessary skilled surgeons capable of performing amputations. They also estimate that blood supplies are currently at sufficient levels to deal with the number of amputations performed each month since the hostilities ended.

Despite improved post-war conditions, however, hospitals in both entities still lack basic equipment to ensure the effective treatment of mine victims. The Ministry of Health in Republika Srpska reports that surgeons must "improvise" during major operations owing to a shortage of amputation kits and micro-surgery kits necessary to perform skin, muscle and bone grafts in the event of serious injuries.

Given the severity of mine injuries and the shortage of surgical and medical equipment and supplies, hospitals in Republika Srpska and in predominantly Croat areas of the Federation rely on outside assistance for the treatment of mine victims. Bosnian Serbs and Bosnian Croats requiring amputations are frequently evacuated to hospitals in the Federal Republic of Yugoslavia or Croatia. The cantonal Ministry of Health in Mostar estimates that 80% of Bosnian Croat mine victims are evacuated to Croatia for treatment.

(b) Physical rehabilitation

According to an ICRC study [44], the majority of amputees in both the Federation (estimated at 4,500 to 5,000) and Republika Srpska (estimated at 2,000 to 2,500) have been fitted at least once with a prosthesis. It also found that the number of current and planned orthopaedic workshops will be sufficient to meet the Federation's long-term need for prosthetics services. The orthopaedic workshops in Republika Srpska, although few in number and presently in bad condition, also have the potential to meet the long-term need for prosthetics services in the entity provided they are improved and renovated.

Currently, there are nine limb-fitting centres in the Federation, two in Sarajevo and one each in Tuzla, Mostar, Zenica, Livno (not yet functional), Cazin, Bihac and Zavid ovici. Average total monthly production is estimated at 85 prostheses, although capacity is thought to be double this. The two workshops in Sarajevo currently make nearly 50% of all prostheses in the Federation.

The cost of a prosthesis varies dramatically. A below-knee prosthesis produced by the Neretva prosthetics company in Sarajevo costs US\$ 1,800; a patient must pay the entire amount unless the material has been donated to the centre, in which case the patient pays 30% of it. A below-knee prosthesis produced in the Merhamet workshop in Sarajevo costs US\$ 600, but is provided free of charge. The average monthly take-home pay for those employed in the Federation was US\$ 136 in mid-1996.

In Republika Srpska, there are four prosthetics workshops, two in Banja Luka, one in Srbinje and one in Trebinje. In each of these centres, there is a desperate need for renovation, new machinery and new equipment. The average monthly production in Republika Srpska is 50 prostheses, with an estimated capacity of 67. Assuming a prosthesis has a lifespan of four years, the current production rate of 600 prostheses per year should, in theory, be sufficient to provide for Republika Srpska's estimated 2,000 to 2,500 amputees. Trebinje is the only workshop to charge for prostheses. It requires adult civilians to pay 15% of the cost, except for those with amputations due to diabetes or cancer. Soldiers are also required to pay 15%, but their contribution is covered by the municipality. The full cost is US\$ 1,350 for a below-knee prosthesis, and US\$ 2,040 for an above-knee prosthesis. Average take-home pay for those employed in Republika Srpska was US\$ 18 per month in mid-1996.

At present, the Banja Luka facilities account for nearly 80% of total prosthetics output in Republika Srpska. However, Bosnian Serbs living in the eastern parts of the entity are more likely to receive treatment in Belgrade (at the Rudo or Zotovic orthopaedic centres) than to travel to Banja Luka.

The ICRC study highlights a number of specific problems which must be addressed if the prosthetics services in Bosnia and Herzegovina are to be improved. In both entities, the technology used for the production of artificial limbs is too expensive to enable these services to become self-reliant in the long term. In addition, technical staff lack theoretical training and efforts tend to concentrate on the production of lower-limb prostheses. Finally, there are no uniform policies on the financial contributions expected from patients.

(c) Psycho-social care

Medical staff interviewed for this study were not aware of any psycho-social assistance specifically aimed at mine victims. However, there are psycho-social programmes operating in the Federation which are designed to treat the general psychological effects of the war and to counteract trauma. The International Council of Voluntary Agencies lists 50 international and local organizations running such programmes in Sarajevo alone.

One of the objectives of the Health Plan for Republika Srpska is to improve services for those in need of psychological treatment by the year 2000. The plan notes that "during 1997-98 in Banja Luka, Bileca, Doboj, Gradiska, Milici, Pale and Prijedor Municipalities, health centres [...] will implement a coordinated approach to detection, investigation, treatment, rehabilitation and care for people with mental-health problems involving GPs, mental-health centres and hospital departments of psychiatry in the area".

(d) Longer-term assistance

Soldiers injured during the war should receive a military disability benefit from the State, with the amount depending on the severity of the injury. However, owing to the weakness of the economy, payments are often made months late or not at all. Furthermore, veterans complain that the benefit is not sufficient to cover their everyday needs. Civilians injured during the war receive no disability payments.

Currently, employment opportunities are limited throughout the country and the chances for a mine victim to find gainful employment are slim. As in many other countries, there is prejudice against employing the disabled.

However, numerous small-scale employment programmes are being implemented by NGOs and

some of these offer jobs to disabled people. For example, a leather workshop in Bosanski Otaka established by Handicap International employs eight war invalids (including three amputees). Landmines Survivors Network, an NGO made up exclusively of mine victims, is also in the process of establishing a programme to provide long-term medical care, employment opportunities and other assistance to people injured by mines. To combat prejudice, the World Health Organization (WHO) is running a mass-media campaign to inform the general public about disability issues.

Amputees and other disabled people cannot rely upon the State to provide for them, nor is there much hope that they will find jobs. As in other countries, the family becomes the most important source of both financial and emotional support. In many areas, there is a local war-invalid association which provides an informal support network and an opportunity to meet and socialize with people facing similar problems.

A ban on anti-personnel mines

Mines will continue to have an impact on Bosnia and Herzegovina for years to come. At present, they maim innocent civilians, prevent the return of refugees and displaced persons, slow the pace of reconstruction and impede agricultural production. These consequences have highlighted the need to prevent any future use of these weapons.

Bosnia and Herzegovina, along with 122 other States, has signed the Convention on the Prohibition of the Use, Stockpiling, Production and Transfer of Anti-personnel Mines and on their Destruction (also known as the Ottawa treaty). It is important that rapid and visible progress be made towards the destruction of stockpiles of anti-personnel mines. Encouragingly, the government has proclaimed its intention to destroy its anti-personnel mine stockpiles and dismantle production facilities within four years. The entity governments should conclude a binding agreement to make this goal a reality. The agreement should be made public and proof of compliance should be offered to build confidence in the process. SFOR monitors may act as international guarantors to confirm that the stockpiles have been destroyed.

Conclusions

While all elements of an effective mine-action plan — mine-clearance, mine-awareness and victim-assistance activities — do exist, there appears to be very little consultation, prioritization or exchange of information among the organizations concerned. This is particularly true with regard to minefield marking and mine-awareness activities. In theory, demining in Bosnia and Herzegovina should benefit from the country's advanced infrastructure: a well-developed communication system, a good road network and easy international logistics. Thus far, however, the pace of demining has been slow and coordination among the various organizations lacking. Through 1997, UNMAC to some degree assumed a "coordinating" role and acted as a focal point for information. But there is still no uniform approach to demining or prioritizing mined areas for clearance. Different strategies have led to inadequate demarcation of dangerous areas. With regard to mine-awareness activities, there has been some duplication of efforts, especially with regard to teaching children. Moreover, contradictory messages have sometimes been spread. These shortcomings point to the need for a more integrated approach.

The Memorandum of Understanding (MOU) signed by the government of Bosnia and Herzegovina and the United Nations is an important document which has the potential to help improve the situation. The MOU recognizes that the landmine problem requires a long-term strategy and the involvement of the local authorities. Thus far, efforts in that direction have been limited. The MOU established the National Mine Action Plan and provided for Entity Mine Action Centres (EMACs) that will survey, mark, and clear minefields, and teach mine awareness. Each EMAC is to coordinate demining activities with other operational agencies, ensuring that they address approved priorities and operate according to approved standards. In addition, the EMACs are to propose a list of urgent tasks within each entity on the basis of priorities set by local authorities and UNHCR for approval by the government. Hopefully, this agreement and the structures it establishes will enable the authorities to play a prominent role in improving coordination among the demining organizations and increase the pace of minefield marking and clearance.

There is a substantial amount of information available about the mine contamination problem in Bosnia and Herzegovina. The ICRC systematically gathers and analyses data on mine victims and UNMAC collects data on mined areas. However, as sections of this report indicate, there is a lack of information on some aspects of the problem and inadequate coordination in the international response. One way to prevent this in the future is to systematize the collection and analysis of data. In March 1997 at the Tokyo Conference on anti-personnel mines, the ICRC proposed the concept of a "Mines Information System" as a means of standardizing the collection, analysis, and flow of mine-related information. Such a concept can improve coordination and ensure that the response to the

mine problem is both effective and efficient. [45]

VI. Final conclusions and recommendations

This report provides an overview of the impact that landmines are having in Bosnia and Herzegovina today. It clearly shows that the presence of these weapons affects all aspects of post-war life. If the problem is to be addressed effectively and efficiently, a comprehensive, coordinated and integrated approach will have to be adopted and support provided from the highest levels. While it is hoped that the establishment of the Bosnia and Herzegovina Commission for Demining will help meet these requirements, there are a number of important steps that can be taken to reduce the risk landmines pose to the post-war society. These steps and a summary of the report's major findings are presented below.

- **The use of mines, minefield maps and demarcation**

Although mines are now severely hindering reconstruction, the return of refugees and other activities, they were nevertheless used in a relatively disciplined fashion during the war. Many minefields were laid, in accordance with JNA doctrine, along front lines to protect defensive positions and their location was often recorded. As most minefields are within sight of former military positions, it should be possible to find many unrecorded minefields by analysing the confrontation lines and the movements of fighting forces during the conflict. Crucially, this semi-disciplined use did not usually include the marking of mine emplacements on the ground to warn civilians of dangerous areas. Most mined areas remain unmarked to this day.

To help protect civilians from the dangers of mines, demining agencies should focus increased effort on surveying and demarcation programmes, particularly in areas to which refugees are expected to return.

- **The human impact**

Mines in Bosnia and Herzegovina have had a severe impact on the civilian population. Since the end of the war, 80% of mine victims have been civilians, most frequently male farmers. The number of recorded mine accidents is slowly falling as people become better acquainted with the threat in their communities. However, UNHCR and other organizations are concerned that the figures will increase in 1998 as refugees continue to return. Many will go back to the most heavily mined parts of the country, and their lack of local knowledge will make them particularly vulnerable to mine accidents.

To enhance the protection of returning refugees, mine-awareness programmes should be established in host countries.

- **Medical treatment available to mine victims**

The number of people killed by mines is lower in Bosnia and Herzegovina than in other mine-affected countries. This is attributable to quicker evacuation times and to rapid and good quality emergency medical attention, which is free of charge. However, Bosnian Serb and Bosnian Croat mine victims are frequently evacuated to sophisticated medical facilities in the Federal Republic of Yugoslavia or Croatia for further treatment.

To ensure that mine victims receive the most effective medical treatment available, the ICRC should disseminate information about the best surgical practices to all hospitals concerned in Bosnia and Herzegovina, Croatia and the Federal Republic of Yugoslavia.

- **Physical rehabilitation of mine victims**

Overall, the quality of prostheses available to mine victims in Bosnia and Herzegovina is good. Given the number and capacity of operational and planned orthopaedic workshops, the country has the potential to meet its long-term need for prosthetics services. At present, most mine victims appear to have been fitted with an artificial limb at least once. However, there is room for improvement. In particular, facilities and equipment in Republika Srpska need to be renovated and upgraded, and appropriate training provided to technicians. Furthermore, most centres concentrate on lower-limb prostheses and there are no uniform policies regarding the financial contributions expected from patients.

To ensure more effective provision of artificial limbs in Republika Srpska, donors should commit themselves to renovating and re-equipping prosthetics centres in the entity.

To ensure an effective long-term programme, prosthetics workshops in both entities should use more appropriate technology and provide theoretical training to technicians.

Social reintegration of mine victims

The survivors of mine explosions face shattered lives: there are few employment opportunities for disabled people and depression, coupled with the lack of an adequate State disability benefit, makes life difficult in most circumstances.

To promote the social reintegration of mine survivors, especially amputees, the authorities and relevant organizations should seek to address their psycho-social needs.

• Agriculture and economic recovery

Some of the most fertile land in Bosnia and Herzegovina is mined, severely affecting strategic food production. The impact of mines on agriculture is critical in certain regions. As a result, the country continues to rely on international assistance to feed its population. The US\$ 5 billion programme for economic recovery, which ranges from the reconstruction of water-supply facilities to the resumption of logging activities, is being hindered by the presence of mines in numerous areas. However, official assessments of the full impact of mines on agriculture and economic recovery are lacking and further research is required in these areas.

To address the impact of mines on agricultural production and economic recovery, the ministries concerned should conduct relevant research and they should improve the prioritization of land for clearance on the basis of their findings.

To ensure safe and effective economic recovery, all reconstruction programmes should include a financial component for demining, where necessary.

• Demining

A number of organizations are active in humanitarian demining in Bosnia and Herzegovina, although progress to date has been slow. UNMAC, the World Bank, the EU and UNHCR mine-clearance programmes are now either operational or about to start, and it is hoped that the pace of surveying and clearance will pick up in 1998. Demining operations should benefit from the country's well-developed infrastructure, such as an effective communication system, a good road network and reasonable international logistics. However, there have been problems in reaching agreements with the entity governments concerning the use of demining assets. Moreover, coordination among the major demining organizations has been insufficient at times, and different mandates and working methods have resulted in inadequate demarcation.

Under the Dayton Agreement, the entity armed forces are required to assist in "lifting" the mines emplaced by them. While the principle behind this obligation is important, there have been some practical difficulties, both in coordinating their activities with those of humanitarian demining agencies and in ensuring that land cleared by the entity armed forces deminers is free of mines.

The United Nations and the government of Bosnia and Herzegovina have concluded a Memorandum of Understanding, whereby the government will take over the responsibilities and assets of UNMAC in 1998. With the establishment of the Bosnia and Herzegovina Commission on Demining (BHCD) and the Bosnia and Herzegovina Mine Action Centre (BHMAC), the national authorities will assume a prominent role in mine clearance and it is hoped that coordination among the various organizations involved in demining will improve and that the pace of mine clearance will speed up in 1998.

To ensure effective long-term demining, international donors should commit themselves to financing mine-clearance programmes in Bosnia and Herzegovina for a minimum of three more years.

To ensure the effectiveness of mine-lifting by the entity armed forces, SFOR should insist on the use of humanitarian demining techniques at all times and employ sanctions where appropriate.

To improve the coordination of demining activities, a concerted effort should be made by all governments and organizations concerned to provide BHCD and BHMAC with the necessary resources and political support to enable them to discharge their responsibilities under the MOU.

• Mine awareness

Mine-awareness activities in Bosnia and Herzegovina have benefited from the experience gained in other mine-contaminated countries, particularly with regard to methods of spreading information. The two major programmes in the country are run by the ICRC and UNICEF, although numerous other organizations are also involved. The fact that school attendance rates are high means that most children can be taught about mines in the classroom. However, reaching adults is more difficult. In some areas, lack of coordination among the various organizations has led to a duplication of efforts and, in some instances, to the dissemination of contradictory messages.

To improve coordination among the organizations involved in mine-awareness activities, it is important that agreement be reached by all those concerned regarding the messages to be spread and their respective areas of responsibility (both geographical and sectoral). The ministries of education of both entities should take the lead in coordinating the programmes, ensuring that there is no duplication of efforts within the school system.

- **Banning anti-personnel mines**

The government of Bosnia and Herzegovina joined 122 other States in signing the Ottawa treaty banning the use, stockpiling, production and transfer of anti-personnel mines.

To build confidence in the treaty, the entity governments should immediately conclude a binding agreement to destroy all stockpiles of anti-personnel mines currently being held by their armies.

VII. Annexes

Types of Mines

On 31 August 1997, the UNMAC database in Sarajevo listed the following as the most common types of mines found in Bosnia and Herzegovina. [46]

Antipersonnel mines Anti-personnel mines

PMA 1A: Minimum metal blast mine. The PMA 1A is made of two pieces of plastic joined together clamshell-style. Three kg of pressure causes a spark to shoot into the detonator and explode the mine. The device has a lethal radius of 1 m and a hazardous radius of 25 m. Minefield records show that a minimum of 15,516 of these mines were laid during the conflict. Manufactured in the SFRY.

PMA 2: Blast mine. The PMA 2 is made of bakelite/plastic and is the size of a small can of shoe polish. It has a star-shaped pressure plate which protrudes above the mine body. The mine is usually buried so that only the pressure plate is exposed. The PMA 2 is a "minimum metal content mine" and contains only a very small piece of metal that is detectable. Five kg of pressure are necessary to detonate it. Minefield records show that a minimum of 22,995 of these mines were used during the conflict. The JNA considered the PMA2 their most dangerous mine, and it was never recovered once laid but always destroyed in place. Manufactured in the SFRY.

PMA 3: Blast mine. The PMA 3 consists of an upper and a lower plastic half and is sealed by a protective rubber cover. It is about the size of a can of tuna and looks like an oversized ice-hockey puck. The mine contains very little metal. Three kg of pressure fires the detonator, causing the mine to explode. As with the PMA 2, the JNA made no effort to recover this mine. Minefield records show that a minimum of 35,299 PMA 3 mines were used during the conflict. Manufactured in the SFRY.

PMR 2A AS: Fragmentation mine. This mine has a cast-steel body which is pre-fragmented on the outside. It is mounted on a wooden stake and the fuse protrudes above the mine body. Three kg of pull on the tripwire causes it to explode. The mine can hold a flare which is fired 100 m vertically while the mine is simultaneously detonated. It has a lethal radius of 40 m and a hazardous radius of 100 m. Minefield records show that a minimum of 65,001 of these mines were used during the conflict. Manufactured in the SFRY.

PROM 1 1P: Bounding fragmentation mine. This mine is usually buried with only the prongs and fuse extension exposed above the ground. It has been seen taped to trees at eye level and can be immersed in water up to 50 cm deep. It can have as many as six tripwires. The mine has a smooth metal appearance and is the size of a half-litre beer bottle. A small primary explosion throws the mine 70-80 cm into the air before the main explosion. It is usually detonated by 3 kg of pull pressure on a tripwire. The mine has a lethal radius of 50 m and a hazardous radius of 100 m. Minefield records show that a minimum of 9,018 of these mines were used during the conflict. Manufactured in the SFRY.

MRUD: Directional "Claymore-type" fragmentation mine. The MRUD is a surface-laid mine, which is made of plastic and contains 650 steel balls designed to fragment on detonation. The mine is generally found standing on its scissor legs or fastened to trees. It can be laid under water for up to 24 hours, set to fire as a booby-trap or used as a command-detonated munition. The mine can also be activated by a tripwire. Minefield records show that a minimum of 7,241 MRUD mines were used during the conflict. Manufactured in the SFRY.

Anti-tank mines

TMM 1: Blast mine. The TMM 1 is made from sheet metal and was used extensively around road blocks during the war. It requires a pressure of 130 kg to explode. However, the mine has been used without its pressure plate, reducing the detonation threshold to 70 kg. This is sufficiently low to

turn it into an anti-personnel mine. The mine comes equipped with an anti-handling device. Minefield records show that a minimum of 6,754 TMM 1 mines were used during the conflict. Manufactured in the SFRY.

TMA 3: Blast mine. The TMA 3 is made of cast explosive with a fibreglass coating. It looks like a large round cheese and has a cloth handle moulded into the side. The mine has three fuses which protrude above the mine body and look like brown mushrooms. It takes 180 kg of pressure on one or all three of the fuses to detonate the mine. The TMA 3 comes equipped with an anti-handling device. Minefield records show that a minimum of 6,746 of these mines were used during the conflict. Manufactured in the SFRY.

TMA 4: Blast mine. The TMA 4 is made of cast explosive with a plastic coating. It is circular in shape and looks like a sharp-edged large round cheese. It has a rope handle attached through a hole in the body. A pressure of 120 kg on one or all three of the fuses that protrude from the mine body will cause it to detonate. Minefield records show that a minimum of 5,209 TMA 4 mines were used during the conflict. Manufactured in the SFRY.

TMRP 6: Blast and jet mine. The TMRP 6 is made of plastic but contains a convex steel plate. The mine is circular in shape and has a ribbed upper surface with a large fuse unit that holds a tilt rod in the centre. It can be detonated in one of three ways: 1.3 kg of lateral pressure on the tilt rod; 150 kg of pressure on the pressure plate; or by remote firing after an electrical device has been fitted to the bottom of the mine. The TMRP 6 has been found laid horizontally around roadblocks and roadside embankments. A special key is required to arm and disarm the mine. It comes equipped with an anti-handling device. When a tripwire is attached to the tilt rod, the mine can be used for anti-personnel purposes. Minefield records show that a minimum of 10,192 of these mines were used during the conflict. Manufactured in the SFRY.

Abbreviations

ARBIH: Bosnian government army
BHCD: Bosnia and Herzegovina Commission for Demining
BHMACE: Bosnia and Herzegovina Mine Action Centre
ECU: European currency unit
EMAC: Entity Mine Action Centre
EOD: explosive ordnance disposal
EU: European Union
FRY: Federal Republic of Yugoslavia
GNP: gross national product
HVO: Bosnian Croat army
ICRC: International Committee of the Red Cross
IEBL: Inter-Entity Boundary Line
IFOR: Implementation Force
IPTF: International Police Task Force
JNA: Yugoslav People's Army
MCPG: Mine Clearance Policy Group
MOU: Memorandum of Understanding
NATO: North Atlantic Treaty Organization
NGO: non-governmental organization
NPA: Norwegian People's Aid
OHR: Office of the High Representative
PIU: Project Implementation Unit
SFOR: Stabilization Force
SFRY: Socialist Federal Republic of Yugoslavia
UN: United Nations
UNDHA: United Nations Department of Humanitarian Affairs
UNDP: United Nations Development Programme
UNHCR: Office of the United Nations High Commissioner for Refugees
UNICEF: United Nations Children's Fund
UNMAC: United Nations Mine Action Centre
VRS: Bosnian Serb army
WHO: World Health Organization
ZoS: Zone of Separation

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Notes

1. In April 1992, the SFRY became the Federal Republic of Yugoslavia (FRY). It consists of Serbia and Montenegro.

2. *Bosnia and Herzegovina: Toward economic recovery*, The World Bank, Washington D.C., 1996.

3. *The priority reconstruction programme: 1996 achievements and 1997 objectives*, prepared by the European Commission and the Central Europe Department of the World Bank, March 1997.

4. *Bosnia and Herzegovina: Toward economic recovery*, *op. cit.* (footnote 2).

5. *Information notes Bosnia and Herzegovina and regional reports*, No. 5-6/97, UNHCR, Geneva, May-June 1997.

6. Unless otherwise stated, the information in this report is believed to be accurate as at 31 August 1997.

7. Research completed in October 1996 by the 36th Engineer Regiment of the British Army provides a detailed analysis of the use of mines during the war. The document entitled *Mined area analysis: Report and findings* examines the use of mines in the western part of Bosnia and Herzegovina monitored by British troops in the NATO-led Implementation Force (IFOR). Much of this section draws from that document, which contains information that is believed to be indicative of the use of mines throughout the country.

8. Large numbers of SFRY-manufactured landmines were exported and have been found in Afghanistan, Cambodia, Mozambique and Namibia, according to *Trends in landmine warfare*, Jane's Information Group Special Report, July 1995.
9. *The Talon*, US Army newsletter, Vol. 3, No. 31, 1 August 1997.
10. The International Police Task Force is a multinational force created to advise the police forces in both entities and to monitor and oversee their work. However, it has no executive policing role.
11. In December 1996, IFOR's duties were handed over to the NATO-led multinational Stabilization Force (SFOR).
12. The term "entity armed forces" is used to describe the armed forces of the Federation of Bosnia and Herzegovina and Republika Srpska. The Federation forces include the former ARBiH and HVO armies.
13. Article VI (3)(e) of the Dayton Agreement.
14. Article VI (6) of the Dayton Agreement.
15. *COMSFOR's Instructions to the Parties*, Chapter 3 (2), 6 June 1997.
16. In demining, "cleared to humanitarian standards" means that an area is known to be 99.6% clear and that the risk of a mine accident is statistically insignificant when compared with other potential types of accidents.
17. *Mine activities report*, United Nations Mine Action Centre, 31 July 1997.
18. *Mined area analysis: Report and findings*, *op. cit.* (footnote 7).
19. *Ibid.* p.4
20. The business conflict broke out over competition for customers.
21. These figures are considered to be far below the total number of those killed and injured by mines during the war. Few hospitals kept detailed records during this period. In the Zenica hospital alone, the organization Voluntary Relief Doctors registered 445 mine victims between 15 June 1994 and 31 March 1995.
22. While the ICRC has an extensive information-gathering network throughout the country, its database is not a comprehensive record of all mine casualties. For instance, the database does not include deaths or injuries to IFOR or SFOR soldiers, which averaged six per month between January 1996 and July 1997. Furthermore, although the ICRC receives most reports of mine accidents, it is likely that some do not come to its attention. ICRC estimates take this factor into account and are therefore higher than the total numbers reflected in the line chart.
23. *Information notes Bosnia and Herzegovina and Regional Reports*, *op. cit.* (footnote 5).
24. UNHCR figures.
25. "Serbs lay mines to stop convoy of Moslems trying to return home", AFP English Wire, 22 January 1997.
26. "Two Moslem returnees injured by mine blasts near Jajce", AFP English Wire, 20 August 1997.
27. *Bosnia and Herzegovina war victims rehabilitation project: Technical annex*, The World Bank, 1996
28. *Bosnia and Herzegovina: From recovery to sustainable growth*, The World Bank, Washington D.C., May 1997.
29. *ICRC survey on the threat posed by landmines to local communities in Bosnia and Herzegovina*, ICRC, 1996.
30. For an overview of the treatment of people injured by mines in Bosnia and Herzegovina, see "Treating and Assisting Survivors", p.42.

31. *Public health and health care: A general overview, Republika Srpska*, World Health Organization, February 1997.
32. *Republic of Bosnia and Herzegovina: Reconstruction at a glance*, The World Bank, December 1995.
33. *The priority reconstruction programme: 1996 achievements and 1997 objectives*, The World Bank, March 1997.
34. Voluntary Relief Doctors statistics.
35. *Assistance for victims of anti-personnel mines: Needs, constraints, and strategy*, Dr Robin M. Coupland, ICRC, Geneva, 1997.
36. *Uredjenje zemljista*, Republic Committee of Agriculture, Forestry and Water Management, Republic of Bosnia and Herzegovina Institute for Statistics, Sarajevo, 1986.
37. Figures for 1983 from *Omedjivanje planinskog rejona i mjere ekonomske politike za podsticanje razvoja poljoprivrede u planinskom rejonu Bosne i Hercegovine*, Faculty of Agriculture, Sarajevo Institute for the Economics of Agriculture and Food Processing, Sarajevo, 1985. Owing to the destruction of the agricultural library at the University of Sarajevo and the loss of most pre-war reports, figures for 1982 are the most recent available.
38. *Economic issues and priorities*, World Bank Factsheet, December 1995.
39. Interview with the Secretary of the Federation's Ministry of Agriculture, Waterpower and Forestry. In the past, forestry accounted for 53% (2.7 million hectares) of land use.
40. For further information, see *Ridding Bosnia and Herzegovina of landmines: The urgent need for a sustainable policy*, International Crisis Group, Sarajevo, 18 July 1997.
41. World Bank press release, Sarajevo, 9 August 1997.
42. Moreover, the rate of literacy is high and newspapers are widely read. The country clearly has an educated population capable of absorbing information in many different forms.
43. The Automobile Club of Bosnia and Herzegovina reports approximately 420,000 vehicles in the country.
44. *Prosthetic surveys of the Federation and Republika Srpska*, ICRC, Geneva, October 1997.
45. For additional information about the Mines Information System see *Assistance for victims of anti-personnel mines: Needs, constraints, and strategy, op. cit.* (footnote 35).
46. These descriptions of mines are abridged from the mine data leaflet issued to UN peace-keeping troops by the United Nations Protection Force.



The Silent Menace: Landmines in Bosnia and Herzegovina

A detailed study of the human, social and economic impact of mine contamination in Bosnia and Herzegovina. It describes efforts currently being undertaken to address the situation and offers some recommendations on how the response to the problem could be improved.

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