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Explosive Remnants of War in the Republic of Croatia

Explosive remnants of war represent a constant threat to normal life and activities of the population living in mine-affected areas in the Republic of Croatia. The author considers the extent and impact of unexploded ordnance and other ERW contaminating the country as a consequence of military operations between 1991 and 1995.

by Dražen Simunović [Croatian Mine Action Centre]

Until recently, the ERW problem in Croatia was addressed simultaneously during demining projects. Records show pieces of UXO were found almost five times as frequently as mines. This disparity between UXO and mines is a result of numerous pieces of UXO being collected in landfills that were mine and ammunition deposits before the war. During the war, several Serb-rebel-held parts in the Vojin municipality were also used as ammunition deposits. These landfills and depots represent a great threat to locals in the heat of the conflict. For example, while retreating, rebels blew up these depots along with ammunition—ERW was scattered within a radius of 2,000 meters (2,187 yards). A more drastic example was the ammunition and mine stockpiling by Serb rebels in a local Catholic church in Vojin (western Slavonia) that was entirely destroyed by blast. ERW contaminated the wider area of Vojin city. Other classic examples of ERW locations included the Vojinja depot in the city of Vojinja and theLogosanti bar- rack near Karlovac. Between 1996 and 2005, personnel removed UXO from the following exploded ammunition depots:

- Ostrica (1996)
- Vojin (1999)
- Vojin (2000)
- Borov (2004)
- Udbina (2004)
- Vojin (2005)
- Logosanti (2005)

More than 100,000 pieces of UXO were found at these depots. ERW have generally been found in populated places, settlements in the vicinity of towns, villages, forests and confrontation lines. Based on reports from locals, ERW were also detected in areas that were either subject to artillery activities or targeted with air-dropped bombs and cluster munitions. Most of the ERW were found in the vicinity of ex-Yugoslav Army facilities. According to the Croatian Mine Action Centre’s minefield records and information gathered, a variety of mines were found. The quantity, level of threat for the local population and clearance efforts associated with each vary.

Mine and UXO Contamination Analysis in the Republic of Croatia

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

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

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

Details of the Conflict

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

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

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

Mine Situation in Croatia

Between 1998 and 2001, records indicate 1,695 demining projects covered a total area of 160,216,893 square meters (62 square miles) of land. The projects found 17,765 anti-personnel mines, 13,030 anti-tank mines and 144,152 pieces of unexploded ordnance. The Republic of Croatia contains of 21 counties and the city of Zagreb. Twelve counties are within a mine-suspected area, totaling 1,147 square kilometers (713 square miles) of land. Around 1.1 million inhabitants are directly endangered within the MSA; one in five inhabitants is threatened by a possible accident within the MSA. ERW that has been located and removed and remaining ERW that was emplaced in mine-clearance locations within the MSA.

Progress of Clearance Operations

One of the issues on the third international symposium organized by the Croatian Mine Action Centre for Testing, Development and Training Ltd., held from April 24–26, 2006, in Sibenik, Croatia, was UXO detection at depths over 20 centimeters (8 inches). This is an important concern for safely conducting construction activities in certain areas where it is necessary

Ammunition Expenditure/Failure Rates

Small-arms ammunition (≤14.5 mm).

Most of the ammunition was originally packaged and represented a small threat to locals. Little effort was needed to remove and destroy them. According to the official statistics from the CROMAC database, eight persons have been wounded by this type of ammunition since 1991.

Pyrotechnics (smoke, flares).

Pyrotechnics represented a small quantity of the findings and a medium-level threat for locals, and little effort was needed for their removal and destruction. The most common pyrotechnics found were the flame- and blast-simulating INL-14 signal M58 P1 cartridge and cannon blast simulators. Two persons have been wounded since 1991 by these munitions.

Cannon shells and artillery projectiles (≤14.5 mm).

A medium quantity of almost all types of artillery cartridges and projectiles (shells and shrapnel) was found in the Republic of Croatia, representing a huge threat for locals. Their removal, disposal and destruction were of medium risk. Two persons have died from this type of ammunition and six have been wounded since 1991.

Submunitions.

Attacks deploying submunitions occurred in 1991 (around the Vransko lake area, Gospić and Medulena) and 1996 in the Bijela area. The most commonly used submunition was the deadly KB-1, produced by Yugoslavia. Between 33 and 66 percent of the submunitions were found; high risk is involved for removal. Eleven persons have died and 19 have been wounded by this type of submunition since 1991.

Improvised explosive devices (IEDs).

These are common in the Republic of Croatia. They represent a huge threat for locals. They take medium risk for their removal, transport and destruction. Thirty-three people have died and 66 have been wounded from this type of UXO since 1991.

Mortar ammunition.

A huge quantity of mortar ammunition was found because it was used for destroying targets up to six kilometers (four miles) away—the range between parties to the confrontation. This type of ERW represented a high threat because it included a certain number of unexploded mortar HE shells that usually were 60-mm, 82-mm and 120-mm caliber. These require a very high risk for removal and destruction and represent a medium threat for locals. One person has died from this type of UXO and 14 have been wounded since 1991.

Free-flight rockets (ground-to-ground and air-to-ground).

These rockets were found in medium quantity and are a huge threat for locals, although their destruction is relatively easy. Six persons have died from this type of UXO and 15 have been wounded since 1991.

Guided missiles.

A small quantity of guided missiles was found, but they represented a huge threat for locals as it take a medium risk for their destruction.

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to first survey the ground to large depths (usually up to 4 meters [13 feet]). In some of these survey areas, common skills may have been acquired which represent a threat to the local population.

Also discussed were specific problems related to UXO and ERW laid within mine-suspected areas in the Republic of Croatia. During the symposium, the following guidelines were agreed upon to improve detection and removal of UXO:

- Improvement of legislation concerning UXO
- Definition of space and location for which some incidents on UXO are of depths of over 20 centimeters (8 inch) exist
- Application of new methods, operating procedures and devices
- Improvements of safety measures

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

From 2000 to 2005, CROMAC surveyed the land and concluded that 1,174 square kilometers (453 square miles) of Croatia were contaminated with mines and UXO. In this area, CROMAC classified 121 towns and areas within 12 counties as suspected of being within the vicinity of mined areas. As of January 2006, Croatia reported that numbers above 1,547 square kilometers (445 square miles) of being contaminated with mines. There are still an estimated 150,000 anti-personnel mines and 88,000 anti-vehicle mines that need to be demined. Fortunately, pieces of UXO are not too threatening to the community as they have been well-documented and made recognizable to the public. Croatia is now working to reach a goal of clearing 360 square kilometers (134 square miles) of mine-contaminated land by the end of 2007. This goal is subject to change due to the speed of demolishing activities, which varies depending on the availability of funds, the cost of demolishing, and capacity.

Conclusion

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

See Endnotes page 114

News Brief

"Devil’s Garden" Cleared of Explosive Debris

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

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

The HALO Trust conducted clearance of the minefields with financial support from the U.S. Department of State. Clearance operations began in December 2001 and cost nearly $850 million. Additional funding was provided by the governments of Germany, Ireland, Japan, the Netherlands, Norway, and the United Kingdom.