Demining of Underground Adits in Ukraine

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Armenia, Azerbaijan and Georgia presented the landmine and UXO problem of the South Caucasus. Many workshops such as this one are full of some successes and many failures. The key is to keep pushing the workshops because success is being achieved, even if change is gradual.

Some consensus was observed on the desirability for all countries in the region to work toward becoming States Parties to the Ottawa Convention once peace agreements to regional conflicts are reached. Georgia and Azerbaijan have already made positive steps by announcing a moratorium on the use, production and transfer of anti-personnel landmines. The main obstacle for accession to the Convention is dealing with territory not controlled by national authorities. In the South Caucasus there are unresolved conflicts in the OSCE areas, including conflicts in Georgia (South Ossetia and Abhazia) and Azerbaijan (Nagorno-Karabakh).

A suggestion to include mine-action activities on the agenda of peace negotiations within the OSCE Minok Group was widely supported, as well as the option to meet jointly in Georgia’s offices with Georgia acting as a mediator between Armenia and Azerbaijan.

In the second part of the workshop, the representatives from three central Asian countries (Tajikistan, Kyrgyzstan and Kazakhstan) presented the mine problems in their countries. Common problems are mines that lie on state borders, especially on the border with Uzbekistan. Only Tajikistan has joined the Ottawa Convention, possibly serving as a role model for other countries in the region. Largely because of its status as a State Party to the Ottawa Convention, Tajikistan’s mine-action program receives financial support from several donor countries. All three delegations from central Asia supported the idea of developing a follow-up regional workshop in the near future.

The Tbilisi workshop ended with a roundtable discussion in which participants discussed possible next steps in mine action. The following cooperation was suggested:

- Continuation of joint training
- Cooperation in mine-victim assistance
- Encouragement to announce a moratorium on the use of anti-personnel mines and to voluntarily submit reports on each country’s respective landmine situation in accordance with Article 7 of the Ottawa Convention
- Marking of all known minefields
- Including the mine problem in national strategies
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- Marking all known minefields
- Including the mine problem in national strategies

Conclusion

Cooperation in mine action among countries is one of the first steps for confidence building in the region, as experience from southeastern Europe shows.

A simple conclusion can be drawn from the Tbilisi workshop. Demining is considered a complementary activity of the OSCE, not a central one. However, since demining makes way for the core activities of the OSCE—primarily disarmament, human rights and environmental issues—to be truly exercised, it is evident that mine-action activities are essential for OSCE. 

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On the basis of one of conclusion of the Tbilisi workshop, Canada and Slovenia, supported by Kazakhstan, prepared a follow-up workshop for central Asia in the framework of the OSCE. The workshop was held 26–27 March 2007 in Kazakhstan, but specific dates were not available at the time of this writing.

Demining of Underground Adits in Ukraine

During World War II the Soviet Union established ammunition depots with over 10,000 metric tons (11,023 U.S. tons) of explosives around the Ukrainian towns of Sevastopol and Kerch. Stored in adits, these explosives threaten the peaceful lives of present-day Ukrainians. In 2002, teams began the task of removing unexploded ordnance, landmines and debris. They encountered many problems while pursuing their goal of eliminating these stockpiles by 2010. Their efforts are described in this article.

by Yuri Koliyan (Ukroborservice State Company)

In spite of the fact that 60 years have already passed since the biggest and the most severe war of the 20th century, the problem of clearing a large number of unexploded ordnance from Ukrainian territories is still topical. Engineering and demining units from the Ministry of Defense completed partial clearance of the territories in Ukraine in the mid-1990s. Despite the considerable work the deminers have done and are still doing on extraction, neutralization and destruction of the detected World War II unexploded objects, there are still accidents resulting in injuries to and deaths of the civilian population.

Nowadays, the government of Ukraine is improving the procedures of mine action in accordance with the requirements of International Mine Action Standards and plans to set up a specialized governmental body for coordinating all mine action in the country.

Clearing unexploded objects from Ukraine’s territories is the obligation of the Ministries of Emergency and of Defense, Ukroborservice State Company (through its structural subunit, the Centre of Humanitarian Demining) specializes in carrying out commercial projects in Ukraine and abroad. This company has played the leading role in establishing humanitarian demining in Ukraine.

The area most contaminated by unexploded objects is the Crimea Peninsula, namely the towns Sevastopol and Kerch, where 30 people have perished or have been injured due to WWII unexploded objects in recent years. In January 2001 the Cabinet of Ministers of Ukraine adopted a state program—“Clearance of WWII Unexploded Objects in the Area of Towns of Sevastopol and Kerch until 2010”—based on the results of investigations of the specialists of Ukroborservice State Company had done. This program will run until the end of December 2010.

The Inkerman Adits Ammunition Depot

The main area that needs to be cleared of explosives within the framework of this program is the destroyed Inkerman Adits located two kilometers (1.3 miles) from Sevastopol. The Inkerman Adits were destroyed due to an ammunition explosion in June 1942. Before the explosion, they served as the Soviet Army ammunition depot, storing more than 10,000 metric tons (11,023 U.S. tons) of ordnance.

A considerable amount of ammunition (approximately 1,000 to 3,000 metric tons [1,102 to 3,307 U.S. tons]) did not detonate during that explosion and now access to it has been obstructed. The intact areas of the galleries are practically inaccessible. The majority of the ammunition that did not detonate has been mechanically and thermally damaged as well as affected by weather, such as erosion and the periodic influence of ground heave.

Examination of the destroyed adits has shown that the rock massif over them consists of separate blocks (more than 1,000 cubic me...
Economy, Finance, Industrial Policy and Defense to coordinate program activities. Project financing is provided by Ukraine. The main executor of the work is Ukroboronservice State Company. The specialists of Ukroboronservice conducted the clearance task and presented a problem-solving strategy comprising several stages:

1. Thorough investigation
2. Ensuring access to unexploded ordnance
3. Localization
4. Maximum clearance

Thorough investigation. The first stage took place from 2002 to 2004. During this time the working group hired a special guard to protect unauthorized persons from accessing the adits. The working group cleared unexploded ordnance from the ground surface up to 0.25 centimeters (0.1 inch) in depth and determined a scheme of probable adit locations before the explosion. A specialized Crimean team conducted geodetic investigations while a local institute made inspections using such technologies as impulse electromagnetic traversing. Ukroboronservice conducted engineering and technical investigations. The lack of reliable information regarding the adits’ layout and stockpiled ammunition before the explosion has caused problems for specialists at the Centre for Humanitarian Demining. According to the results of this stage, Ukroboronservice has determined the location of most of the unexploded ordnance, their nomenclature, approximate quantity, condition and the possibility of accessing them. Ukroboronservice decided the following:

- To make five vertical excavations (with areas no less than 5 by 5 square meters [54 square feet], deep, 25–35 meters [82–115 feet] each), to reinforce the walls of passages with concrete braces no less than 30 centimeters (12 inches) in width to prevent soil dislocation.
- To move the ammunition and in case of an emergency evacuation make up to 100 running meters (329 feet) of underground horizontal passage, which can provide access to explosives in the places where they are most concentrated.
- To reinforce the overhang layer with wooden or concrete supports and protective constructions to prevent collapse.
- To destroy on a special range all ammunition allowed to be transported.
- To prepare the ammunition that cannot be transported by pouring concrete in special places under the ground.

During this stage the state company Ukroboronservice provided its expertise, collaborating with the private company ATIK. Project completion is expected before the end of 2010.

Ensuring access to unexploded ordnance. From 2004 to 2006 Ukroboronservice and ATIK carried out the second stage. During this stage, Ukroboronservice did the main preparations to start the extraction of unexploded objects. Also, ATIK made three vertical excavations (25–30 meters [82–99 feet]) and horizontal shafts (30 meters [99 feet]) towards the place where the objects were concentrated. The engineer of safety monitored this stage, ensuring that deminers cautiously transported the UXO by hand and machines safely destroyed the ordnance. ATIK constructed additional concrete supports to protect against landslides. Taking into account all safety regulations, trains executed the task of demining at an intensive and dangerous rhythm. Speleologists and deminers worked out a special system that considerably increased efficiency and safety. To reduce risk, the deminers of Ukroboronservice State Company constantly made engineering and technical inspections during the construction of vertical and horizontal excavations. Teams made wide use of mine-detector Vallen EL 1303D with the Vallen EV32000 Module Bore Hole and Surface software. With its help deminers detected large-caliber aerial bombs and were able to confirm and refute information concerning the ammunition’s main location. While accompanying adit excavations during this stage, deminers detected and destroyed more than 2,000 unexploded objects, including shells, mortar mines, aerial bombs and the different types of blasters. One of the difficulties of adit excavation is the fact that the rock and soil are constantly in motion. In time new holes and cracks appear that give access to the underground section. To control ground movement a Crimean team of specialists conducts constant speleological investigations of the working site. Based on the results, the safety engineer takes the appropriate measures to ensure the staff is protected against a possible landslide.

Localization. A group of deminers from Ukroboronservice have been executing the third stage since mid-2006. The third stage marks the start of intensive extraction of unsafe unexploded objects from underground obstructions. Demining before detonation of the ordnance concentration of a 20 metric tons (22 U.S. tons) of TNT equivalent, a camouflet explosion may happen and during larger ones, a blowlaw. That is why the working group believes that reducing the scale of possible accidental explosions is important. Deminers must strive safety last, dividing excessively mine-laden areas into smaller, more manageable quantities of UXO.

During this stage (which at the time of writing was still ongoing), the teams have extracted more than 20,000 pieces of ordnance. This total includes munitions of varying types and calibers: aerial bombs from 10 to 1,000 kilograms (22 to 2,200 pounds), shells from 37 to 180 millimeters and mortar mines from 50 to 122 millimeters. Also during this stage Ukroboronservice has prohibited unauthorized access to the adits. Maximum clearance. The working group will execute the fourth stage from 2007 to 2010. Ukroboronservice plans to construct two more vertical shafts in order to extract a maximum quantity of UXO. Paying attention to safety precautions, the working group will implement a system of actions:

- Collaborating with state services such as fire protection, ecology, free safety, etc.
- Constantly monitoring the rocks, supporting the walls of passageways with concrete and inspecting equipment condition.
- Controlling the ammunition’s condition, defining the level of damage and handling it carefully.
- Communicating reliably between cave-growing teams and surface-level teams.

Ukroboronservice believes that carrying out this program will help eliminate many dangerous explosive remnants of WWII.

Ukroboronservice’s four-stage plan for clearance of the Inkerman Adits requires prompt and complete coordination with the state; however, Ukraine has only paid half of the total amount necessary to complete the task. Incomplete program financing will adversely impact the time it takes to complete the work. With every passing year the clearance of the Inkerman Adits becomes increasingly more expensive. Insufficient financing forces individuals involved with the project to increase their working hours while the threat of an accidental explosion escalates.

Conclusion

Besides the Inkerman Adits, the state clearance program of unexploded objects from Sevastopol and Kerch also takes place in six areas: the Makeyev Mountains, near the Prypiat battery, the villages of Geniouvsky and Bondarenkov, Adzhimushkay quarries and the Black Sea. Ukroboronservice believes that carrying out this program will help eliminate many dangerous explosive remnants of WWII.

Yuriy Kolitsnyk is the Deputy Chief of the Humanitarian Demining Center of Ukroboronservice, Ukraine. In 2002 he retired from the Armed Forces of Ukraine as Colonel of the General Staff, since he was expected to take on the coordinating engineering troops and demining units.

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• Doubleing exits in vertical shafts to provide easier evacuation for cave-going teams
• Prompt first aid to victims and evacuation to the medical center in accordance with International Mine Action Standards


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