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**Taming the Minefields**

Demining is a dangerous, labor intensive and costly process. An underlying precept of successful demining operation is a perfect safety record. The question is, how can a perfect safety record be achieved while the overall cost of the demining operation be reduced at the same time? It is not an easy or simple task, but with a good tool box and a skilled management team this can be accomplished.

**by Davor Družižan, Mech. Eng., E.O.D.**

**Introduction**

The initial step in the demining process is preparation of a master plan. Preparation begins with gathering all accessible data such as mine reports, demining reports, mine accident reports, survey reports, maps of minefields, followed by a survey by deminers. During the survey, data about terrain, type of soil and vegetation, metal content or mineral contamination is collected. A working plan should be outlined on a map using a scale of 1:5,000 to identify where areas will be marked for each demining method used.

Constant in the overall process is the education of the whole staff engaged in demining: field leaders, team leaders, deminers, dog handlers, machine crews, operators, medical teams, etc. The aim is to develop expertise with intensive learning of methods, characteristics and limits of instruments used in demining. This is the only way it is possible to create an automatic reaction safety first.

Development of any plan entails an assessment of available demining capabilities including mechanical mine clearing machines, mine detecting dogs (MDDs), skilled deminers with metal detectors and prodders, and in the near future, some new methods or instruments for selection, location and detonation of mines. Machines can improve safety and productivity in demining, especially in areas covered with dense vegetation. The use of demining machines, in combination with other methods, has proven to be the most successful, as no single method can guarantee 100 percent effectiveness if used alone. Another advantage of mechanical mine clearance is the ability to treat the soil to the depth of 20 cm, unlike prodders and metal-detectors. In areas of dense vegetation, slopes along rivers or along artificial water channels, an excavator with an armored cab and vegetation cutter on an extended crane combined with manual demining may assure effectiveness and safety. For safety reasons, it is recommended that the excavator be located only in safe or previously cleared areas.

**Demining in Croatia**

For demining of areas near Nusar, located close to Vinkovci City, three teams of deminers were employed. Each team had one team leader and four deminers. Each deminer was equipped with a metal detector, a prodder, a ballistic blanket and a helmet. Based on the mine reports, manual demining began at three different parts of the field, respecting the safety distances, to preparing for machine access. After mines had been located, some of them were destroyed on site and others were rendered safe at the place designated for destroying the mines. The area was then cleared by RHINO, with the exception of the channel at the east and higher slope at the west. The channel and the high slope (areas with trees and dense vegetation) were cleared mechanically by excavator MVD 006 (rented for this task). The whole area was controlled by deminers with metal detectors and prodders, followed by four dog handlers with eight MDDs. Dogs work in pairs checking the area.

Main facts about the demining task:

- **Starting date**: April 22, 2003
- ** Fifteen deminers worked for 12 working days**
- **RHINO cleared**: 150,000 sq m in 14 days (112,500 sq m after MVD 006)
- **MVD 006 cleared**: 38,500 sq m in 12 days
- **Fifteen deminers controlled**: 76,000 sq m in 12 days
- **Four demining dog teams controlled**: 23,280 sq m in 10 days
- **Completion date**: May 25, 2003
- **Cleared area**: 177,280 sq m in 33 days

**Machines Involved in Demining**

There are two basic types of demining machines: remote controlled and directly controlled. Remote controlled demining machines can be used on flat terrain, without bigger slopes and tall trees. Directely controlled demining machines can be used on the fields where operator response should be quick and precise, depending on terrain and vegetation or other. Demining machines with a flail tool can be used on rocky areas. Demining machines are not able to operate effectively in swampy areas.

Remote controlled demining machines should have radio control systems with video surveillance, at the range of 1,000 m on an open space, and automatic depth control. Before using machines in the new environment, e.g. another country, tests with 50 of the smallest mines or surrogates should be made in the area at depths of 0.5, 10, 15 and 20 cm. Self recovery and fire fighting equipment is preferred.

Directely controlled demining machines should also be tested with the smallest mines, but only after passing the cab prototype. Cab walls should be tested with five fragmentation mines. The cab bottom should be tested with two AT mines with Mishty Sheridan Effect. If this type of AT mine is not available in the particular area, two of the strongest AT mines should be used to test penetrability. The cab should be tested by ten-kilogram TNT blasts. The explosion should occur one meter in front of the cab, and airwave impulse should be less than the medically recommended level. The cab should be equipped with a radio communication unit and with airbags at the sides and roof, as well as with an air conditioning system.

**About AKD MUNGOS Ltd.**

AKD MUNGOS Ltd. was established by the government of the Republic of Croatia, on March 28, 1996, for performing mine-clearance activities on the territory of the Republic of Croatia. The company has been performing mine clearance tasks since June 1, 1996. The Croatian Mine Action Center has coordinated the mine clearance activities since 1998. In accordance with the changes of the Croatian law, mine clearance activities have become completely commercialized. Thus, Mungos Ltd. was introduced to the market, along with few other firms, as undoubtedly the biggest firm in the country.

At the beginning of its activities, AKD MUNGOS Ltd. had only 80 employees compared to the current 266:

- 186 pyrotechnics
- 34 medical personnel—10 medical teams, consisting of a doctor, a driver and an orderly, for each group of pyrotechnics engaged in field operations
- 6 dog handlers with 12 mine detection dogs
- 40 technical and logistic personnel

The company owns:

- 79 motor vehicles
- High-quality protection equipment and a corresponding number of

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[Image: View from the top of the RHINO control truck (38 zoom).]
**UIDMA in Bosnia and Herzegovina: Possibilities for Wider Use**

The Bosnia and Herzegovina Mine Action Centre (BHMAC) recognized the need for and developed a new model of the Unique Identifier of Mine Action (UIDMA). The author outlines the new model and its benefits in identifying aspects of mine action.

**by Almir Budalica, BHMAC**

**Summary**

A need for UIDMA has been recognized in the Bosnia and Herzegovina (BiH) mine action community. The purpose of UIDMA is for users to be able to identify any aspect of mine action properly, regardless of the type of information (data on risk, incident, etc.) or activity (clearance, mine awareness education, quality control, etc.). The existing model is fixed (20 digits) and does not provide any flexibility. The consequence of the lack of flexibility is that identifiers of some mine action data contain unnecessary data (two, four or even eight zeros). The new model would provide more flexibility and enable unique identification of UID of any mine action to incorporate only data that is relevant.

Possibilities for eventual wider use are based on the flexibility of the system and its capability to cover all aspects of mine action in more than one country.

"Flexibility" means that UIDMA could classify all mine-related information from the countries that carry out different procedures in mine action. One of the benefits of wider use of UIDMA would be easy mine action data interchange and referencing.

**Main Problem**

BHMAC has already developed UIDMA according to the procedures performed at the time of development and in accordance with the geo-political structure of the country. The identifier consists of 20 digits, and it is quite easy to read.

Generally, UIDMA consists of two elements: geo-reference (country, district, region and municipality) and mine action data (information or activity). The mine action data elements follow the demining procedure: consists of a General survey ID, a Task ID, an Inspection ID and a Clearance ID. After the general survey is done, some areas are declared as risk areas and the project is prepared for demining. Upon receipt of the budget, a task is created and demining begins. Upon completion, a clearance certificate is issued. Meanwhile, there are demining quality control inspections.

Identifiers for certain aspects of mine action in some countries are rapidly growing, i.e. they require more digits. This problem is obvious in Bosnia. When using a linear incremental identifier for certain aspects of mine action, it gets higher with each record added. For example, there are about 4,000,000 records of general survey in Bosnia. In a few years it will reach 10,000, and five-digit identifiers will be necessary. Furthermore, keeping in mind financial resources and demining dynamics, as well as survey activities, one can expect a reduction of the area for each survey activity, which will also increase the number of records.

**Consequences**

UIDMA will need one more digit (maybe two) that will change the identifier.

At an international level (information interchange and reference), this would cause confusion because all countries would have to change their UIDMA. Solutions would include:

- Re-indexing existing tables.
- Making reference tables ("Code Book") for all the crucial data types, since reference tables are the core of any classification system, including UIDMA.

**Benefits**

The following are benefits to developing a new model of the UIDMA:

- Flexibility is not the way that UIDMA is generated would have to be changed.
- Number of digits in UIDMA would not be higher, but rather lower (7 or 18 characters).
- With proper re-indexing of tables, there would be no need to re-designing the database.
- Sorting and searching would be performed by UIDMA.

**Potential Difficulties in Solution Implementation**

Though changing the identifier presents a "non-elegant" solution to retrospective "spending" of DIDs, it is imposed as the only possible solution. On the other hand, the benefits are great and difficulties would be temporary.

**Purpose of UIDMA**

Elements that define the purpose of UIDMA include:

- Simplicity (maximum 18 characters)
- Recognizability
- Uniformity
- Mine Action Data Interchange