August 2003

Hierarchic Approach to Mine Action in Croatia

Nenad Mladineo
University of Split

Snjezana Knezic
University of Split

Damir Gorseta
SEEMACC

Follow this and additional works at: http://commons.lib.jmu.edu/cisr-journal

Part of the Defense and Security Studies Commons, Emergency and Disaster Management Commons, Other Public Affairs, Public Policy and Public Administration Commons, and the Peace and Conflict Studies Commons

Recommended Citation

Available at: http://commons.lib.jmu.edu/cisr-journal/vol7/iss2/12
Landmines in Europe & the Caucasus

**FOCUS**

Victim Assistance in Iraq continued from page 82

continuing presence in central and southern Iraq since the first Gulf War in 1991. During their first few years in Iraq, they provided for food, storage and logistics to over 300,000 people per month. They also provided logistical support and assistance to other U.N. Agencies. CARE's work in Iraq began in the northern Kurdish regions of Duhok, Erbil and Suleymaniyah and in parts of its central and southern regions such as Arbil, Arbil, Diyala and Najaf. As humanitarian need became more prominent in central and southern regions during the mid-90s, CARE's focus turned more toward providing these areas with basic health care, clean water and proper sanitation.

Conclusions

As expected, the recent conflict brought many new temporary concerns to the civilian population of Iraq. Large amounts of explosive remnants of war (ERW) such as artillery shells, grenades, mortar bombs, cluster bombs and other submunitions, rockets and missiles left in residential areas cause the number of victims to increase daily. Those dedicated to helping these victims must first create a means of keeping track of the number of victims and the nature of their injuries. Their second concern is finding a secure way in which to deliver or administer medical or emotional assistance. Finally, they must train Iraqi specialists, medical workers, and civilians in their various areas to help protect the ultimate goal of a safe and sufficient Iraqi health care system. Despite these hurdles, the UN and NGOs are slowly making progress in their efforts to heal the wounded in Iraq.

References

7. Sallu Kalyo, Political and Media Officer, OSCE, Taji, Iraq, 2003. Telephone: +972 372 21 40 63 372 21 40 63 Fax: +972 372 21 40 63 E-mail: office@osce.tajikistan.com Website: www.osce.org Year: 2003.
8. Kevin Dussereau, MAIC, E-mail: kdu@jmu.edu


**References**

7. Sallu Kalyo, Political and Media Officer, OSCE, Taji, Iraq, 2003. Telephone: +972 372 21 40 63 372 21 40 63 Fax: +972 372 21 40 63 E-mail: office@osce.tajikistan.com Website: www.osce.org Year: 2003.
8. Kevin Dussereau, MAIC, E-mail: kdu@jmu.edu


**References**

7. Sallu Kalyo, Political and Media Officer, OSCE, Taji, Iraq, 2003. Telephone: +972 372 21 40 63 372 21 40 63 Fax: +972 372 21 40 63 E-mail: office@osce.tajikistan.com Website: www.osce.org Year: 2003.
8. Kevin Dussereau, MAIC, E-mail: kdu@jmu.edu


**References**

7. Sallu Kalyo, Political and Media Officer, OSCE, Taji, Iraq, 2003. Telephone: +972 372 21 40 63 372 21 40 63 Fax: +972 372 21 40 63 E-mail: office@osce.tajikistan.com Website: www.osce.org Year: 2003.
8. Kevin Dussereau, MAIC, E-mail: kdu@jmu.edu

Landmines in Europe & the Caucasus

Hierarchical Approach to Priority Assessment for Humanitarian Demining

In developing a hierarchical approach in humanitarian demining, participans must consider different approaches at different decision levels. Due to the characteristics of humanitarian demining in Croatia, the multi-level approach was developed. For different problem levels, a special algorithm for evaluation criteria and actions (solutions) was developed. This means that for the different decision levels, a separate "action set" is created (projects for demining of socio-political areas, counties, municipalities, villages, minefields, homogenous areas, etc.). Such sets are evaluated by applying multicriteria analysis. This actually means that:

At the strategic level, problems should be treated at the state (or canton) level, so the municipalities are defined according to a logical set of actions evaluated by multicriteria analysis. Alternatively, at the state level, homogeneous zones can be defined according to a set of actions that will be ranked according to the demining priorities related to the basic criteria. Generally, at this level, homogeneous zones can be defined according to the criteria that concern:

- Terrain characteristics (slope, petrology, accessibility), and supposed minefield characteristics (density, risk degree, information reliability, mine types).
- Socio-economical parameters such as demographic data (age structure, nationality, family structure), economic parameters (basic economy of each municipality, population, employment, average income, potential of the area). A project for demining should be evaluated by taking into consideration the criteria that are acceptable for this area.

At the tactical level, problems should be treated at the county (or canton) level, and suspicion areas within homogeneous zones can be defined according to the criteria for that particular level, as well as to the expectations of the "partners" in the decision process. Examples include:

- The tactical decision level is characterized by using macroeconomic and other global parameters and by coordinating with strategic partners such as governments, competent ministries and international organizations.
- The tactical level is characterized by an approach that favors those parameters that are the most important for a particular county's development, as well as parameters that are important for political stability and population satisfaction (understandable and global criteria for securing that the set of activities is feasible and conflict-free).

Within the pilot project for Sisacko-Moslavacka County, the multicriteria analysis was applied at the tactical level. Namely, ranking mine-endangered municipalities was performed in order to check the above mentioned approach in practice, and to find its convergence for other decision levels. The following conclusions are valid for the tactical level, as well as for other decision levels that are involved in the evaluation of optimal policies for risk reduction. As the project demands and in order to ensure all relevant data and enable straightforward generation of more general data, a GIS, containing various thematic layers, was created. ArcView and similar software were used.

Environmental Systems Research Institute (ESRI) tools enable more complex spatial data analysis were used. When solving the problem, the following characteristics were delineated:

- High demining priority
- Conflict of interest
- Settlement of the problem (several solution levels)

Within the project, the following objectives were defined:

- Establishment of a project model for mine-contaminated areas (six levels, i.e., optimal policies for risk reduction)
- Gathering of all relevant data
- Modelling of the decision process
- Establishing additional data and resources
- Involvement of more groups in the decision process

As the solving methodology, the following compromises were worked out:

- System approach in problem characteristics definition
- Provision of relevant data for numerical process by GIS
- Support system
- Modelling of the decision process
- Multicriteria analysis for making objective of the subjective demands (approaches)

According to the fact that during the evaluation of the optimal policies for risk reduction, several groups are involved in the decision process, the activities in the problem of solutions were defined:

- Defining of the characteristics, namely, of the set of activities and the criteria (problem scope definition)
- Bringing together the sets of actions and criteria with "partners" in the decision process (usually, some of the criteria are added due to the partners' insistence during the group decision-making)
- Definition of the criteria weight and preference order
- Negotiating criteria weights in the iterative process
- Definition of the alternative scenarios of the criteria weight assessment, assessing more weight to the certain criterion group
- Model forming: prohibiting and presenting of numerical and graphical results of ranked actions (of mine-contaminated areas) by the Preference Ranking Organization Method for Enrichment Evaluations (PROMETHEE method)
- Sensitivity analysis, namely, stability checking of the set of the criteria weight scenarios
- Usage of GAIA (Geometrical Analysis for Interactive Aid) method for the generation of the problem characteristic via geometrical representation
- Presentation of the multicriteria analysis results to the participants in the decision-making process, as well as numerical solving of the additional scenarios (criteria weight variations as the results of one of the multicriteria analysis results including verbal and
Landmines in Europe & the Caucasus

FOCUS

Fig. 4: Layout of the methodology by optimal policies for risk reduction in mine-contaminated areas.

A large part of the information, most of which is possible to visualize (graphs, various colored diagrams), gives the decision-maker a complete insight into the problem characteristics and possible results of various problem-solving scenarios. Table 1 presents results of the "numerical analysis" for Stakovo-Moslavaca County by the PROMETHEE method. For example, look at the evaluated ranks that present priority assessment for the 11 contaminated municipalities (presented results are not the final optimal solution).

Achieved synthetic parameter "Phi" presents prioritization of values based on defined criteria and weighting coefficients. Table 1 shows that municipality Slunj is ranked first and represents


dominating priority because the total Phi value of 4.564 dominates the second-ranked municipality Petrinja, with Phi value of 3.077. Follow the ranks of other municipalities to the last one, municipalities considered with negative priority value Phi -0.2397.

Synthetic parameter Phi is very convenient for the expression of differences or definition of priority "power," so it can be used for the determination of funding demands relations of each municipality. For example, if someone wants to distribute the total amount of money to the top four ranked municipalities, the proportion of the distribution can be based on Phi index value (Fig. 6).

Figure 7 shows the layout of the relations between criteria obtained by GAIA software, namely by application of principal component analysis for Phi values for each criterion. Insight into the criteria relations is important for understanding the problem and recognition of the correlation between different criteria parameters. As Figure 7 shows, it is easy to notice criteria with a high degree of correlation and criteria in conflicting positions.

Conclusions

The developed hierarchic approach of priority assessment for demining, using multicriteria analysis and GIS support, illustrated the possibility of objective valorization in humanitarian demining that is acceptable for most stakeholders in the decision process. The relatively small costs of data collection, editing and analysis with simple control and transparency through all hierarchical levels, as well as involvement of all stakeholders (directly or indirectly) in the decision process, give such an approach an advantage compared to the other methods being used.

References


Appendix

Table 1: Municipalities ranked.

*All graphics courtesy of the authors.

Contact Information

Nenad Mladineo
Faculty of Civil Engineering
University of Split
21000 Split
E-mail: mladineo@gradst.hr

Damin Goreza
Southeastern Europe Mine Action Coordination Center
2129 Ig, Slovenia
E-mail: gorsea@uf-fund.si