



ENGINEER SUPPORT IN THE POST - FLOODING ENVIRONMENT

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SUMMARY:

This article presents the role of military engineers in non - military structures of the state, the military crisis management system and the military activities in the post - flooding environment.

KEYWORDS: security, crisis management, military engineers, flooding environment.

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Military engineers play an important role in functioning of military and non - military structures of the state. In combat operations their use is often crucial for achieving victory on the battlefield. The recent years have shown how important their activities in non - military fields are for wellbeing of society, when in cooperation with civilian organizations they undertake rescue, relief and reconstruction operations in response to natural and man - made disasters. Engineering troops have the capability to bring immediate help to society in situations of threat. In peacetime, part of their personnel and materiel are kept in readiness for use in rescue and evacuation operations. After their completion they can rebuild bridges

and road infrastructure. Engineering subunits can carry out demolitions as an element of clean - up efforts.

1. CRISIS MANAGEMENT SYSTEM

In order to support the government of Poland and to ensure effective response of Polish Armed Forces to emergency situations, a Ministry of Defence Crisis Management System has been developed. Its basic element is Crisis Group created within the structures of the Ministry. The system comprises crisis management teams of each of the Services. Within the Land Forces Command a task force is organized, based on the Command Team including members of the Army Engineers Command (Fig.1).

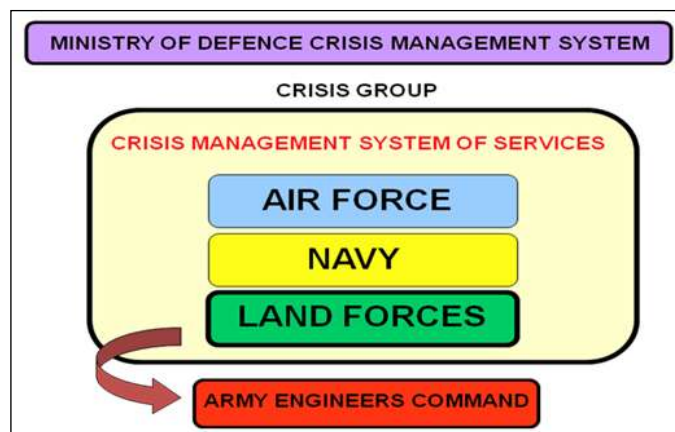


Fig. 1. The Ministry of Defence Crisis Management System

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A body of planning documents has been worked out, describing the responses of military forces to emergency situations of non-military nature. The basic document is "Plan of Participation of Armed Forces Units in an

Event of a Crisis Situation in Given Year." Its appendixes are: "The List of Threats and Procedures for Activities of the Armed Forces in Crisis Situations" and detailed plans for Armed Forces participation (Fig. 2).

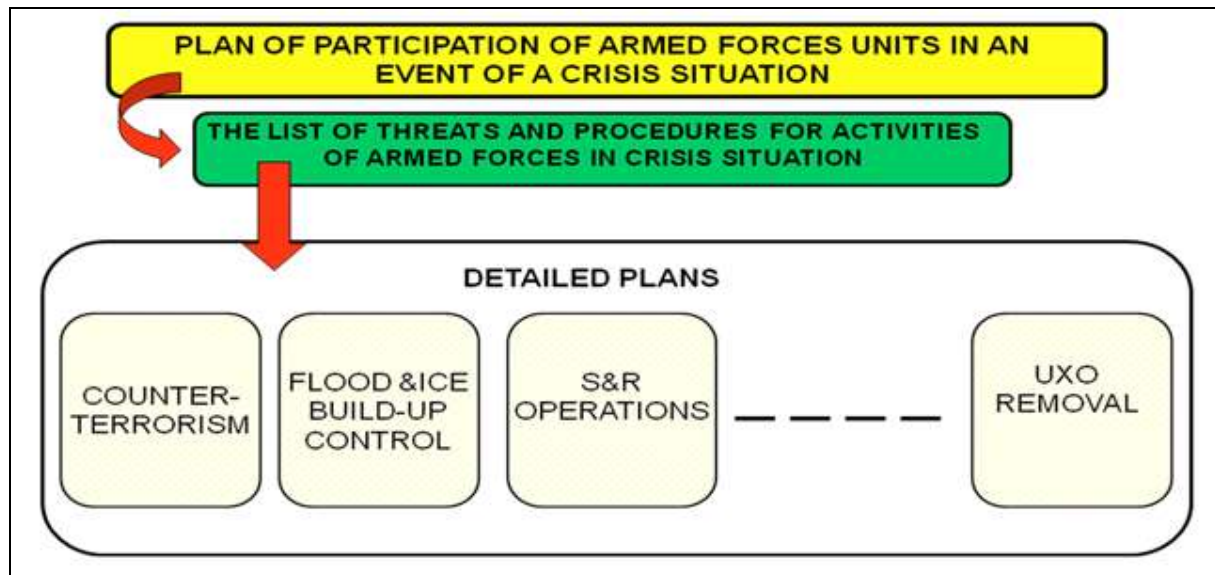


Fig. 2. The Plan of Participation of Armed Forces Units in an Event of a Crisis Situation

The non - military threats belong to three major categories:

- terrorism (threat of acts of force, biological, chemical and radiological terrorism),
- natural and industrial disasters,
- negative social and political phenomena.

Taking into account the threats mentioned above, the Armed Forces maintain resources necessary for support of the non - military structures. The military may be used for:

- monitoring of threats, warning and alerting,
- assessment of damage in threatened areas,
- evacuation and protection of people and property,
- isolating of the threatened area or the site of a rescue operation,
- securing and evacuating of threatened cultural artifacts,
- removal and disposal of dangerous materials,
- removal of chemical and biological contamination,
- reconstruction of transport network,
- search and rescue efforts, delivering medical help,
- obtaining, refining and delivering water.

Depending on the level of emergency, activities of the Armed Forces are carried out in three phases:

The first phase includes activities aimed at crisis prevention. The following tasks are fulfilled:

- finding out the reasons and kinds of threats and their possible effects,
- promoting desired behaviors of the population,
- establishing plans and maintaining personnel and materiel necessary for actions,
- monitoring and situation assessment in the endangered areas,
- maintaining readiness of the system of warning and alerting military units, headquarters and MoD institutions,
- activating of Crisis Management elements of MoD.

The second phase includes responses to emergency situations, which take the following forms:

- monitoring and current situation assessment,
- warning and alerting military units and MoD institutions,
- preparing personnel and materiel for action,
- countering crises,

- coordination of tasks within the framework of Host nation Support,
- reacting to situation changes and commitment of further personnel and materiel.

During the **third phase** the effects of crisis are eliminated through:

- supervision and coordination of actions of detached military units and subunits,
- cooperation with national and international institutions engaged in elimination of effects of crisis,
- supervision of return of the committed forces to their bases,
- supervision of force regeneration after the completion of the operation,
- supervision of accounting following the use of the military.

2. ACTIVITIES IN FLOOD AREAS

Activities of military engineers in flood areas aim at protection of buildings, people and property from the results of flow of high water and ice. In the initial stage, military forces can carry out the following tasks (Fig. 3):

- protection of bridges and hydroengineering facilities (crushing ice and breaking ice jams),
- protection and strengthening of flood banks
- removal of barriers damming up water,
- evacuation of people and property from threatened and flooded areas,
- delivering of food, medicine, drinking water and fodder to flood areas,
- transport of people to work and children to school.



Fig. 3. The activities in flood areas Source: private collection

In flood areas engineering troops can be used to:

- build access routes to the flooded areas,
- protect slopes, embankments, roads and bridges,
- rebuild breached flood banks and embankments,
- clear roads and carry out recovery of those covered by landslides,
- prepare evacuation points for people and property,

- evacuate victims,
- provisionally rebuild roads and bridges,
- build and maintain helipads.

There are following major elements in a military force taking part in a counter - flood operation:

- **Permanent parties** organized for continuous protection of installations and areas during ice float flow or high water.

- **Intervention parties** organized for temporary protection of installations and areas with use of explosives.
- **Rescue-evacuation parties** organized for evacuation of people and property from areas threatened by floods.
- **Demolition parties** on helicopters organized to break ice jams with the use of explosives,
- **Reserve subunits** detached from units committed to counter-flood operations or from other forces.

Military units are deployed for the use in counter-flood operations according to the following modes:

- **Basic mode**, when the local authorities of the threatened area inform authorities at a higher level, who notify a given military command, which decides on the use of a military unit in the operation.
- **Alarm mode**, when the unit commander makes the decision to commit his forces to the operation himself (or on request made at the local level).
- **Command mode**, when military forces take part in the operation based on the decision made by the Minister of Defense, order of the Chief of Joint Staffs of Polish Armed Forces or other relevant, high-level commanders.

When planning for the use of military engineers in counter - flood operations, it is difficult to predict the scope of the disaster and decide on the size of forces detached to cope with it. In the initial phase, the capabilities of military forces are limited because of lack of specialist operators of heavy equipment and lack of legislation allowing their immediate call-up into active service.

After the completion of rescue - evacuation operations soldiers participate in removal of flood damage, elimination of threats and providing of aid to the victims. The contribution of engineering troops to reconstruction effort may include:

- provisional rebuilding of roads and bridges,
- construction of metal and wooden military bridges,
- elimination of effects of landslips and landslides,
- reconstruction of flood banks,
- demolition of remains of destroyed buildings and installations,
- clearing the area of washed-up ammunition,
- building of pipe-wells.

3. ACTIVITIES IN AREAS OF STRUCTURAL COLLAPSE

The strong current of water during floods very often causes structural collapse. In urban areas, the scope of phenomena of this sort can be very large. Crucial for the ability to act in this environment is the arrival to the area of operations, preparation of access roads and well-organized deployment of rescue personnel and equipment, and efficient evacuation of the victims.

Providing aid to people in the areas of structural collapse consists in locating these people in the collapsed buildings, providing them with access to air, removal of rubble and their evacuation. If a thick layer of rubble is encountered, tunnels are dug which begin in relatively long distance from the damaged buildings. In situations when aid must immediately reach the victims (air deficit) explosive charges can be used to make openings in walls or ceilings.

While rescuing people trapped on higher floors of buildings (destroyed staircases) temporary bridges made of planks or boards are put across damaged spans, or the people are evacuated through window openings by means of ladders and ropes.

The damaged buildings can collapse while the rescue operation is in progress. Because of that, those structures often have to be reinforced. In order to ensure safety in the area, electricity must be disconnected, the water supply, sewage, central heating and gas supply networks must be provisionally repaired.

The rescue operation finishes after the last victim is moved out of the area and sent to a place where medical help will be provided. After that, the condition of the damaged building or installation is assessed and checked.

4. ACTIVITIES IN CONTAMINATED AREAS

Several dozen of the biggest industrial plants which store and use toxic industrial chemicals pose a threat to population living in their vicinity. During a flood these chemicals may spread in an uncontrolled manner. If the population or environment is threatened, reconnaissance and elimination of a chemical disaster damage will be carried out by specialist teams consisting of NBC protection, engineering and medical units (Fig.4).



Fig. 4. The Activities in contaminated areas

The main tasks of military engineers in contaminated areas are the following:

- clearing access routes to the contaminated areas or damaged installations or buildings
- removal of rubble and extraction of victims
- evacuation of victims, property and equipment
- carrying out earthworks aimed at limiting or eliminating the leaks of toxic industrial substances.

5. MAKE-UP AND ORGANIZATIONAL STRUCTURE

The make-up and organizational structure of the detached engineering troops should facilitate their effective participation in rescue operations and in elimination of damage caused by natural and man-made disasters. Despite the proper preparation and possession of necessary equipment, the Armed Forces were not able to effectively counteract the huge dimension of the flood on Polish territory. In the most threatened areas a necessity arose to create specialist units for use in rescue efforts and in reconstruction of damaged infrastructure.

Major elements of engineering rescue units are: commander and staff, evacuation group, rescue group (bridge, machinery and technical teams) and logistical services.

These units are to fulfill the following tasks:

- evacuation of people and property from threatened and disaster areas,
- rescue operations for military personnel and civilians,
- delivery of supplies,

- removal of obstacles from transport routes,
- reconstruction of flood banks,
- provisional repairs of water-supply and sewage disposal infrastructure,
- provisional repairs of roads and bridges.

CONCLUSION

1. Natural disasters in the recent years have proved that the state is inadequately prepared for carrying out rescue operations effectively. In the opinion of specialists, the military was unable to mobilize its resources quickly enough to fight the disaster. This criticism was directed at some of the regulations of the bill, defining the use of the Armed Forces and rules of the military service of Polish citizens, and at not the skills and knowledge of soldiers.
2. Where effective instruments for predicting disasters are not available, rapid mobilization of the military to fight threats could limit the damage and number of casualties. It proved necessary to organize engineering rescue teams stationed in threatened areas, belong to the territorial defense system, which operates on demand of local authorities.
3. Experience gathered during the previous natural and man-made disasters and appreciation of the change of scale and character of threats form the basis for development of National Crisis Management System. *What role should the Armed Forces play in it? What tasks should be anticipated for engineering units?*

4. Large scale floods bring about the necessity to quickly rebuild damaged roads and bridges. In the first phase this is achieved with the use of provisional technologies, later, as the situation becomes stabilized, the destroyed buildings and installations are replaced by permanent structures. The basic problem is the lack of technological resources for provisional rebuilding in civilian firms.
5. Military engineering units are more flexible from the point of view of national interests. They can be used in military conflicts *and* in response to threats of man-made and natural disasters. Therefore it seems

reasonable that they should be used in situations of this kind, and be adequately prepared, equipped and organized for it.

6. The participation of Armed Forces in rescue and protection operations creates a positive image of the military working for the society. These activities also test the level of training of soldiers and the effectiveness of command and control system. Cooperation with the non-military structures is an important factor, which influences effectiveness of actions undertaken by all organizations responsible for crisis management on the territory of the state.

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