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**THE USE OF NEW CONSTRUCTION
TECHNOLOGIES IN THE MILITARY
CONSTRUCTION PRACTICE OF THE HUNGARIAN
DEFENCE FORCES DURING PEACE-SUPPORT
OPERATIONS**

PhD dissertation author's review

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DRAFTING OF THE SCIENTIFIC PROBLEM

Lately – since the change of regime – military engineer equipment, machines and materials have been characterized by small numbers of availability, undesired diversity, old-fashioned devices (nearly of the same age), and as a result of these they have been considered out-of-date and morally low-level. The years after the change of regime was determined by economic necessities, so in those years the inherited situation got even worse.

From this level the real breakthrough started in 1999., with the reform of the military forces. In the first stage of this process the defence review - ended up in 2003., initiated by the government -, projected establishment of self-supporting infantry battalions and allocated combat support- and service support units. These are complemented by the so called »niche« capabilities connected to peace-keeping operations. When specialization had to be chosen, an important consideration was to choose an ability really lacked by the Alliance. Another point was, that it should be built on an existing experience, or it ought to be developed relatively cheaply and fast. Under the first category fell engineer (bridge construction, water purification)-, medical- and ABC capacities, the latter contained military police-, special forces and CIMIC capabilities. In the process of the defence review, on the 2002. NATO Summit in Prague, Hungary offered, as new capabilities water purification and bridge construction in the field of engineer support.

Experience - gained during Hungarian peace support operations - shows, that engineer support tasks are demanded not only by applying such military organizations accomplishing basic requirements, but they also mean the basic condition of activities of those military formations, which do not carry out engineer missions. Accommodation of military troops, providing traffic service, or fortification tasks in favour of safeguarding manpower and machines, require adoption of special methods and procedures, engineer expertise and technical capacity.

That is exactly, what provides my research topic with timeliness: so far a widely reviewed and overall improvement of the domain of engineering has not been accomplished, thus in order to reach the above mentioned goals, it is essential to review and tendentiously improve the constructional activities of engineer troops, taking into account, that Hungary offered these abilities to the Alliance. In this context engineer tasks of peace support operations have to be focused on with special attention, including applied and applicable engineering methods and technical solutions, that enable us to cooperate with multinational partners.

AIMS OF RESEARCH

The general goal of this research is to define theoretical and practical inferences of military construction activities implemented in peace support operations, in order to promote and establish the modern construction practice of the Hungarian Defence Forces. The general goal is based on achieving the sub-goals, detailed below:

1. Studying the inferences of peace support operations and logistic support, systematizing the engineer support tasks of peace support operations, establishing the scope of buildings constructed by engineers, and characteristics of military constructions;
2. Establishing the possible engineer support tasks to be undertaken by Hungarian military engineers;

3. Studying the phases of peace support operations, establishing the stages of constructions in terms of levels of developments, and according to its content, defining safety in scope of military construction;
4. Exploring the inherences of necessary capabilities, establishing the ways of research and development and also acquiring in the light of engineer-military-economic considerations.
5. Studying the relationship of technical modernization and education-training, establishing the conditions of effective application of modern technical devices.
6. Establishing the general requirements for newly applied devices, evaluating the new materials and technologies, which can be fitted into the tasks of the Hungarian Defence Forces.

RESEARCH METHODS

To achieve the above mentioned goals, while preparing my dissertation, I did the followings:

In connection with the topic of the dissertation I studied the Hungarian and international military- and construction engineer bibliography and documents issued by economic organizations, Hungarian and international military jurisprudence, standards and engineer regulations.

Paralell with my PhD studies I conducted additional construction engineer studies, and in my dissertation I utilized this experience gained in the field of construction engineering and quality-control. While processing the studied topic, I integrated the professional principles of this special field.

I attended special military courses, and processed the experience gained there.

While being a lecturer, I conducted consultation activities for students, who prepared dissertations in the scope of my researched topic.

I took part in national and international professional military conferences, gave lectures, published articles in professional military and construction engineer periodicals, and submitted my articles for scholarships.

I elaborated some sub-topics of my dissertation extremely in details, and took part in research programs and laboratory experiments in connection with other parts of my study. The results of these activities were utilized in my publications.

I conducted purposive research activities in military-, construction engineering- and quality-control bibliography.

I consulted with experts experienced in the field of military construction and other topics concerning the scope of my dissertation.

THE ACHIEVED RESEARCH DESCRIBED BRIEFLY CHAPTER BY CHAPTER

In the preambulum (Chapter 1.) I based the importance and timeliness of the chosen topic with a short historical review. In this I outlined the title, considered appropriate, the researcher's hypotheses, and I drew up the researcher's goals, while establishing the scope of the researched topic. I drafted the professional scientific activities accomplished in favour of processing the researched topic, and outlined the structure of my dissertation.

In Chapter 2., I shortly summarize the facts which establish the processing of the researched topic, and are in connection with peace support operations. Above all this I systematize the military engineer support tasks connecting to peace support operations.

According to Hungarian and NATO standing operational procedures and documents I systematize the tasks awaiting for military engineer units in peace support operations. I define and outline the following terms: „three level developed system” and „required safety of use” as the characteristic features of peace support operations.

In Chapter 3., I summarize the application viewpoints of military construction practice, with special attention to the international military roles undertaken by the Republic of Hungary, and the capabilities volunteered by the government to establish and improve. I summarize the military-engineer-economic considerations of technical devices, materials and technologies, some inferences of them, and I suggest the possible ways of their evaluation. In this chapter I also explore the sources of up-to-date military construction practice, and the methods to shape them. In connection with this I scrutinize the inferences of education-training and technical-and procedure standardization.

In Chapter 4., according to the military construction tasks systematized in Chapter 2., I introduce and systematize such materials, devices and technologies, that have come into my view during my research, and I have considered them to be worth dealing with in some fields.

The summary contains the main conclusions established in Chapter 1-4, and as a synthesis, the results of the research. Here I marked those fields which – in my opinion – either require additional research, or are appropriate for detailed elaboration.

SUMMARIZED CONCLUSIONS

In the focus of the research there are the buildings and structures to be built (rebuilt, renovated or maintained), together with their goal, and the conditions, whether they can be constructed or not. In favour of this I introduced the definition of „military construction”, that is as follows: Military construction is a constructional activity of military (engineer) organizations, while they establish, refurbish, maintain or pull down different buildings and structures, in favour of military goals, meeting military standards, using military troops and equipment.

On the one hand, in my point of view, the basis of establishment of the tasks is not the scope of the crisis management operations according to Article No. 5, and the form and content of the tasks undertaken by military organizations. On the other hand, the engineer tasks of the peace support operations closely belong to the scope of logistics support, where the military goal is to transport materials and personnel, and provide the troops with accommodation and other installations which provide them with places of resting. It is also a speciality of peace support operations, that military organizations take part also in the civilian activities (ie.: CIMIC, environment protection). Thus, these special buildings and structures are even a part of military infrastructure. Buildings and structures equipped, constructed, maintained or improvised, either for temporary or permanent use for peace support operations belong to it. I systematized the tasks of engineer support according to these principles.

I established the general scope of necessary buildings and structures on the fields of engineer support during peace support operations. According to this to construct, rebuild, refurbish and

maintain roads and rails and their accessories, landing sites, ports, traffic-junctions and logistics centres, and also to build compounds of peace support operations mean providing field infrastructure in a broad sense. From a constructional engineer viewpoint we cannot speak about fortification tasks and -structures in its classical meaning, protecting troops and equipment in peace support operations does not mean to construct a single building, but a special quality of the buildings of peace support operations, or in terms of constructional engineering a requirement of the customer, who ordered the job, or basic data for designing.

By specifying the scope of buildings and structures, I established and made suggestions for the tasks to be undertaken by Hungarian engineer units in peace support operations, and also for the buildings and structures to be constructed by them.

I defined the characteristics of levels of military constructional preparedness, and in cases of certain building types I made suggestions for their content.

I studied the relationship of military constructional tasks and the provision of the necessary engineer standard. I came to the conclusion, that Hungarian „engineers” cannot meet all the requirements established by the tasks, thus, in a long term, engineer specification can enable us to keep up the appropriate standard. Specification can also ensure the success of improvement and modernization from the technical side. I established, that the basic conditions to reach these goals are to define the tasks of modern constructional practice of the Hungarian Defence Forces, and also the sub-tasks to be undertaken in this field. The basic condition of these is to establish capacities and capabilities to be improved, taking into account the personal and technical conditions.

I have established, that we can ensure the efficient and the long term technical conditions, if we study military-, engineering- and economic considerations and demands in a complex way, and also work out the methods, and apply them consistently, while improve and form the necessary engineer capabilities.

I recognized, that during peace support operations it is quite typical, that military construction is drafted in the direction of civilian constructional practice, and the reason for that is the system of conditions both on the side of demands and execution. Because of this, I studied the possible sources and methods of modernization of military construction in Chapter 4., and paid special attention to this topic.

In my opinion, while upgrading and modernizing we have to assert, what we have undertaken from NATO standards, on the one hand in connection with materials, equipment and technologies planned to be applied in military constructional activities, on the other hand during the training of our personnel. Contrary to our practice having applied so far, we are to ensure, that these standards are going to be built into the practice of military construction.

I have specified those military engineer manuals, which have to be revised, and worked out the basic viewpoints of this activity. Above all these, in my point of view, we should work out a new manual about the construction of military camps in peace support operations.

I think it is vital to publish every manual of technologies, technical equipment and materials to be used in peace support operations, not later, than their deployments to the theater.

Additionally I defined the military requirements in connection with engineer equipment.

According to the structure, mentioned above in my dissertation, I revised materials and technologies, considered to be partly or completely meeting the military requirements, used in domestic and international military-, or civilian constructional practice, and appropriate even under the circumstances of peace support operations.

I consider it to be an important field of research to study new civilian materials and methods, especially in the field of geo-plastic materials, aluminium structures, plywood support beams, modern concrete-technologies and composites.

I recognized, while revising the suggested technologies, that in peace support operations capacity of Hungarian military engineer units can meet requirements of certain contemporary standards, but others require major technical improvements and methodical regulations. The extremes of this can be observed in the NATO contributions on the field of engineering, undertaken by our country. In this respect, the field of military bridge construction is lagging far behind: we have neither kept the long-established bridge structures (built in the traditional way, spare-parts by spare-parts), not speaking about upgrading its technics, nor acquired the up-to-date panel- or mechanical bridge systems, which meet NATO weight-requirements. This is the most urgent and most important task of the modern military constructional practice.

NEW SCIENTIFIC RESULTS:

1. In the light of the tasks of peace support operations, in harmony with the tasks of logistics support, I have defined the task-system of engineer units in peace support operations, and also established the scope of military constructions in peace support operations, additionally I have systematized the standing military and civilian regulations, and demands for military adoption. I have established the characteristics of military constructions in peace support operations.
2. In the system of engineer support for peace support operations, and characteristic buildings and structures, I have evaluated engineer support tasks to be undertaken by Hungarian engineer units, as soon as the technical modernization has been done, not forgetting, that it is to be done on the basis of the present technical level. During the evaluation two fields are to be highlighted: to improve bridge construction capability, and to process the theoretical topics of furnishing camps.
3. I have analysed the requirements set for constructed buildings and structures in the periods of peace support operations, and so I have proved, that in different periods different requirements have to be met. In order to mark the borders between these periods I considered it important to introduce the term of stages, and in case of certain structures I suggested the content of them. The stages are useful to establish the engineering content of preparedness of these structures in line with the given periods of peace support operations, and enables us to plan the necessary manpower, materials and equipment. By this the necessary safety of usage can be achieved, and the necessary stocks can be piled up.
4. I have defined and systematized coherences of the necessary capabilities, which have to be determined, with a special focus on the considerations of research-development and the engineer-military-economic considerations of acquiring. I have worked out a lifetime-cost evaluation system in connection with military construction acquiring, according to general quality control principles, a field having been slightly neglected so far in military modernization.

5. I have proved, that modernizing military education- and training system is a crucial part of technical improvement, and a basic condition of application. The primary conditions of this are as follows: applying NATO standards, renewing basic military engineer manuals, terminate the uncontrolled fields of engineer support.
6. I have established the general requirements for newly introduced equipment, and detailed the materials and technologies considered appropriate to be introduced, according to the systematizing, written in the dissertation. By outlining the characteristics of these, I have proved, that these are not to be fitted into a task-system: they can enrich the existing-, and establish the missing capabilities.

HOW TO CAPITALIZE ON THE RESULTS OF THE RESEARCH IN PRACTICE

In my point of view, the content of the dissertation can be used:

- to establish the necessary capabilities of the Hungarian Defence Forces;
- to plan consecvently during technical modernization of engineer support, -acquiring and -research-development;
- to prepare decisions in connection with acquiring, and to evaluate the acquiring projects in a complex way;
- to work out and renew the military engineer manuals of the Hungarian Defence Forces;
- to contribute to the preparation, education and training of military engineers.

SUGGESTIONS

Some fields, mentioned in the dissertation require additional attention and research:

- the relation of buildings and structures of peace support operations – as sub-system of military infrastructure – to the system of „national infrastructure”, „defence infrastructure” and „critical infrastructure”;
- the engineer- and legal aspects of national, international and NATO regulations, concerning the preparation of military construction tasks, planning, designing, constructing and maintainig buildings and structures, especially in cases of non-domestic application;
- studying and working out methods to establish, how the existing equipment can be applied in additional ways, how to evaluate the acquiring of necessary capabilities in a complex way, by evaluating materials, equipment, technologies used by engineer support, in peace support operations;
- overviewing the regulations in the field of military construction and NATO standards, concerning this field. On the basis of this, renewing the existing military engineer manuals, and working out new manuals for the unrulred fields, like furnishing camps in peace support operations.
- conducting additional research to renew military bridge constraction technologies, to choose mobile- or mechanical bridges, meeting NATO weight-system requirements, and to apply geo-plastic materials for military purposes.