National University
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An author's résumé and the official reviews of the PhD dissertation by

LIEUTENANT COLONEL GÁBOR SZÁSZI (ENG.)

An assessment of defence requirements to railway system infrastructure and the analysis of its further development potential

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An assessment of defence requirements to railway system infrastructure and the analysis of its further development potential

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THE OUTLINE OF THE SCIENTIFIC PROBLEM

Following the regime change, having joined the North Atlantic Treaty Organisation (NATO) Hungary had an opportunity to become a full member of the European Union (EU). As an integral part of this process the appropriate development of the transport infrastructure with the proper timing and quality became top priority from economic and national defence aspects both for the European integration and the NATO accession of Hungary. The international commitment towards the integration process requires taking into consideration the pan-European interests besides those of the country during the development of its national transportation system. At the time of inevitable network-development the legal, economic and structural preconditions should all be created in order to enforce defence interests matching new value systems.

During the creation of a unified European transportation network defining the development priorities for the subsystems comprise a fundamental problem. Under purely market-oriented circumstances the significance of railways continues to decrease while in its transport policy concept issued in 2011 the EU highlights the development of railway networks and the liberalisation of railway transportation in order to counterbalance the dynamic development of road transportation. As a result of this process the railway network and its system of operation have fundamentally changed. Besides the unified development strategy of the network, taking into consideration pan-European interests, a large-scale decrease in the role of governments and an increase of private entrepreneurship should be expected. In my opinion such a new situation justifies the analysis of the issue whether strives towards unification and the priority of developing trans-national transportation corridors allow the enforcement of defence aspects on the development of national railway networks.

What makes the question even more up-to-date is the fact that NATO regards the development of the mobility of armed forces as an issue of high significance, emphasising that this should be achieved through the joint utilisation and coordinated development of military and civil systems. Besides the development of strategic (air and sea) transport capabilities, with justifiable priority, the development of railway infrastructure network is rather backward. However, within a unified Europe the defence significance of railway development is indisputable as even today railways are the most appropriate means of large-scale movement of assets to sea ports or of regrouping forces in Europe. Taking all these factors into consideration it is a fundamental requirement

whether the present railway network and its development opportunities meet the requirements of home defence and Hungary's NATO commitments.

RESEARCH HYPOTHESES

When processing my research theme I formulated the following hypotheses:

- I presumed that the present EU and domestic railway development objectives meet the defence interests of the country only partly;
- I presumed a possible overlap between the defence-purpose preparation of the territory of the country and the protection of critical infrastructures therefore the measures to be taken for the preparation could serve the interests of both areas in a cost-effective way;
- I presumed that the availability of replacement means of long-span bridges comprising the most critical elements of the railway network of Hungary is low priority for international railway traffic while they are inevitable for the defence interests of the country therefore such replacement should be provided as early as peace time;
- I presumed that the operation conditions of side tracks constructed primarily for military purposes should be reviewed in order to introduce the most efficient techniques for their further operation;
- I presumed that the availability of the necessary quantity of special rolling stock serving primarily defence purposes (to be used for national defence or disaster relief) is justifiable even today therefore it is inevitable to assess the methodology of its provision.

RESEARCH OBJECTIVES

From the aspects of the present research theme the requirements towards the transportation system can be divided into two determining areas:

- social and economic expectations and;
- requirements stemming from national defence missions and from the NATO/EU membership obligations of Hungary.

In accordance with this dual requirement system I set the following research objectives for elaborating my research theme:

- analysis of the current conditions of the railway network of Hungary and the summary of measures to be taken for meeting the relevant EU requirements;

- an analysis of the current requirements towards the railway infrastructure, the examination of their justifiability and providing the necessary propositions;
- through an analysis of international models to examine the ways of eliminating defence capability deficiencies, with special regard to the need to prefer both efficiency and common civil-military capabilities;
- the analysis of the availability of rolling stock determining from defence aspects, in order to disclose methodology and techniques of eliminating deficiencies;
- the examination of the role of exclusively defence-purpose railway elements and making propositions to eliminate the disclosed deficiencies.

RESEARCH METHODOLOGY

I applied several of the specific (partial) research methods as the processing of the theme requires a historical context, an analysis of the existing and functioning systems and structures, and their comparison to similar systems and structures of other countries. I tried to provide an overview of the development processes of the transportation systems in the evaluated countries comparing them to the development of the transportation structure in Hungary.

From the theoretical-logical research methodology I applied primarily the technique of analysis for disclosing the characteristic features of transportation systems including the railway network infrastructure since the complexity of the system necessitates its components to be analysed separately with special focus on the links between each element so that I can gather exact and precise information on the current state of affairs. After identifying and systematising the requirements and expectations of both NATO and the EU, using the technique of comparison, I disclosed the areas where railway network infrastructure does not meet defence requirements. I utilised the following research methods in particular:

- researching special literature: analysis and evaluation of strategies, publications (monographs, studies, articles, lectures, government reports, research findings) on the transportation network of the European Union and Hungary, particularly on the development of railway infrastructure, followed by making the proper conclusions;

- I analysed the strategic defence- and security-political consequences, examined the mobility requirements generated by Alliance tasks, and their requirements to the domestic railway network;
- Through the processing of various case studies (threats and extreme situations with negative influence on the railway network) I examined the justifiable needs for maintaining non-trunk-line railway infrastructure;
- I conducted comparative analyses of the reliability of exclusively military or defence-purpose side lines, loading stations, outlined the tasks necessary for enforcing legal and technical requirements;
- I processed information gathered during study trips, conferences and exchanges of experience;
- I made interviews with domestic and international experts in the field of transportation policy, railway, and military transportation.

A BRIEF DESCRIPTION OF THE ANALYSES

Chapter 1:

I identified the similarities of and the differences and links between transportation system and military transportation structures. I outlined the socio-economic and political changes making the theme timely. I defined the notion and elements of transportation system and the specific features of military transportation system. I disclosed the social, economic and defence-related interconnections of the development of transportation infrastructure.

Chapter 2:

I processed the characteristic features of defence requirements to the railway network infrastructure of Hungary in the period of time between 1920 and the regime change. I paid special attention to the specific features of the post-regime-change period of time, to the legal background of the enforcement of defence interests including the methods of implementation. I examined the present state of affairs in the railway transportation system of Hungary, the ways of the enforcement of defence interests, those of meeting requirements, the legal background of

identifying and enforcing requirements, and the methodology of their implementation. I formulated the conclusions stemming from my analyses.

Chapter 3:

On the basis of the new requirements to the railway network and in the framework of comparative analyses I examined how certain elements of the network infrastructure meet the expected requirements. I extended the comparison to the railway network infrastructure elements and procedures of nations which can provide techniques or technological assistance for the elimination of the deficiencies of domestic system. On the basis of this comparison I formulated the requirements to the Hungarian railway transportation infrastructure including the necessary developments. I specifically examined the railway network as part of critical infrastructure and disclosed the deficiencies whose elimination is a fundamental national interest.

Chapter 4:

I formulated my conclusions on how the NATO- and EU-requirements are enforced in the present railway transportation system. I made proposals on the development of railway network infrastructure from the aspects of defence interests, on the clear and transparent legal regulation system of the endorsement of national defence interests, on the methods and structural frameworks of the enforcement of interests.

SUMMARISED CONCLUSIONS

Having reviewed all sequences of my research area I regard the defence preparation of Hungarian railway network as an important mission although it should be accomplished on the basis of the requirements towards it, the ways of implementation, the social, economic and technical characteristics of the era.

The overview of the notion system highlighted the fact, and supported my opinion, that in the field of railway transportation there is no use of distinguishing between civil and military systems and structures. There are elements which can be separated – such as the side-track system technology – but the negotiation of distances can only be successful with the use of identical networks. Although I mention cases when defence interests overwrote civil ones this tendency has decreased since the motorisation boom of the 1960s.

At present defence transportation can only be ensured with the use of civil systems and structures. However, such tasks require an appropriate network even if its maintenance cannot always be justified on cost-effective grounds.

On the basis of the findings of my analyses I consider that the railway transportation system saw significant changes in the past twenty years. The structural changes in economy and the decrease in the need for transporting bulk goods resulted in a tremendously shrinking role of the railways in the national division of labour. Consequently, a large number of structural changes took place that does not support the defence-related preparation of railway system. This fact leads up to the final conclusion that much more attention should be paid to the enforcement of defence interests in relation to railway systems and structures because between the current trends and processes – demand and opportunity – currently there is a growing gap developing.

In the era following the Trianon Peace Treaty the defence preparation of the railways had different characteristics in various, consecutive and relatively well-separable cycles. On the basis of the disclosed principles I formulated those tasks and capabilities which can be regarded relevant and also disclosed new requirements which are to be met in the field of the development of railway network infrastructure.

Before the Second World War Hungary was practically preparing for waging a new war even though because of the significant limitations codified in the Peace Treaty the country had no real preconditions for such a confrontation. Nevertheless, the primary objective of the military leadership was to prepare the railway network of Hungary for a significant military build-up, which comprised a rather complex mission because of the newly drawn border lines. Therefore in that period of time railway development was dominated by military interests consequently the strategic aspects referred to the line network, to the maximum utilisation of opportunities provided by the railway lines, to the development of rolling stock, and the maintenance of the continuity of railway traffic. In many cases the requirements formulated by the military leadership were far away from the real economic potential and capacities of the nation.

In the period of time after the Second World War the characteristics of theatre-preparation tasks were rather similar in many aspects to those of the Horthy-era. That time it was the needs of the Soviet military command that identified the content of theatre-preparation tasks and the methodology and scheduling of their execution, therefore in that period of time there did not exist a system of requirements directly serving the interests of Hungary. It was the alliance interests

that played a determining role. As a member of the Warsaw Pact Hungary did not have – and in my opinion it could not have had – a chance to represent its own independent national interests. It should also be seen that those interests served primarily the military plans of the Soviet Union and only partly those of Hungary. The so-called system of centralised plan directives was typical for that period of time which was principally supposed to support the efficient execution of theatre-preparation, however, the seamless coordination of plans and reality failed. Nevertheless it can be stated that significant investments were accomplished which also served the economic interests of Hungary because the main directions identified in the field of railway network development coincided with the international main lines in many places.

Examining the current characteristics I came to the final conclusion that the development of the transportation system and structure, including that of the railways, significantly coincided in the field of both civil requirements and defence missions. The defence preparation and development tasks for the transportation system are similar to the transportation-policy expectations and objectives approved by the EU and NATO and to Hungary's commitments made in the framework of Host Nation Support activities. However, there is no cause to be fully satisfied because it must be stated that it is only partly true, from one aspect. If I examine whether everything was done for our national defence interests, significant deficiencies can be disclosed. One of them is the problem of replacement of long-span bridges.

Examining and analysing the railway network of Hungary, including the exclusively military-owned lines (side tracks) and the situation of special rolling stock necessary for defence railway transportation purposes I came to the overall conclusion that currently the system meets only the minimum requirements. In many cases the railway transportation system is able to meet only the requirements which I specified in the field of new defence (national defence and critical infrastructure protection and defence) if disregarding the relevant legal regulations. This statement of mine means the following:

- the main-line network – in spite of its significant backwardness from the European standard – meets the requirements of defence railway transportation, its capacities (network permeability, station loading infrastructure) are able to meet both the expected domestic and Allied capacity-requirements;
- on the basis of my analyses in the field of regional and other railway lines I came to the conclusion that if the minimum conditions for transportation are provided on them, they

are able to provide support to meeting defence requirements. In my opinion the related problem is that in the case of closing down a line for passenger services, the repair and maintenance of the line, including its protection, cease. Lessons learned from the disaster relief operations during the floods on the Danube river in the summer of 2013 proved that side lines play important roles in ensuring continuous traffic if/when main lines are damaged;

- having examined side lines designated for connecting military bases I concluded that the network elements which I suggested for preservation hardly coincide with those ones proposed for preservation by civil professional organisations, however it should also be taken into consideration that they focused only on main line networks (TEN-T). In spite of all this I am convinced that in the future a new way of cooperation should be established which will be able to guarantee the enforcement of defence interests at the development or closing down of the railway network at national or regional levels;
- I came to the conclusion that at present – particularly because of the technical deterioration and the unsuitability of TS barges for bridge-building purposes – the Hungarian Defence Forces does not possess any replacement bridge-construction sets which would be usable for replacing long-span railway bridges. On the basis of international examples I am convinced that this situation endangers the defence capability of the country as far as the maintenance of the continuous operation of the railway system is concerned. Thus this field requires an immediate intervention which can be done – in my opinion – in the framework of a civil-military cooperation which would be the most efficient way since the Hungarian Defence Forces has highly experienced technical personnel although its strength is insufficient for such missions and the provision of the necessary bridge sets is a state responsibility;
- At present the situation of the special rolling stock necessary for the defence use of railways is unacceptable. On the basis of the examined international models I proposed to establish the most efficient and cost-effective common capabilities in close cooperation with other NATO-member states suffering from similar deficiencies. I also disclosed the fact that it is hardly possible to funnel such assets from civil sectors because on the basis of market demands their operation is not in their interests and in accordance with defence

legislation such companies can be obliged to such cooperation only if the necessary funding is also provided.

In conclusion I think that at present the railway network infrastructure of Hungary is only partly able to meet the potential expectations it faces. In order to eliminate these deficiencies significant progress is to be made in the field of legal regulation, of providing the necessary financial conditions for the maintenance of the operability of the systems. Another important factor is that the preconditions for establishing the missing capacities should be initiated with the involvement of top-level decision makers as soon as possible.

NEW SCIENTIFIC RESULTS

1) On the basis of the currently applicable and relevant regulations and tasks I identified the new defence requirements to the railway system. I analysed the present system of building strategic reserves which is a determining factor for the defence preparation of the railway network system. I also disclosed the deficiencies in long-span bridges. On the basis of international comparisons I made proposals for the possible ways of eliminating the deficiencies.
2) I made a proposal for the elements of regional and other railway network systems which can be taken into consideration as alternate routes for national defence purposes or in the case of any damage to the critical elements of the railway network.
3) I disclosed the operating problems of military-owned railway lines, maintained exclusively for national defence purposes and made proposals for changes in their operating order.
4) On the basis of the analysed international examples I elaborated various alternatives for the future provision of special railway rolling stock (heavy-load flat wagons).

THE PRACTICAL APPLICATION POTENTIAL OF THE RESEARCH FINDINGS

My research findings are appropriate for underpinning the preparation of decisions by leaders necessary for the defence-preparation tasks of railway network, for providing assistance with planning, organisation and implementation of the defence-purpose preparation of railway-network elements.

On the basis of my propositions elaborated for the defence-purpose preparation of the railway network and for the provision of special rolling stock there is an opportunity to further analyse various alternate solutions in the field of economic and technical efficiency in order to provide support to efficient decision making process.

RECOMMENDATIONS

I wrote my dissertation in order to assess and examine the present state of the railway infrastructure of Hungary, to analyse the current system of enforcing defence requirements and of the meeting requirements which I identified and specified for primarily military infrastructures. Therefore I recommend my dissertation to:

- experts who are responsible for the operation of elements of specific military infrastructure or who are involved in the technical supervision of such infrastructures;
- leaders who make decisions on the distribution of budget resources designated for the maintenance and development of military infrastructure elements;
- professional and financial leaders who are responsible for the planning, coordination and implementation of civil-military cooperation;
- teachers, researchers and leaders and members of organisations responsible for the elaboration of transportation development strategies.

LIST OF PUBLICATIONS BY THE PHD STUDENT

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Neme	férfi
Szakmai tapasztalat	
Időtartam	2011 -
Foglalkozás / beosztás	adjunktus
Főbb tevékenységek és feladatkörök	oktatás – szállításszervezés; Katonai szállításszervezés, Szakalegység vezetése; Közlekedési jog kutatás – Közlekedési kritikus infrastruktúra védelme
A munkáltató neve és címe	Nemzeti Közszolgálati Egyetem; Hadtudományi és Honvédtisztképző Kar; Katonai Logisztikai Intézet; Hadtáp és Katonai Közlekedési Tanszék
Tevékenység típusa, ágazat	Felsőoktatás
Időtartam	2007-2011
Foglalkozás / beosztás	dékáni hivatalvezető helyettes/hivatalvezető
Főbb tevékenységek és feladatkörök	A ZMNE Bolyai János Hadmérnöki Kar igazgatási ügyeinek koordinálása, majd irányítása
A munkáltató neve és címe	ZMNE Bolyai János Hadmérnöki Kar Budapest, Hungária krt. 9-11.
Tevékenység típusa, ágazat	
Időtartam	2004-2007
Foglalkozás / beosztás	kiemelt főtiszt (főmérnök)
Főbb tevékenységek és feladatkörök	az MH katonai közlekedésműszaki feladatainak irányítása
A munkáltató neve és címe	MH Közlekedési Szolgálatfőnökség HM II: Budapest, Lehel út 35-37.
Tevékenység típusa, ágazat	közlekedésműszaki feladatok felsőszintű tervezése és irányítása

Időtartam	1991-2004
Foglalkozás / beosztás	főiskolai adjunktus/docens
Főbb tevékenységek és feladatkörök	közlekedési szakos polgári és katonai hallgatók szakmai képzése, szakcsoportvezetői és tanszékvezető helyettesi feladatok ellátása
A munkáltató neve és címe	Bolyai János Katonai Műszaki Főiskola
Tevékenység típusa, ágazat	Felsőoktatás
Időtartam	1986-1991
Foglalkozás / beosztás	szaktanár/főiskolai tanársegéd
Főbb tevékenységek és feladatkörök	katonai közlekedési szakos hallgatók szakmai képzése, osztályfőnöki feladatok ellátása
A munkáltató neve és címe	Zalka Máté Katonai Műszaki Főiskola Budapest, Üllői út 133-135.
Tevékenység típusa, ágazat	Felsőoktatás
Tanulmányok	
Időtartam	1983-1986
Végzettség / képesítés	közlekedésmérnök
Oktatást / képzést nyújtó intézmény neve és típusa	Közlekedési és Távközlési Műszaki Főiskola, Győr
Időtartam	1991-1993
Végzettség / képesítés	műszaki tanár
Oktatást / képzést nyújtó intézmény neve és típusa	BME Természet- és Társadalomtudományi Kar
Időtartam	1999-2001
Végzettség / képesítés	okleveles katonai logisztikai vezető
Oktatást / képzést nyújtó intézmény neve és típusa	ZMNE Vezetés- és Szervezéstudományi Kar Katonai Logisztikai szak

Egyéni készségek és kompetenciák	
Anyanyelv	**magyar**
Nyelvvizsgák	**Német:** ARMA katonai szaknyelvvel bővített felsőfokú „A” nyelvvizsga **Német:** ARMA katonai szaknyelvvel bővített felsőfokú „B” nyelvvizsga **Angol:** STANAG 1.1.1.1.
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