

NAUKI TECHNICZNE

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PRELIMINARY CONCEPT OF EXPEDIENT/BATTLE DAMAGE REPAIR SYSTEM FOR THE POLISH ARMED FORCES

The paper presents the expedient/battle damage repair of weapon system preliminary concept for The Polish Armed Forces which should be introduced in order to fulfil NATO standardization agreements. The proposed concept was drawn up on the basis of allied doctrines and regulations as well as on the study of expedient/battle damage repair systems which occur in other NATO armies. The preliminary proposition includes the functional concept of the abovementioned system at central level.

Key words: *military equipment, expedient/battle damage repairs, expedient/battle damage repair system*

INTRODUCTION

Logistic units should aim at the same level of mobility and ability as combat units supporting them [1]. An efficient and effective combat service support system of military units conducting any combat operations is the principal determinant of success. This fact is confirmed by both historical and recently conducted armed operations [2, 3, 4, 5, 6, 7, 8]. The most essential is the process of technical support provided by the maintenance subsystem as referred to in this paper [9]. According to doctrinal documents, technical support means the maintenance of weapon systems to keep them ready to use and the recovery of their ability to use in the case of damage as well as supplying military units with military equipment, spare parts and technical materials which are crucial to conduct service and repair [10, 11].

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1. BATTLEFIELD MAINTENANCE

In peace maintenance includes numerous tasks connected with keeping military equipment ready to use like servicing, repairing and maintaining during storage. Apart from that, there is the modernization, retrofit or purchases of new weapon systems on an as needed basis. However, combat operations is a very dynamic process varying with time and space. The combat and tactical situation is changing on the battlespace instantly and at random. Meanwhile all combat service support processes are determined and they require precise planning, organization and supervising. Taking that point of view into consideration, a combat service support system slows down the dynamics and pace of combat. Therefore maintenance actions will often be limited to the recovery of weapon systems, namely a quick assessment of situation, evacuation, quick expedient repairs, the cannibalization or destruction of equipment which cannot be evacuated or repaired (Fig. 1). The efficiency of that process will determine success on the current battlespace, which is connected with logistic forces and means supporting recovery tasks during an operation [12, 13, 14].

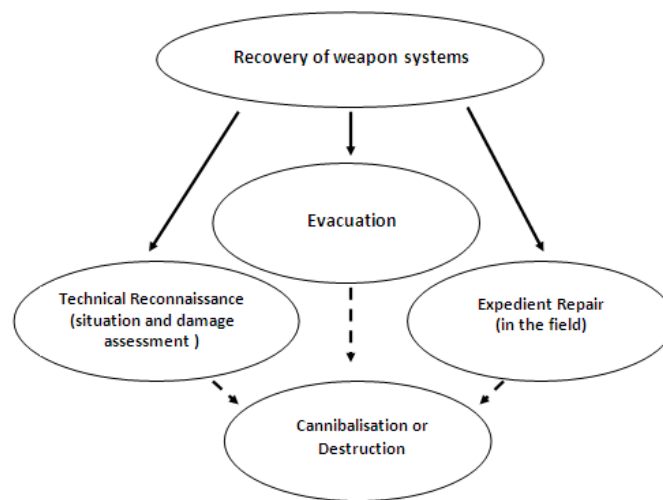


Fig. 1. Recovery tasks of weapon systems during a combat operation

Source: Own elaboration

It should be underlined that weapon systems belong to the group of technical objects used in a random mode [15] and like agricultural, city or rescue service equipment, they require a special maintenance system which is determined to perform tasks just on time and place. One of the organizational and technical solutions developed and improved by NATO armies, which enable a quick recovery of the fighting ability of broken weapon systems during combat operations, is the system of expedient (temporary) repairs, including battle damage repairs.

According to the allied doctrine, the expedient repair is taken if:

- there is not enough time or lack of spare parts to provide standard repairs;
- the operational situation forces to quickly restore damaged weapon systems;
- after expedient repair and accomplishing task, the restored object must be repaired using standard methods.

According to Stanag 2399 “Battle Field Recovery/Evacuation Operation”, the evacuation and repair of weapon systems should be executed very close to fighting units with the use of the newest technology, which allows to quickly recover damaged equipment and accomplish a task. It is also permissible to restore the working order of the object only partially using improvised and temporary methods and technologies [16]. The latest NATO document that refers to the battle damage repair of weapon systems is Stanag 2418, which introduces the idea of expedient repair. This kind of activity was defined as repair which can be temporary and executed with the use of nonconventional (improvised) methods in barracks or in the field. The expedient repair can be conducted only in accordance with the accepted procedures and instructions [17]. According to the quoted document, expedient repair includes also battle damage repair.

2. EXPEDIENT/BATTLE DAMAGE REPAIR IN NATO ARMIES

In addition to the U.S. Army, German and Norway (Fig. 2), which are well under way in the field of Expedient/Battle Damage Repair systems, highly developed solutions function in the Land Forces of Great Britain, Canada and Australia. Apart from the Polish Land Forces, the countries which recently joined NATO are also developing and implementing their concepts of a BDR system, such as the Czech Republic, Hungary and Romania.

According to the conducted analysis concerning ER/BDR systems in NATO selected armies, the following conclusions can be formulated:

- some NATO armies, especially those as big as the U.S. Army, Great Britain or German, have advanced ER/BDR systems, while smaller and those that recently joined NATO, such as the armies of Austria, Hungary or Romania, are in the process of creating their systems;
- the armies that have more developed BDR systems also have appropriate regulations (doctrines, instructions) concerning the rules and extent of providing expedient repairs depending on an operational and technical situation. A general rule is that expedient and battle damage repairs are applied in special situations which result from operational conditions, namely being cut off from own units and supply sources, an urgent need to restore a damaged weapon system, lack of spare parts and use of standard maintenance at the same time;
- individual NATO armies organize ER/BDR systems in a somewhat different way (they have various BDR levels, repair time at their disposal, different equipment and BDR kits), which is dependent on the size of Land Forces, specificity of tactics and weapon systems;
- the most important elements of improvised repairs is an operator or a crew of a military vehicle or other weapon system, since they will decide as the first about further action. So it is crucial to the system that the maintenance personnel should be properly trained and have experience in performing ER/BDR;
- an essential element of expedient repairs is recording and archiving them (with standardized forms), which allows one to correctly provide further re-

covery action on the broken equipment and use the data recorded to conduct training and support maintenance personnel with similar technical problems.



Fig. 2. The Norwegian Army three-level Battle Damage Repair system

Source: I. Kjartan, *Presentation of the Norwegian BDR-equipment. In Proceedings: 15th NATO/PfP Battlefield Maintenance Panel meeting, 10 – 14 May 2010 in Turkey*

3. THE EXPEDIENT/BATTLE DAMAGE REPAIR SYSTEM PRELIMINARY CONCEPT

The ER/BDR system at the level of the Polish Armed Forces should be finally managed by a unit at central level. The Centre of ER/BDR System Coordination and Organization is a suggested name for this unit. It should function at the Inspectorate for Armed Forces Support, since the abovementioned staff is responsible for organising and executing the undertakings and tasks of service support. The centre created should not be complex staff consisting of many people, but only a team of several specialists who will be responsible for the following (Fig. 3):

- collecting and archiving data concerning battle and maintain damage and failures;
- collecting data with reference to the technologies applied and the methods of expedient (temporary) repairs to weapon systems maintained in military units as well as monitoring their durability;
- developing doctrines, instructions, regulations and field manuals concerning ER/BDR and publishing serial newsletters on ER/BDR procedures and technologies;
- organizing and directing annual training events for personnel on ER/BDR, which could be arranged in the Land Forces Training Centre.

A digital platform of data exchange should be the main component of the system, which will ensure proper knowledge and experience creation as well as usage in the field of ER/BDR. It should be a functional element of the integrated computer system which is being currently created for supporting logistic services in the Polish Armed Forces [18]. Additionally, it should operate in a computer network and be accessible not only for the centre but also for military headquarters, maintainers and cooperating units responsible for the development of the system. The information resources of the platform would be increased with every new experience concerning temporary repairs. What is more, in the future it might be some kind of computer tool to support logistic headquarters, maintenance units, recovery teams and even single mechanics in solving technical problems which could occur during a combat operation on remote battle areas. The aforementioned support could be executed online by modern communication technologies such as sat voice and picture transmission. To sum up, the com-

puter tool would be created to support new trends in remote technical objects managing called “telemaintenance” [19] (Fig. 4).

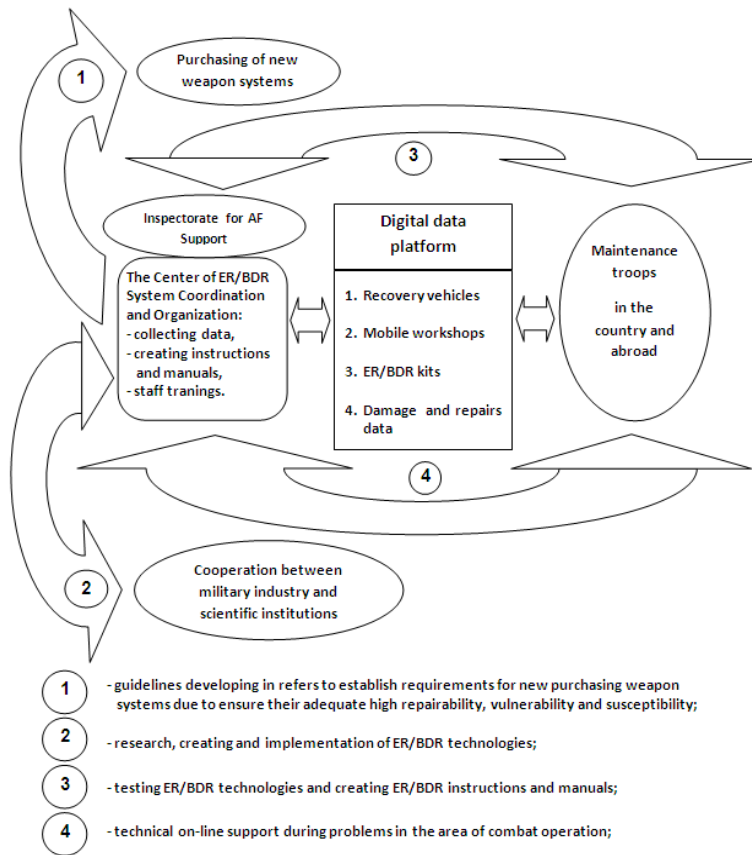


Fig. 3. A schematic diagram of the ER/BDR functional system in the Polish Armed Forces
Source: Own elaboration



Fig. 4. The concept of the telemaintenance system in the German Land Forces to support expedient repairs during combat operations

Source: O. Reitshmied, Battle Damage Repair (kit), In Proceedings: 15th NATO/PfP Battlefield Maintenance Panel meeting, 10 – 14 May in Turkey

The Centre of ER/BDR System Coordination and Organization should cooperate closely with maintenance units deployed around Poland or in foreign countries. On the one hand, the abovementioned cooperation would concern the development and testing of the newest technologies (methods, tools and materials), which allow one to execute expedient repairs in the weapon systems currently used in order to put them back in the field. At the same time, maintenance staff would be engaged in developing new ER/BDR instructions and procedures. On the other hand, the Centre should be able to provide some kind of online technical support in the future, especially for those units which would execute combat operations on remote battle areas. A feedback channel should be created between the Centre and maintenance units that would encourage units to come up with new ideas and solutions, which would then be included in formal documents and on a digital data platform.

A crucial task for the Centre would be developing guidelines for specifying requirements for new purchases of weapon systems in order to ensure their proper high repairability, vulnerability and susceptibility. The Centre should cooperate closely not only with maintenance units but also with the military industry and scientific institutions to properly formulate the aforementioned requirements. The cooperation would also concern conducting research in order to work out and implement the technologies of expedient and battle damage repairs for the weapon systems currently maintained and the future ones.

CONCLUSIONS

A properly developed battlefield maintenance system can create an advantage over an enemy by quickly recovering and restoring all damaged objects with the exception of heavy combat damage. That is why, new and diverse solutions should be searched for in order to support fighting units with capable weapon systems without the necessity of evacuation to stationary workshops. The expedient repair/battle damage repair system is a solution which can improve the operation of the maintenance system. The diversification of various solutions and the appropriate design of equipment (repairability) will support logistic units in recovering weapon systems and can help create an advantage over an enemy.

The crucial role of efficient and effective maintenance system in the field is underlined not only in the allied doctrines and rules but also in numerous publications concerning the combat operations recently conducted. Appropriate documents admit the execution of improvised and temporary repairs in order to quickly recover damaged weapon systems to the battle area. As far as the battlefield maintenance of weapon systems at the appropriate level of task efficiency is concerned, it is very profitable that the weapon system would be characterized by the high level of survivability, vulnerability and repairability in the case of any damage. Additionally, there is a necessity for well-trained specialists, appropriate procedures and accepted repair instructions as well as tailored equipment, tools and materials to quickly execute battle damage repairs during combat operations.

The Polish Armed Forces, as a NATO member, are obliged to introduce allied procedures and regulations. One of them refers to the expedient repairs of weapon systems, including battle damage repairs. It seems that the implementation of the suggested concept for the Polish Armed Forces at central level would concentrate work on its im-

provement in one centre subordinated to the Central Logistic Headquarters. The proposed Centre of System Coordination and Organization would be responsible for a long-lasting policy of system creation and development and for combining all of its functional components.

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WSTĘPNA KONCEPCJA FUNKCJONOWANIA SYSTEMU NAPRAW DORAŻNYCH SPRZĘTU WOJSKOWEGO W SIŁACH ZBROJNYCH RP

Streszczenie

W artykule przedstawiono wstępną koncepcję systemu napraw doraźnych sprzętu wojskowego w SZ RP. System taki powinien zostać wdrożony, aby wypełnić porozumienia standardyzacyjne wypracowane w ramach NATO. Przedstawiona koncepcja została wypracowana na bazie analizy sojuszniczych doktryn i regulacji NATO, a także przestudiowana systemów napraw doraźnych, które funkcjonują w innych armiach NATO. Wstępna koncepcja obejmuje funkcjonalny wymiar opisywanego systemu na szczeblu centralnym.

Słowa kluczowe: *sprzęt wojskowy, naprawy doraźne, system napraw doraźnych*