

IX. Évfolyam 2. szám - 2014. június

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HUNGARIAN ESTABLISHING TEST OF CBRN DECONTAMINATION TECHNOLOGIES FROM THE ASPECT OF CBRN DECON PLATOON COMPOSITION

Abstract

The obsolete more than 40 years old Hungarian developed CBRN decontamination technologies had not met anymore the requirements of NATO standards and thus the procurement of modern CBRN decontamination system became necessary. Before the procurement of chosen KARCHER - RESPIRÁTOR CBRN decontamination technologies comprehensive, detailed test procedures were required which supported the reliable and safety further application effectively. The main aim of test procedure was to take measure the applicability of decon containers to the overall CBRN environment and determine exactly the most effective composition of CBRN decontamination platoon.

Az elavult, több mint 40 éves magyar fejlesztésű ABV mentesítő technológiákkal szemben támasztott követelmények már nem találkoztak a NATO normákkal és ennek következtében korszerű ABV mentesítő rendszer beszerzése vált szükségessé. A kiválasztott KARCHER - RESPIRÁTOR ABV mentesítési technológia rendszerbeállítást megelőzően egy széleskörű csapatpróba vizsgálat vált szükségessé, mely képes volt hatékonyon támogatni a technikai eszközök jövőbeli biztonságos alkalmazását, felmérni azok használatának lehetőségeit ABV környezetben, valamint egyik legfontosabb feladatuként meghatározni az ABV mentesítő szakasz feladatorientált összetételét.

Keywords: *CBRN defence, CBRN thorough decontamination, KARCHER Futuretech Decontamination System, CBRN decon platoon ~ ABV védelem, ABV teljes mentesítés, KARCHER Futuretech mentesítő rendszer, ABV mentesítő szakasz*

PREAMBLE

CBRN situation in operational theatre due to using of CBRN weapons can be characterised with contaminated terrain, fires, obstacles, damages, contaminated air with radioactive products, and these make carrying operations, development of tactical success and work of combat support troops to eliminate strike consequences difficult. [1]

Our forces must be prepared to conduct operations in a CBRN environment with minimal degradation. At the theatre operational level, CBRN defense involves protection for forces and the means to remove or cope with operationally significant hazards in the area of responsibility. Contamination avoidance, physical protection, CBRN defense measures, and decontamination are the primary principles of CBRN defense.

Depending upon his estimate of the actual threat, the commander has to consider the need to implement NBC protective measures. Troops threatened by the CBRN strike, should be warned and the commander will have to decide whether his force should continue to hold, disperse, or seek to interlock with the enemy. The commander subjected to CBRN attack has two basic options: to move or remain in place. Before deciding to move he must consider inter alia: the need to decontaminate before occupying a new position. CBRN defence units will monitor units passing to the rear for contamination and conduct decontamination operations to prevent the spread of contamination. [2]

Decontamination stops the erosion of combat power and reduces the possibility of additional casualties from inadvertent exposure or failure of protection. The extent of and time required for decontamination depends on the tactical situation, mission, degree of contamination, and other alternatives to decontamination, such as deferring the use of the equipment. Forces should ordinarily decontaminate only that materiel needed for completion of the mission. Depending on agent type and weather conditions, decontamination may not be required because of natural weathering effects (temperature, wind, and sunlight). Non-mission essential equipment would have the decontamination deferred, or natural weathering could be used. [3]

Depending on the level of use of CBRN weapons in a theatre, there may be a need for a surge capability for decontamination units. Current combat forces are configured to cope with only sporadic use of CBRN weapons. In this case the rapid and accurate conduct of decontamination activities is very important both in defence and in offense in order to help commanders maintaining combat power and manoeuvre flexibility.

INTRODUCTION OF TESTED CBRN DECONTAMINATION DEVICES

The Hungarian Ministry of Defence Development and Logistic Agency launched public procurement process in harmony of Hungarian Defence Forces development plan for establishing modern CBRN decontamination ability in 2008. The final part of this public procurement process was to carry out establishing test concerning 2 pieces DECOCONTAIN 3000 GDS decontamination containers, 1 piece personal decontamination container and 1 piece decontamination equipment-, chemical solution storage container. These CBRN decontamination technologies made by the German Kärcher Futuretech GmbH and the dealer firm were the Hungarian Respirátor Zrt.

The establishing test is focused the following three different kinds of vehicle mounted CBRN decontamination devices:

The DECOCONTAIN 3000 GDS SYSTEM:

The RÁBA H-25 truck mounted DECOCONTAIN 3000 GDS container can ensure such a technical basis which is able to establish a complete decontamination station and it is effectively suitable for simultaneous CBRN decontamination for vehicles, persons, equipment and routes.

Vehicle decontamination procedure contains three different treatments:

1. During pre-treatment, the main physical contamination like mud and sludge are removed from the surface of tanks or vehicles by applying cold water under high-pressure (approx. 60 bar) using the HD 4000 decon module with two high-pressure spray lances.
2. During the main treatment, the vehicle is covered by special decontamination solution foam. The main treatment depends on the type of CBRN contamination:
 - a) - C decontamination: Detoxification using the highly effective GDS 2000 detoxification solution (AMGDS 2000 decon module)
 - b) - B decontamination: Disinfection using the effective BDS 2000 disinfectant system (HDS 12/14-4 ST decon module)
 - c) - RN decontamination: Radioactive decontamination using the highly efficient RDS 2000 hot foam (HDS 12/14-4 ST decon module).
3. During post-treatment, the decontamination residues are removed from the decontaminated surface using hot water under high-pressure (approx. 80 °C and 60 bar) and hot steam (approx. 140 °C) which is applied via one or two high pressure spray lances.

Personal equipment decontamination is carried out using hot gas/hot steam in a specially designed hot gas/hot steam chamber. Thermal biological and chemical decontamination depends on temperature and time. Optimal decontamination temperatures can increase between 130 °C and 170 °C within hot gas/hot steam chamber and 20 minutes continuous operation duration ensure effective CB decontamination.

Decontamination of the interior can be carried out by means of a highly efficient aerosol technology using a special thermal aerosol generator. The bio contaminated interiors like vehicle cabins, aeroplanes and buildings are decontaminated by SN 50 Decon hot fogger. This thermal aerosol generator atomises the active agent of the thermally stable peroxyacetic acid (Wofasteril SC 250) in an effective droplet size.

Decontamination of the route can be accomplished by two high-pressure spray lances which can cover spray width of more than 2.60 m. The integrated 3000 l water tank can provide to use the DECOCONTAIN 3000 GDS for independent decontamination tasks. [4]

PERSONNEL DECONTAMINATION SYSTEM:

Personnel decontamination container can be used for persons who suffered CBRN contamination and the personal cleaning is urgently needed to avoid harmful effect of CBRN contamination. This system includes 4 pieces isolated inflatable tents¹ for undressing and dressing for males and females. The shower container is located in the center where the personal decontamination is carried out. The shower water is supplied via hot water module integrated into the container. The waste water can be pumped off, collected and it can be used for material decontamination pre-treatment. Personnel Decontamination System consists of personal decon scaffold with fixed shower heads, waste water collecting basin and pump, collapsible water tanks, water supply module and lighting sets. [5]

¹ Personal decontamination tents contain overpressure system and interfaces for providing isolated connection.

Decontamination equipment and chemical solution storage container

The main function of this container is to provide storage capability for all necessary additional decontamination equipment and decontamination solutions. The container is normal ISO standard and can be transported by RÁBA H-25 truck.

The following items are stored in the container:

- - 2 pieces Hot Gas Units with tents;
- - 1200 l Chemical-, Biological-, Radiological decontamination solutions;
- - 4 pieces tents for personnel decontamination equipment;
- - Furniture for dressing and undressing tents;
- - Accessories for sensitive equipment decontamination.

METHOD OF ESTABLISHING TEST CONCERNING CBRN DECONTAMINATION CONTAINERS

The establishing test started in the base of HDF 93rd CBRN defence battalion in September 2011 which was carried out by CBRN decontamination company.

The establishing test focused the following parts of examinations:

- - utility of main function and method of operation;
- - maintenance and repairing;
- - transportability;
- - technical reliability and support;
- - work safety, fire-, electric shock protection and accident prevention regulations;
- - required composition of decontamination unit and manning of decontamination platoon;
- - conception of preparation course and training methods for operators;
- - scheme of CBRN decontamination station;
- - performance and efficiency;
- - applicability to the HDF disaster relief system.

Committee was established for supervising and evaluating the procedure and result of establishing test. The committee consisted of representatives from HDF General Staff, HDF Joint Force Command, MoD Development and Logistic Agency, HDF CBRN Defence Battalion and Respitátor Zrt. dealer firm. The designated chairman was the chief of operation and training department, HDF Joint Force Command. Meetings were held in every two months for concluding the partial result of establishing test. The official minutes were submitted for HDF Chief of Defence regarding results of meetings.

The testing period was 10 months and it was divided into two separate phases during the examination.

The main aim of first phase was to determine exactly the operational capacities of decon units. The examination clearly revealed the mightiness and weakness of decon and storage containers concerning functional operation of equipment, operation of safety systems, assuredness of continuous operation, applicability summer-, winter season, night and in low visibility conditions, deployment time and standards.



Figure 1. Deployment test of personal decontamination container

The examination of second phase was mainly focused to the CBRN decontamination procedures which were carried out by decon containers. This part of establishing test examined the application and impact assessment of CBRN decontamination solution, scheme of CBRN decontamination station², time requirement at the CBRN decon station. One of the main achievements of establishing test was to determine the best composition of decontamination unit and manning of decontamination platoon and the definition of commander's and operators' tasks at the CBRN decontamination station. [6]

COMPOSITION TEST OF CBRN DECONTAMINATION PLATOON

To determine exactly the ideal and most effective composition of CBRN decon platoon was one of the most demanding challenge during the test phase. The CBRN decon platoon is designated to operate all tested decon containers at same time and same place so, the platoon is responsible for establishing decontamination station with full capabilities. That means the decontamination station must consist of vehicle, equipment and personal decontamination sites. Additional requirements are to provide CBRN control points, waste management-, force protection-, logistic supply sites during the all phases of CBRN decontamination process.

Firstly, the development of scheme of decontamination procedure was necessary and the primary intention was the next:

- - The 2 pieces DECOCONTAIN 3000 GDS containers have to be used for operating the vehicle decontamination sites.
- - The personal decontamination container has to be used for handling contaminated persons and it can provide personal bath cleaning capability.
- - The primary function of decontamination equipment and chemical solution storage container is to support the equipment decontamination and provide enough amounts of decontamination solutions for the activities at the area of decontamination station. After the development of scheme of decontamination procedure the next step was to identify exact duration of deployment and redeployment activities regarding the decon containers.

² tools installation, water supply, and contaminated liquids collection of environmentally friendly design options



Figure 2. Deployment activity of DECOCONTAIN 3000 GDS container

Many typical battlefield tasks, including decontamination activities will require additional time. To form of the number of staff required a heavy protective gear operating personnel exchange, and set aside should also be considered. The developed scheme of CBRN decontamination procedures and the well-determined duration of deployment activities could ensure enough information to design the manning of decontamination platoon. The result of the final composition is the following:

Platoon staff (3 persons):

- Platoon leader
- Platoon sergeant
- Driver

1. - 2. CBRN decontamination squads (2x10 persons):

- Squad leader
- 6 decon lance operators
- Driver - main module operator
- Driver - decontamination solution operator
- Driver - water supply

Personal decontamination squad (6 persons):

- Squad leader
- Module operator
- 2 personal belonging attendants
- 2 drivers - personal belonging operators

Equipment decontamination squad (8 persons):

- Squad leader
- 4 Hot Gas Unit operators
- 1 weapon decon operator
- 1 driver - sensitive equipment decon operator
- 1 driver - equipment decon operator

CBRN control section (6 persons)

- Section leader
- 4 CBRN controllers
- 1 driver - CBRN controller

The total strength of CBRN decontamination platoon is 43 personnel. The advised technical background of the platoon as the follows:

Platoon staff	1. CBRN decon squads	2. CBRN decon squads	Personal decon squad	Equipment decon squad	CBRN control section
MB G 270 four-wheel drive vehicle	DECOCONTAIN 3000 GDS	DECOCONTAIN 3000 GDS	Personal Decon Container	2 Decon Storage Containers	MB G 270 four-wheel drive vehicle
	RÁBA H14 high-mobility off-road truck for personal transport	RÁBA H14 high-mobility off-road truck for personal transport	MAN HX 32 high-mobility off-road truck for container transport	MAN HX 32 high-mobility off-road truck for container transport	
	RÁBA H25 high-mobility off-road truck for container transport	RÁBA H25 high-mobility off-road truck for container transport	RÁBA H14 high-mobility off-road truck for personal transport	RÁBA H25 high-mobility off-road truck for container transport	
	RÁBA H25 high-mobility off-road truck for 8m ³ water transport	RÁBA H25 high-mobility off-road truck for 8m ³ water transport			

Figure 3. The elaborated technical structure of CBRN decon platoon

The suggested technical transportation structure can ensure all aspects of decontamination activities. The transportation vehicles can provide extraordinary mobility and quick response time for platoon members for conducting CBRN decontamination procedures.

SUMMARY

National Security Strategy of Hungary (NSS) contains that maintaining of international peace and security, prevention and management of possible conflicts are key interests to our country's security. The NSS determines the main challenges to Hungary's security and its international environment such as terrorism and proliferation of weapons of mass destruction (WMD). The combination of these two phenomena is a primary threat to military operations especially in conflict areas where presence of CBRN devices or materials are high risk due to possible possession or production of CBRN weapons. Restructuring of Hungarian Defence Forces and changing their responsibilities triggered the change of military technology and equipment, and this process is still going on. Because of the new challenges to Hungarian Defence Forces together with the changes of military equipment modifications became necessary in combat methods and other operational activities and adequate training programmes for these new procedures. This process is still going on, new tactical methods and procedures became parts of the present operational protocols and regulations, and they have to be introduced into the education. [1]

The establishing test was an outstanding opportunity to gain enough information to create the architecture of CBRN decontamination platoon. During the modeling part of test procedures the capability and operating circumstances of decontamination containers were exactly identified and the gained results were synchronized with personal and technical characteristics of CBRN decontamination platoon. The main achievement of establishing test period was to realize the balance between functionality and personal demands which could help developing the integrity of CBRN decontamination platoon. The verified numbers of personnel and the technical pool are able to cover the full aspects of CBRN thorough decontamination including persons, vehicles and equipment. The determination of personal and technical requirements has not finished concerning the complete CBRN decontamination station yet. Additional

identifications of engineering, CIS support, logistic support and force protection are required to establish overall manning and technical basis of support activity at the CBRN decontamination station not only from the CBRN aspects.

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