

PROTECTION OF MILITARY CAMPS USED BY CZECH ARMED FORCES IN FOREIGN OPERATIONS

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ABSTRACT

The article deals with barrier protection of structures built at the military base. The article describes the process of designing and construction of the barrier protection. Furthermore, it describes ballistic resistance of the constructions. The article is an output of the project at the Department of Engineers Technologies "Development of Expertise Department focused on the area of verification of material models for protective structures".

Keywords:

Barrier protection, Force protection, defence-wall, T-wall, protecting earth embankment.

ABSTRACT

L'article traite de la protection de la barrière de structures construites à la base militaire. L'article décrit le processus de conception et de construction de la barrière de protection. En outre, il décrit résistance balistique des constructions. L'article est une sortie du projet au ministère des Ingénieurs Technologies "Développement du Département d'expertise axé sur le domaine de la vérification des modèles de matériaux pour les structures de protection".

Keywords:

Barrière de protection, protection de la force, de la défense-mur, T-mur, la protection de talus de terre.

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1 INTRODUCTION

Soldiers are sent to the missions abroad by the Czech Army from 1990. It is the pity that the soldiers of the Czech Armed Forces do not handle with the manual how to design the Military base in mission abroad until now. Some commanders believe that it is not necessary. The opposite is true. In the case of the EU battlegroup would need to deploy units. The Czech Armed Forces would have to provide the base for nearly 2,000 troops.



Figure 1 Barrier protection – Protecting earth embankment and T-wall. The Base Šajkovac protection in mission KFOR

2 FORCE PROTECTION

Force Protection is a set of measures to mitigate hostile actions against own units, resources, facilities, and critical information. According to this definition Force Protection includes wide range of topics. This article is focused on the elements of a technical nature. A range of Force Protection measure depends on intelligence information about the enemy. The intelligence gives the important information about the enemy weaponry, numbers of troops and equipment, level of troops training, etc. [2]

3 BASE PERIMETER

The base perimeter is an area that separates internal base area from its surroundings, see Figure 1. This area is necessary to make safe and patrol by all availability forces and countermeasures [3]. There are four essential protective functions of the base perimeter:

- Essential protection,
- Movement regime protection,
- Patrol protection,
- Technological protection.

The Essential protection is essential for every successful alarm system. It is first of all representing by mechanical equipment for example: the enclosure, the defence wall, etc. The movement regime protection is set of safety actions to safe the base. Between safety actions belong for example: entry direction, service direction, petrol direction. This kind of protection control established the circumstances of entry and

exit [4]. The patrol protection is as previous kinds of protection necessary for the successful and functional alarm system as well. Guards and other agents provide this kind of protection. The technological protection is the base protection by technological equipment and infrastructure. It involves the application of security systems not only within the base area but also outside the physical perimeter of the base to the area of influence and interest. The base perimeter is one of the most important parts of the base protection, for the perimeter, designing it is wise to consider not only region and safety situation but also the duration of the mission. Especially the last one is determining factor for extend and costs of the safety measurements.

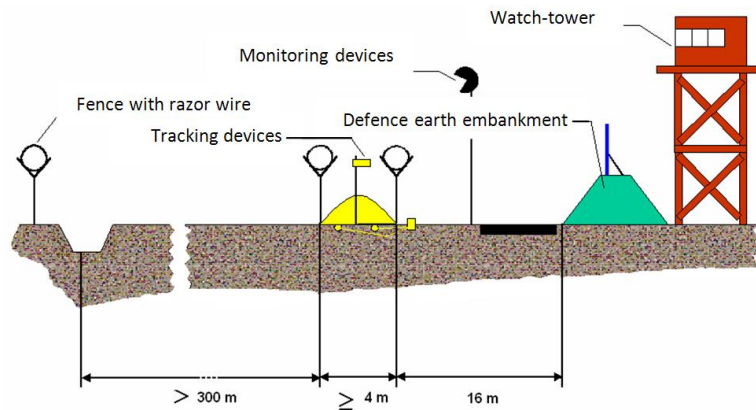


Figure 2 Possible composition of the base perimeter

During designing process, it is possible to divide the base protection into three groups in accordance with its position:

- Barrier protection (the article is focused on this point),
- Perimeter protection,
- Protection of buildings

4 BARRIER PROTECTION

The barrier protection presents mainly mechanical barriers that are usually spread along the base boundary. These barriers indicate visually the boundary, thereby creating not only physical but also the legal boundary of the base. Besides the fencing, the barrier protection includes driveways and entrances to the base. The barriers restrict or prevent access of undesirable persons into protected area. These mechanical barriers do not create an insurmountable threshold; they are able only prolong the time needed to overcome and to break in to the base. That is why that is necessary to supplement the barrier protection by detection and monitoring equipment to enhance the base security

4.1 THE RAZOR WIRE

The razor wire is a modern version of the barbed wire. It is used for the base perimeter protection against the illegal intrusion. The razor wire is made of the high traction steel wire. This kind of wire is not possible to be cut by any common pincers.

The razor wire is sold in rolls with diameters from 450 mm to 1500 mm. With one roll of this wire, it is possible to cover approximately 10 m of the length. Uncoiling and coiling can be performed mechanically or manually. For the mechanically uncoiling and coiling, it is possible to use special tow for trucks.

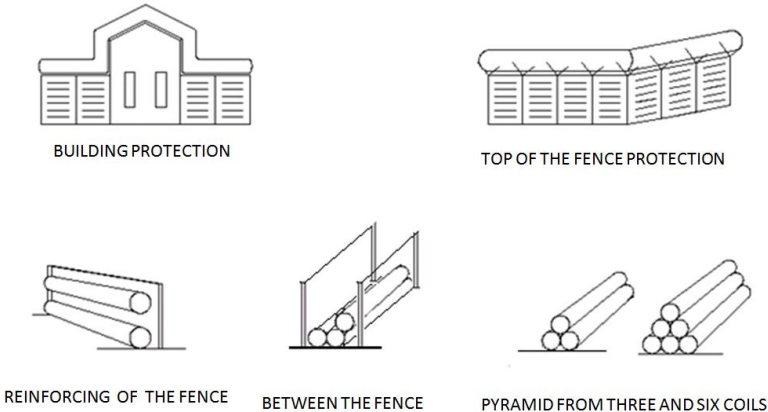


Figure 3 Application possibilities of the razor wire

The razor wire is used primarily against the live force intrusion. See figure 3 for possible using of the razor wire. As the front barrier, the razor wire is used in wire pyramids. Distance of these barriers from the protected buildings has to be at least 100 m. This length is able to protect the base staff against the hand grenade attack. Other uses of the razor wire are:

- complement of the military objects protection through the fence, see Figure 4a,
- protection of the ammunition depot,
- protection of other important objects of the base.



Figure 4 a) Razor wire on the top of barrier, b) The razor wire in detail

The razor wire is possible to install directly to the ground (the wire barricade in the shape of a pyramid, see Figure 5a) or as a complement of the wire fence. Alternatives of the razor wire for the barrier protection purpose:

- Concertina wire,
- Concertina wire with electricity (SMART RAZOR WIRE COIL),
- Pyramid wire,
- The flat wrap coil.

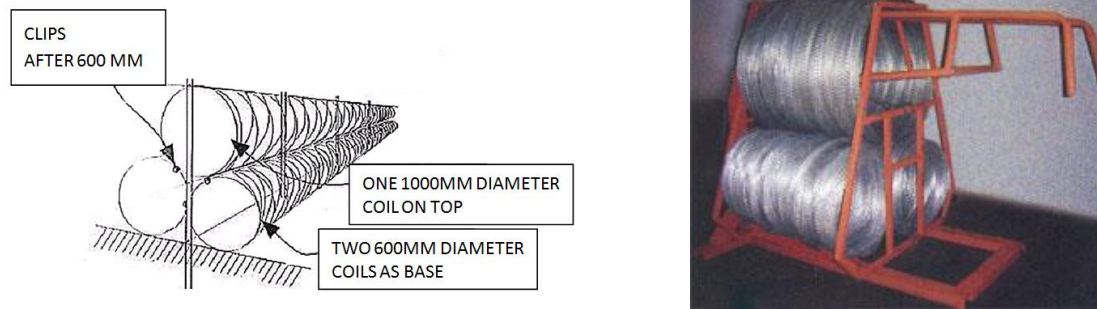


Figure 5 a) an example of a pyramid consisting of three coils, b) The folded cellular barrier

4.2 CONCERTINA WIRE WITH ELECTRICITY

Electricity expands mechanical protective effect of the Concertina wire. The Concertina wire is complement of the stripped interior made from smooth spiral wire. The coil is designed to provide an intruder detection signal and if required can also provide a 7000 volt repulse shock. Because the coil comes with a built in conductor, it provides for a low cost alarm system. The coil is simply attached to a fence, wall or roof. An energiser is connected and the user has a physical barrier, detection and electric repulse system (See Figure 6). An energiser is connected and the user has a physical barrier, detection and electric repulse system.

Innocent access to the live wire is prevented by the outer coil of barbed tape concertina. As the inner coil is attached to the outer coil, the two coils move together in windy conditions etc. thus avoiding false alarms. [1] It is connected to a 220 Volt / 12 Volt charger transformers which supplies the power. It also includes a 2-day battery.

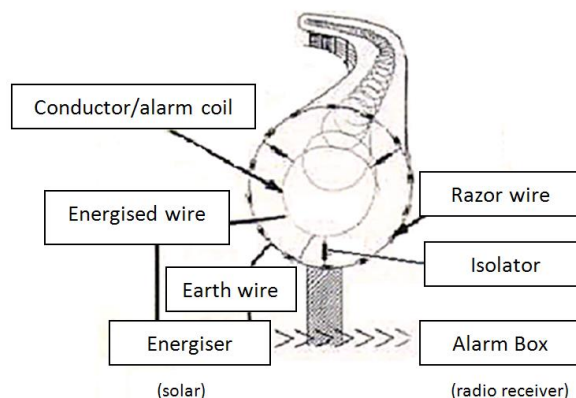


Figure 6 Typical connection with high-voltage source [1]

4.3 PYRAMID BARRIERS

This advantage of this fence is high security. The Pyramid barriers are made up of three or six lines of razor wire. See Figure 7. There are mounted two coils usually smaller in diameter on the bottom of the steel frame and there is a coil with the generally larger diameter above them. The type of pyramid with the six coils is

consisting of three floors. There are three coils of the razor wire on the bottom. On the second are two coils and on the top is one. Coils are separated by stretchable strutting steel wires against razor wire wrapping. Against the over-stretching is in the pyramid barriers woven the rope. This kind of fence can be installed either a mobile or permanent. The permanent pyramid barriers can be stored on the back of a car or on the trailer. Unfolding of this type is very fast. The front part is anchored in the desired location and driving the vehicle ahead is barrier opening.

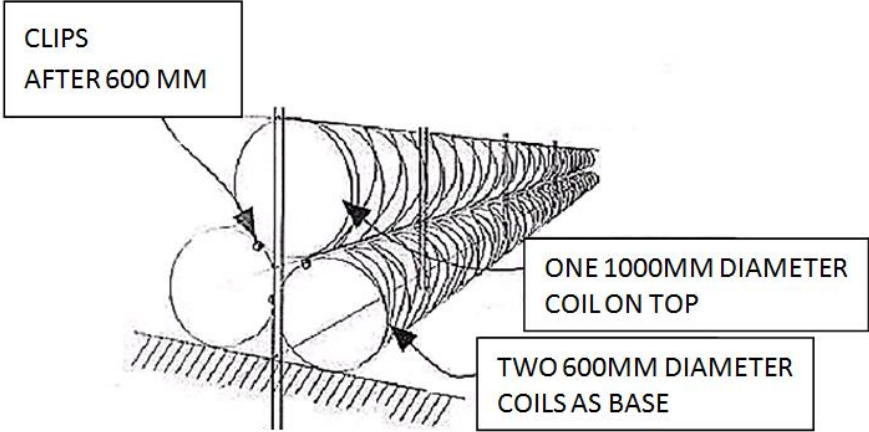


Figure 7 The Pyramid barrier made up of three razor wire lines

4.4 FLAT WRAP COIL

The flat wrap coil is made of high tensile razor wire, clapped into a flat panel formation. The main strengths are low space requirement. (See Figure. 8). The flat wrap coil can be installed into the top of the wire fence or protective walls [1]. This is very useful protective measure against intruders but safe for staffs. It is available in diameters from 450 mm to 1000 mm.

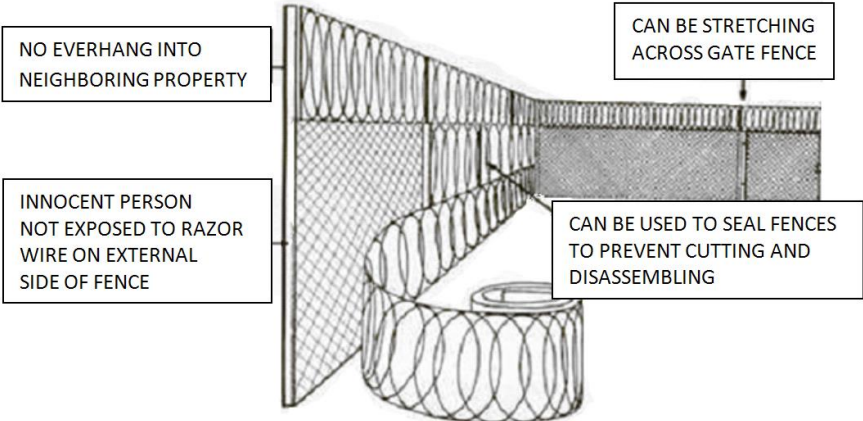


Figure 8 The possibilities of the flat wrap coil using

4.5 DEFENCE WALL

The Defence Wall is a simple modular system consists of steel meshes with a layer of non-woven fabric attached to their inner side. The Defence Walls are possible to fix in horizontal and vertical direction with quick couplers. An infinite wall is possible to create by the combination of defence walls. There is a possibility to put the defence walls each other, see figure 9.



Figure 9 Defence walls compound at each other

Constructing of the defence walls is possible to do mechanically or manually, see figure 10. The Defence Walls are filled with the sand, gravel, earth and in special cases are filled with concrete or a mixture of concrete and stones or gravel by the wheel loader. After it is filling front and rear walls of each module had to be pulled by strings. This precaution is against bulging of walls.

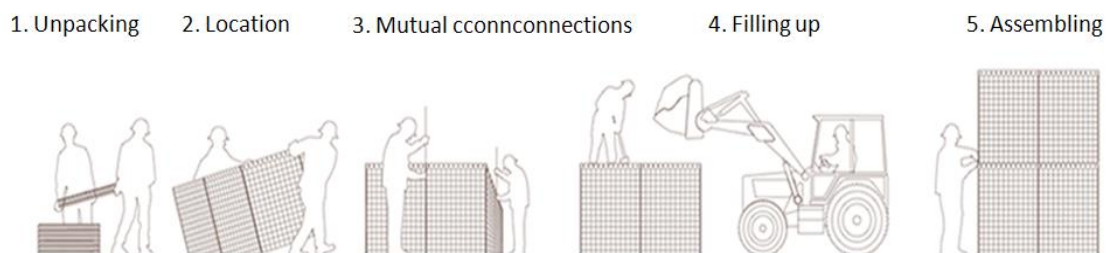


Figure 10 Defence-wall builds up manually

The Defence Walls are intended to protect the life force, the ammunition depot, the fuel storage, the base command. The Defence Walls are used as a solid impenetrable barrier around the base. This barrier is usually consisting of a pyramid of three walls with the Concertina Wire on the top of the highest Defence Wall. The next possibilities of the Defence Walls using are for construction of: the lookout, guard and gun pit, the additional protection of buildings, the protection of the ship containers or the funk hole. Defence Walls filled with gravel are able to resist penetration of bullets of standard infantry weapons, hand grenades, small arms and antitank weapons.

5 RETAINING SYSTEMS OF BASE PERIMETER

This type of obstacles can fully separate the protected area from neighbourhood [1]. Retaining systems of base perimeter included fence of the base, which includes wickets end culvert. In accordance to the security level it is accompanied by the monitoring devices. On the market, there are available wide ranges of fences that meet the most demanding security requirements. The most widespread are wire fences. Various types of wire fence are distinguished by shape and mesh size, connection means at the junction, quality and thickness of material, height of the fence. [1]

Generally, it is possible to divide retaining systems of base perimeter protection, which consist only of wire fencing and solid barriers, but also additional elements, divided into seven main groups:

1. Wire fence,
2. Safety fence,
3. High security fence,
4. Protective walls,
5. Higher barriers,
6. Undermine protection,



Figure 11 a) The wire fence 2m high, b) Safety fence BASTILLA 3m high

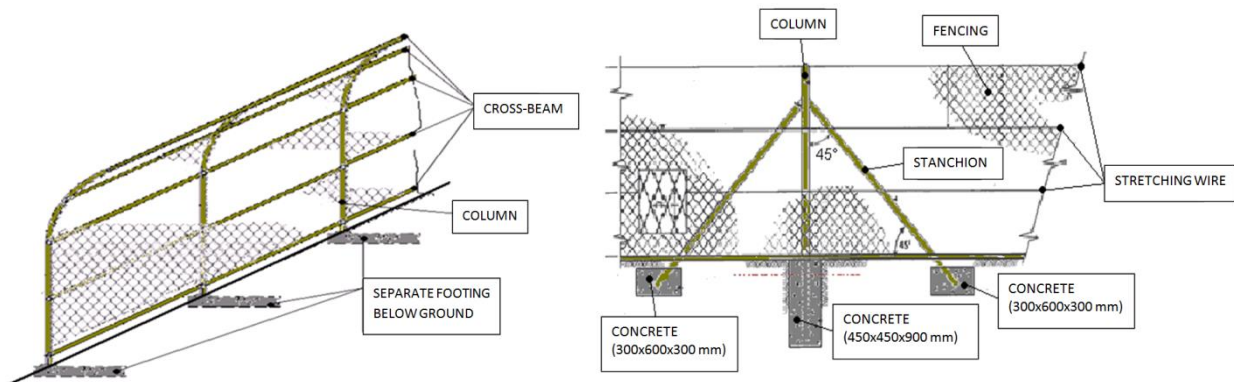


Figure 12 a) High security fence COURBE, b) The cornerstone anchoring of the fence

5.1 PROTECTIVE WALLS

Protective walls can be made of prefabricated units or are produced on site, into a pre-set shutter. Prefabricated units are possible to connect them by tongue and groove in the contact surface. The next method of prefabricated units connecting is to use precast concrete columns in a shape H and insert between them prefabricated concrete slabs, see figure 13 a).

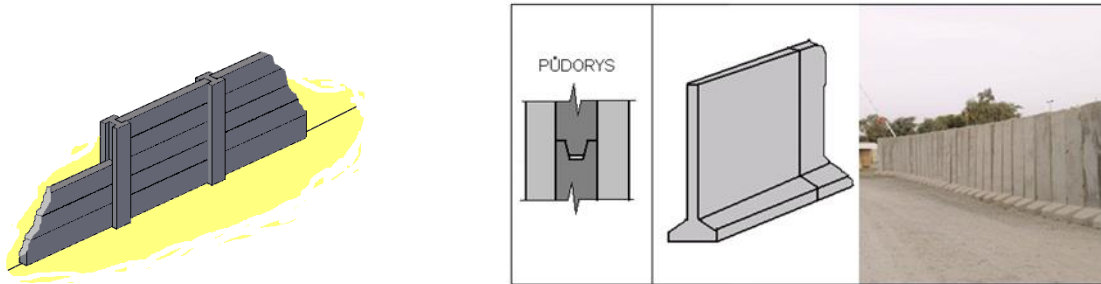


Figure 13 a) The protective wall made of prefabricated concrete slabs, b) T-wall

Currently is very often use T-wall, see figure 13b. It is precast concrete panel with is shaped like an inverted T. T-walls dimension can be different, but usually are T-walls 2,5 m height and 0,25m width. The width of the T-wall concrete footing is 1m. T-walls are deposited on the surface or are taking part in the subsoil. T-walls advantage is very quick deposit on the surface. The high weight is T-wall's disadvantage.

5.2 HIGHER BARRIERS

Higher barriers are protective measures on the top of the wall or fence. It consists of the hard carrying system, spread Concertina wire (see figure 14b) and movable centres. These kinds of barriers serve to deter the potential intruders and also make difficult to overcome the top of barriers.



Figure 14 a) Higher barriers made of movable centres, b) The Concertina wire higher barriers

5.3 UNDERMINE PROTECTION

During the fence constructing it is essential to consider the possibility of undermining. In the case of soft soil undermine fence boards should be added with a minimum width of 1 meter, and the fixed sleeper wall or protective grid. As undermine

protection it is also possible to use the Concertina wire spread along the outer side of the fence around its perimeter.

6 CONCLUSION

Soldiers of the Czech Armed Forces are deployed in many dangerous foreign operations. The military base is their home for several months. It is necessary to realize that the base has to provide them with solid background and influence them in a good way. The perimeter is a very important part of the military base as it protects its inhabitants against hostile surrounding. The design of the perimeter has to be carried out by the team of specialists considering the large area of the perimeter and all its elements. It's designs have to do a team of experienced professionals. In the Czech Armed Forces there is not available a single manual describing this crucial area. The aim of the article is to inform about important conditions of the base perimeter designing. Nevertheless, a detailed list of features is not possible to publish in this article.

7 ACKNOWLEDGEMENT

The article is an output of the project at the Department of Engineers Technologies "Development of Expertise Department focused on the area of verification of material models for protective structures".

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Článok recenzovali dvaja nezávislí recenzenti.