

TEMPORARY BUILDINGS FOR MILITARY FACILITIES – SOLUTIONS FOR INCREASING ADAPTABILITY AND EFFICIENCY –

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Temporary constructions involve structures that can be quickly assembled or disassembled and easily modified. Since the adaptability they offer is essential in the conduct of military actions, in the development of permanent infrastructure and last but not least in post-disaster interventions, they play a significant role in the defence infrastructure framework.

Real estate investments of the Ministry of National Defense (MApN) must comply with both national legislative frameworks and departmental regulations. Temporary facilities are no exception. By analysing the regulations applicable for their implementation, the article briefly presents the typologies of temporary constructions defined by military regulations, the stages of technical documentation development and the conditions for authorising execution works, as well as some considerations on the opportunity to create a regulation dedicated to temporary military constructions.

Keywords: defense infrastructure; temporary facilities; semi-permanent facilities, temporary constructions; military regulations;

INTRODUCTION

In the current context characterised by accelerated dynamics, the ability to swiftly and efficiently adapt to new circumstances is essential. Considering that the implementation of a real estate investment is an expensive and time-consuming process, temporary constructions serve as an alternative for the prompt provision of necessary facilities to the armed forces, under economically efficient conditions.

Temporary structures are designed and built for short-term or interim use. They come in a wide range of typologies, from large tents to container buildings. These structures are distinguished by their mobility (ease of transport), adaptability (they can be mounted in different locations) and ease of assembly and disassembly (requiring minimal time and smaller teams, having reduced complexity). Due to the advantages they present, their use ensures a rapid and effective response to the diverse requirements of military activity and this adaptability is essential for the success of missions.

This article explores the various typologies of temporary constructions and their authorisation conditions, concluding with a series of considerations for increasing efficiency in the provision of military facilities.

MILITARY FACILITIES

*Regulamentul proprietății imobiliare în Ministerul Apărării Naționale*¹ defines barracks as entities consisting of lands, constructions and landscape developments designed to provide the necessary facilities for carrying out administrative and training activities, communications, storage and maintenance, accommodation and catering, medical and community services.

The facilities are classified in terms of duration of use and construction complexity into four categories: initial, temporary, semi-permanent and permanent.

Initial facilities are temporary and relocatable structures, intended for forces deployed for training purposes or in the context of crisis or conflict situations. They offer austere conditions and can be used for a limited duration, no more than six months.

¹ *Regulamentul proprietății imobiliare în Ministerul Apărării Naționale* is approved by *Dispoziția șefului Direcției domeniului și infrastructurii nr. DDI-13* from 17 June 2022.

An example of initial facilities is the tents used by the Romanian army in military exercises or situations of natural or humanitarian disasters. These structures can be quickly assembled and dismantled, providing shelter, work and rest areas for soldiers. The conditions are functional but austere, providing necessities for a limited time. Another example is the tents used to provide temporary shelter for disaster victims or to create coordination and logistics centres for response crews.

These structures are essential for rapid and effective response in emergency situations.



Photo 1: Tent (<https://ccsm.ro>)



Photo 2: Tent camp (<https://www.ziaruldeiasi.ro>)

Temporary facilities are also temporary and relocatable constructions intended for prolonged crisis situations, post-disaster or post-conflict scenarios, with improved durability and efficiency, thus enabling their use for up to 5 years.

Temporary facilities are characterised by austere but superior conditions compared to the original facilities, offering better living conditions, often including access to electricity, water and sanitary facilities.

Similar to the initial facilities, these solutions are scalable and can be expanded or modified as circumstances change, consisting of upgraded tents, modular containers or prefabricated structures.

Semi-permanent facilities are usually fixed constructions, designed for use over more than 5 years but less than 25 years. These structures are more robust than temporary constructions, being designed in accordance with the site conditions and to the same technical standards as permanent buildings. They are built only on state-owned land, their design ensuring the possibility of easy adaptation over time to new requirements.

Regarding their operational lifespan, the time limitation of 25 years is dictated by the dynamics of the functions that need to be provided in the barracks, and it is not related to the technical solution or to the materials from which these buildings are made.



Photo 3: Tent with windfang and electrical installation (<https://ccsm.ro>)



Photo 4: Container construction with temporary foundations²

Being made from durable materials such as steel or precast concrete, semi-permanent facilities provide an adequate level of insulation. Compared to permanent facilities, these are less expensive constructions, with generic plans easily adaptable over time, made in modular or partially prefabricated solutions to speed up the building process. At the end of their lifecycle, the materials from these constructions can often be recovered and reused, contributing to long-term sustainability.



Photo 5: Modular building made of containers (<https://www.mobilemodularcontainers.com/blog/shipping-container-apartments>)



Photo 6: Lightweight construction with prefabricated structure (<https://structurausoara.ro/proiecte>)

Permanent facilities are definitive, fixed constructions, designed with special engineering effort, and used in the long term for special or representative functions. Like semi-permanent facilities, these too are built only on state land.

² Image source: DoDI 4165.56, Relocatable Facilities, https://www.esd.whs.mil/Portals/54/Documents/DD/issuances/dodi/416556p.pdf?ver=uXTqsbk9V5eFQvn8W_1INw%3D%3D, retrieved on 2 November 2023.



Photo 7: MApN Headquarters
(<https://ro.wikipedia.org/wiki/Fi%C8%99ier:20171003-103447-ministry-of-defence-romania.jpg>)



Photo 8: National University of Defence
(https://ro.wikipedia.org/wiki/Universitatea_Na%C8%9Bional%C4%83_de_Ap%C4%83rare_%E2%80%9ECarol_I%E2%80%9D#/media/Fi%C8%99ier:Universitatea_Nationala_de_Aparare.jpg)

The term “facility”, as defined in the US Army construction regulations, is structure or construction located on land, with or without fixed foundations, including landscaping, walkways and exterior stairs, utility connections, equipment and the installations that support the use and are an integral part of these constructions (DoDI 4165.14, Real Property Inventory and Reporting, p. 15)

The four categories of facilities listed above are also found in the US regulations with the distinction that in the National Ministry of Defense (MApN) the initial and temporary facilities are provided by temporary constructions and the semi-permanent and permanent facilities are provided by definitive constructions while the Department of Defense of the United States of America (DoD) deals with initial, temporary, and semi-permanent facilities in a dedicated regulation for non-permanent facilities.

The four construction levels described in *UFC 1-201-01, Non-permanent DOD facilities in support of military operations* are:

- Organic Construction Level: It is a subset of the initial Construction Level and is intended for short-term use, up to 90 days, with the possibility of extension up to six months;
- Initial Construction Level: This level is intended for immediate use by military units upon arrival in the theatre of operations, lasting up to 24 months. Tents or container buildings are initial-level facilities unless specifically designed for a higher level of construction;
- Temporary Construction Level: This level involves buildings and facilities designed and constructed for use up to five years;

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- Semi-permanent Construction Level: Buildings and facilities at this level are designed for a use of less than 10 years, but with proper maintenance and repairs, they can be extended to 25 years.

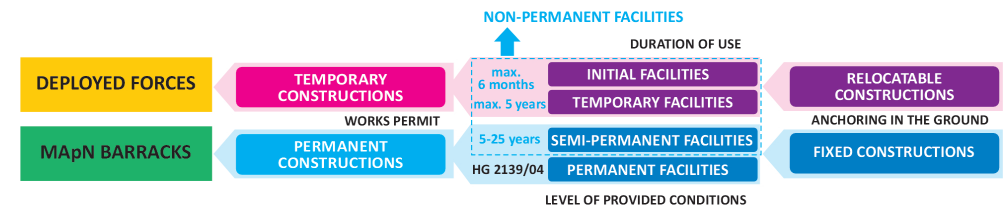


Figure 1 Classification of military constructions according to the Real Estate Regulation in the National Ministry of Defense (author's design)

Military constructions are conditioned both by military regulations and by national legislation specific to the construction sector. That is why, to discuss military buildings, it is necessary to clearly define the terms specific to the field and the legal framework at the national level. This includes the distinction between temporary and permanent constructions, also classified according to their mobility as fixed/immovable or relocatable/mobile as well as establishing the implications of the duration of operation/use/utilisation and life expectancy.

BUILDING PERMIT FOR TEMPORARY CONSTRUCTIONS

According to the *Real Estate Regulation in the Ministry of National Defense*, temporary constructions are used to ensure initial and temporary facilities, while definitive constructions are used for semi-permanent and permanent facilities.

Regardless of the materials used, due to the nature of the building's functions or because of the urban conditions, temporary constructions³ have a limited duration of existence, specified in the building permit. Upon the expiration of the operating term, they are dismantled to restore the land to its initial state, a requirement imposed by the permit.

Having a temporary character, temporary constructions are not subject to the same mandatory technical standards as permanent constructions, according to national norms and regulations. To limit construction and maintenance costs, investments are proportional to the duration of use. Thus, they may or may not be equipped with thermal insulation, soundproofing, etc., and may or may not be connected to utilities.

³ Temporary constructions are defined in *Legea nr. 50 din 29 iulie 1991 privind autorizarea executării lucrărilor de construcții*, annex 2, para. 7.

According to the law on the authorisation of construction works, temporary constructions are authorised under the same conditions as definitive constructions. To simplify the authorisation procedure, the permit for provisional constructions is issued based on technical documentation with simplified content⁴ concerning the framework content provided for definitive constructions.

It should be noted that in *Legea nr. 50/91 privind autorizarea executării lucrărilor de construcții* and in its implementing rules, military constructions are not addressed in terms of temporary structures. Consequently, the technical parameters imposed for the erection of temporary constructions are limited, and in the context of military infrastructure, the specifications regarding the minimum standard and the necessary documentation for the placement of these structures remain unclear.

To implement the standards necessary to ensure the safety and health of military or civilian personnel, the design of temporary facilities involves the involvement of specialised design personnel and the development of a regulatory framework that standardises the minimum requirements for compliance and equipment according to the purpose of the construction and its operating duration. Additionally, the development of standard designs can speed up the construction implementation process, this standardised approach ensuring that temporary facilities are designed efficiently at least in terms of operational safety and fire protection.

Since the provisional permit involves the dismantling of the constructions after a term specified in the permit, and considering that the decommissioning of the constructions before the completion of the duration of use is subject to administrative investigation, it is necessary to clarify the implications of the depreciation period of the investments.

DEPRECIATION DURATION OF BUILDINGS

The classification of military facilities into four typologies provides a basis for understanding and addressing the usage durations of constructions in the military context. Despite the existence of such a conceptual structure, the national construction legislation does not provide in the existing classifications a specific lifetime for these categories of facilities.

⁴ The simplified content of technical documentation is presented in Annex no. 2 of *Normele metodologice de aplicare a Legii nr. 50/1991 privind autorizarea executării lucrărilor de construcții*, approved by *Ordinul nr. 839 din 12 octombrie 2009 al Ministrului Dezvoltării Regionale și Locuinței*.

Under *Ordinul nr. M. 45 din 9 mai 2008 pentru aprobarea Normelor tehnice de domenii și infrastructuri*, the operating duration of the buildings belonging to the Ministry of Defense should correspond to the maximum duration specified in the Catalog regarding the classification and normal durations of operation of fixed assets, approved by *Hotărârea Guvernului nr. 2.139 din 30 noiembrie 2004*. This normal operating life indicates the interval in which the initial value of fixed assets is recovered fiscally through the depreciation process, being generally shorter than the actual physical life of the respective fixed asset.

This classification⁵ adopts a concept of performance that emphasizes the construction's ability to perform a specific function, regardless of the material from which it is made. For example, regardless of the constructive solutions adopted, administrative buildings have a normal operating life of between 40 and 60 years. Consequently, any military headquarters, even if it is militarily classified as a temporary or semi-permanent facility, must operate for at least 50 years to be depreciated before being decommissioned.

The MApN regulations establish their own classification of building service lives, but for practical application, these must be correlated the *Catalogul privind clasificarea și duratele normale de funcționare a mijloacelor fixe*. Moreover, in the header of the *Catalog* it is specified⁶ that for the fixed assets intended for the national defence system, MApN⁷ with the approval of the Ministry of Public Finance can develop its own rules for their classification and normal operating periods.

In conclusion, there is a gap between the general classification of the operational durations of fixed assets and the specific needs of the military infrastructure. To ensure an alignment with the specific needs of the national defence system and the flexibility and adaptability requirements of the military infrastructure, it would be appropriate to develop its norms, which would establish the normal operating durations for the constructions that constitute the temporary and semi-permanent facilities.

⁵ This classification is introduced in the Romanian legislation starting with the 1998 version of *Catalogul privind clasificarea și duratele normale de funcționare a mijloacelor fixe*, that starts with the intention of aligning to global trends.

⁶ The Annex of *Hotărârea nr. 2.139 din 30 noiembrie 2004 pentru aprobarea Catalogului privind clasificarea și duratele normale de funcționare a mijloacelor fixe*, chapter III, para 7.

⁷ According to *Legea nr. 346 din 21 iulie 2006*, art. 19, the Minister of National Defence is the chief authorising officer and designates by order the secondary and tertiary authorising officers (Ib., art. 68).

The decommissioning and demolition or dismantling of temporary constructions are carried out upon reaching the term specified in the construction permit. Considering that the depreciation of the investment involves the use of the constructions until the fulfilment of the established normal operating duration, the relocatable constructions represent a technical solution for the use of a facility for a limited period in a location, which through repeated use ends up being used for the normal duration of use.

RELOCATABLE BUILDINGS

Based on their anchoring in the ground, constructions are divided into two categories: relocatable/mobile and fixed/real estate. According to *Regulamentul proprietății imobiliare în Ministerul Apărării Naționale*, relocatable constructions are used for providing initial and temporary facilities, while fixed constructions are used for semi-permanent and permanent facilities.

Relocatable constructions are a category of temporary constructions, characterised by:

- portability: designed to be easy to transport;
- rapid installation: can be erected in a very short time;
- reusability: can be disassembled and reassembled in different locations;
- low ecological impact: their temporary nature allows for the restoration of the land to its original state.

According to the Real Estate Regulation in the Ministry of National Defense, relocatable constructions are not considered real estate property and are purchased either complete or in components, being assembled, dismantled or moved, by the owning military unit with the minimum necessary arrangements for adapting to the terrain.

Currently, the specifications for the construction of temporary facilities are based on the specifications drafted by the Domains and Infrastructures Directorate – DID for the acquisition of container-type modules, on the instructions for the placement of military camps and on the manufacturers' manuals.



Photo 9: Textile structures with supporting framework
(<http://ro.tendars-marquee.com/marquee-tent/hangar-tent.html>)



Photo 10: Modular buildings from ISO containers
(DoDI 4165.56, Relocatable Facilities)



Photo 11: Inflatable structures
(<https://buildair.com/inflatable-structure/>)



Photo 12: Prefabricated construction booth, kiosk, cabin
(<https://karmod.ro/produs/chio%C8%99c-magazin-215x270>)

To supplement the specifications applicable to relocatable construction in the military context, a relevant source is the DoD Relocatable Facilities Directive. These instructions provide a minimal framework for the implementation and management of these types of structures in the military domain. In this regard, we mention only a few specifications that are not found in the national regulations and that would be useful to optimise the consumption of resources for the infrastructure:

1. Relocatable facilities are used in place of conventional permanent construction when the duration of the requirement is uncertain and interim to provide the necessary spaces until permanent space becomes available in existing facilities or through the construction of a conventional permanent facility;
2. Relocatable facilities must be purchased or leased as equipment;
3. The standard duration of use for a relocatable facility shall not exceed 7 years. The maximum duration of use for a relocatable facility, extending the location authorization, will not exceed 14 years;

4. Site preparation for the placement of relocatable facilities, including earthworks, foundations, networks and connections to utilities, sidewalks, exterior lighting, parking lots or landscaping, may represent a real estate investment and must be treated accordingly;
5. Manufacturer's specifications for relocatable facilities shall meet all requirements, standards and codes for operational safety and fire safety at the level required for real property. When time, materials and funds permit, relocatable facilities should promote sustainable design and ensure energy efficiency;
6. Conversion of relocatable facilities into real estate properties, by connecting to a foundation, must be done through a real estate investment, based on a building permit, ensuring the entire assembly meets the minimum standards for permanent buildings.

In conclusion, to ensure that the minimum requirements for operational safety and fire safety are met, the design of relocatable facilities must be carried out by qualified personnel. To standardise the solutions, the development of a technical norm is necessary, and for the realization of the constructions, a catalogue of standard projects would speed up the process.

REAL ESTATE INVESTMENTS

Unlike relocatable constructions, fixed constructions, made of durable materials, cannot be disassembled and rebuilt in another location. They are treated as immovable assets, their acquisition and modifications being managed through real estate investment projects. According to *Ordinul nr. 151 din 27 noiembrie 2017 pentru aprobarea Instrucțiunilor privind realizarea obiectivelor de investiții, recepția construcțiilor și stabilirea valorii finale a lucrărilor de construcții, cuprinse în programul de investiții al Ministerului Apărării Naționale*, the stages of elaborating technical documentation for execution are regulated by *Hotărârea nr. 907 din 29 noiembrie 2016 privind etapele de elaborare și conținutul-cadru al documentațiilor tehnico-economice aferente obiectivelor/proiectelor de investiții finanțate din fonduri publice*, namely: the elaboration of the conceptual note by the beneficiary and the design theme, the feasibility assessment and the approval of technical-economic indicators, the authorization of construction works and the realization of the technical project for execution.

In conclusion, the realisation of a real estate investment is a lengthy process compared to the acquisition and placement of a relocatable construction. The works carried out for the transformation of a relocatable construction into a fixed construction, through the creation of permanent foundations and connection to utilities, constitute real estate investments and are carried out according to the legal stages. However, real estate investments can be accelerated through the use of standard designs and prefabricated modular constructions.

CONCLUSIONS

Currently, temporary constructions are becoming increasingly important due to budget constraints and the frequent need for rapid adaptation to new circumstances. Their ability to provide adaptable, cost-effective and sustainable solutions aligns with modern military strategies and operations. As a result, they have become a frequently used solution for military facilities as well, representing an alternative to permanent infrastructure, the realization of which is costly and time-consuming.

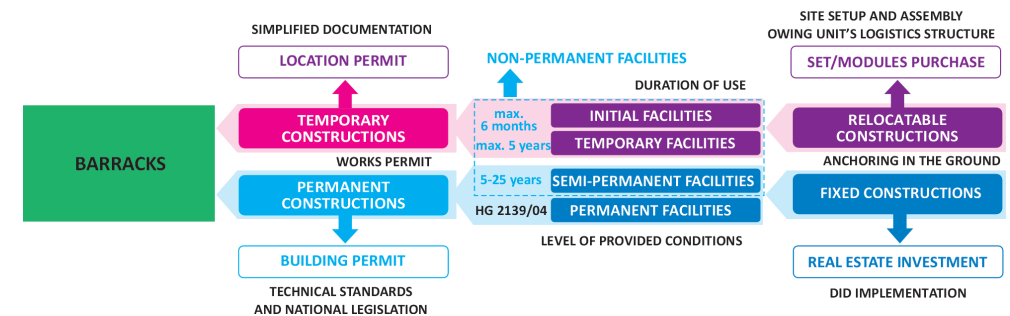


Figure 2: Authorisation and Implementation of Works Related to Military Constructions According to the Classification in the Real Estate Regulation in the National Ministry of Defense (Author's design)

The initial and temporary facilities, intended primarily for deployed forces, offer austere conditions but rapid adaptability in scenarios such as training, emergencies, crises, disasters or conflict. They can be used for short periods of up to 6 months, respectively 5 years, their configuration and location being the responsibility of the owning unit's logistics structure.

Although tent camps require a temporary location permit, military tents are not constructions, being classified in terms of fixed assets as military equipment. In conclusion, the initial facilities are not usually treated by the use of construction.

The temporary facilities, being provided by relocatable constructions, are purchased without the need for a feasibility study. Because they are temporary constructions, they do not have to provide the same isolation and efficiency conditions as a permanent building, and the building permit can be obtained based on simplified documentation.

On the other hand, according to the classifications from the Real Estate Regulation in the MApN, the infrastructure of the barracks is composed of semi-permanent and permanent facilities, made of fixed constructions. Semi-permanent facilities are constructions designed for periods of use of at least 5 years to 25 years, with the ability to be easily adapted according to the future needs of the forces they serve. They are adapted to the site conditions, being made to the same standards imposed by the legislation and technical norms in the field of construction as permanent buildings.

As the duration of the operation is limited by the Regulation, the semi-permanent facilities would be created based on a building permit for temporary constructions which establishes their duration of use. However, given the obligation to amortize the investment by using it for a term determined according to the purpose of the building, we conclude that only relocatable building solutions could be used to create semi-permanent facilities. Although the Regulation allows this solution, as long as the technical standard for the realisation of semi-temporary facilities is similar to permanent constructions, making them a relocatable version is difficult and would not present notable advantages. To correlate the specific needs of the military infrastructure with the general classification of the operational durations of the fixed assets, it is necessary to develop some norms specific to MApN constructions.

In conclusion, we appreciate that the introduction of a regulation dedicated to the construction of temporary and semi-permanent facilities could contribute to the efficiency of military operations, ensuring the operationality and safety of military personnel, as well as the economy of resources.

In this regard, we propose a classification for military constructions respectively: *Operational military constructions* for temporary facilities and *Adaptable military constructions* for semi-permanent facilities. The names emphasise the flexibility and functionality of these facilities, highlighting their ability to adapt to different operational requirements and environmental conditions over a significant, but not unlimited, period of time.

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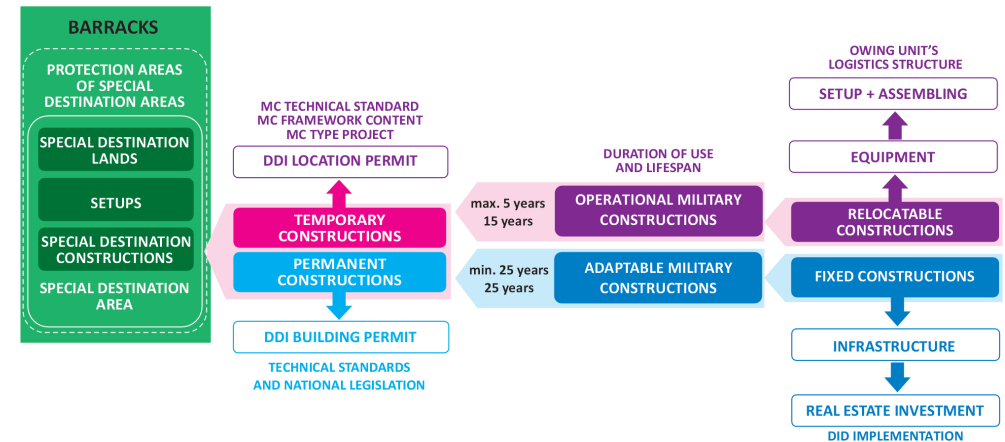


Figure 3: Authorisation and Implementation of Works Related to Military Constructions According to the New Classification, Proposed by the Author

For an effective intervention (time, cost, functional requirements) it is essential to establish a regulation for the standardization of the two categories of military constructions, specifying:

- The type of fixed asset and the approval, acquisition and execution process;
- Duration of use for amortisation;
- Minimum technical standard for military functionality and personnel protection;
- The documentation required for the building permit.

Furthermore, to implement them quickly and within the forecasted budgets, a series of standard projects can be developed based on the destination and duration of operation to ensure the standardization of technical solutions.

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