

Design of Urban Underground Space: Considering Human Defense Facilities

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Abstract: China's underground space human defense design has undergone several development stages to determine the strategic policy of "combining peace and war". Due to the increasing degree of urbanization in China, the cause of human defense construction is also in rapid development, which also produces several practical problems that need to be solved, such as: how to quickly and efficiently "peace and war", how to better integrate the human defense project into the market and the economic construction of a combination of how to do a good job in the era of peace, such as the publicity of knowledge of human defense. The following are some of the issues that need to be solved.

1. Introduction

People's Air Defense Project is an underground protective building constructed to safeguard wartime personnel and material shelter, people's air defense command, and medical rescue [1-3]. According to different division bases, it can be divided into different broad categories: according to the wartime use of underground people's air defense project, it can be divided into the wartime command post, warehouse, etc.; according to the division of the usual use of the place, it can be divided into the underground parking lot, underground theater, etc.; according to the division of the level of resistance, it can be directly referred to as a certain level of people's air defense project underground [4], and at the same time, the designers should have a detailed understanding of the basic requirements of the design of people's air defense project and the process [5]. China has a long-standing history of developing underground human defense projects. This began with the construction of tunnels and air-raid shelters during the war years of the last century. In the early stages of the founding of New China, deep digging pits and a wide grain accumulation policy were implemented. After the reforms and opening up, the concept of "combining peace and war" was introduced, and this policy has been widely accepted. After the reform and opening up, the concept of "combining peace and war" has been widely accepted. In December 1986, the Urban Engineering Construction and Environmental Protection Department and the People's Air Defense Office jointly organized the "People's Air Defense Engineering and Urban Integration Management Seminar" to discuss the integration of our country's air defense engineering and urban policies[6]. With time, the Underground People's Air Defense project construction effectively embarked on the road of organization and standardization [7]. Modern underground air defense projects in the approval of the project have gone

through the preliminary feasibility analysis work while taking into account the wartime air defense needs and the role of economic construction, urban planning, and people's air defense propaganda in peacetime.

In the past 20 years, with the rapid development of the underground space taking into account human defense facilities, some human defense facilities do not get good maintenance, equipment aging phenomenon, can not be updated promptly. On the one hand, the personnel of the Human Defense Office is too small to do timely detection and replacement of damaged and aging equipment. On the other hand, with the current lack of funds for human defense projects, people's awareness of human defense is gradually weakening, and human defense knowledge can not be widely publicized.

This paper discusses the above problems in the design of urban underground space, considering human defense facilities. The project can be roughly divided into three aspects: Firstly, it focuses on efficiently implementing the "peace and war conversion" while ensuring the normal maintenance of human defense facilities during times of peace. Secondly, it aims to combine the human defense project with economic development during times of peace. Lastly, it aims to effectively promote the underground human defense project through social publicity during times of peace. I have checked for any spelling, grammar, and punctuation errors, and corrected them.

2. How to Efficiently Implement "Peaceful Warfare Conversion" and Ensure Normal Maintenance of Human Defense Facilities in Peaceful Time

Human defense projects must ensure the normal use of wartime functions, to facilitate the national economic construction in peacetime, the people's normal production and life, as well as the development and construction of major projects to utilize "[8]. That is, "air defense in wartime, service in peacetime, the integration of peace and war, emergency support" policy. "Combination of peace and war" has great advantages, it can not only mobilize economic growth and development but also play a real role in human defense [9].

Underground civil defense project protection function in peacetime "peace and war conversion" and normal maintenance of civil defense facilities can be divided into three categories, respectively, the main structure of the civil defense project "peace and war conversion", the structure of the mouth of the civil defense project "peace and war conversion" and the internal facilities of the civil defense project "peace and war conversion":

(1) The primary structure of underground human defense projects is crucial for their protective function. They serve as the primary place of refuge for people and materials in times of crisis. However, these projects are vulnerable to damage from air attacks during times of war and must withstand significant dynamic loads. Therefore, the design and construction of these projects must prioritize solidity and safety at all times. However, the main structure of the peace era as the largest part of the space of the underground civil defense project, usually as an underground garage, commercial centers, and other uses, can not effectively plan the protection zoning and confinement processing. This requires the underground civil defense project in the design and construction stage to take into account the wartime protection function and normal use of the function in peacetime.

(2) The mouth structure of the underground civil defense project is the entrance and exit of personnel and equipment, ventilation and exhaust port, and wartime observation window. The mouth structure of the civil defense project should adopt the stereotyped protective confinement facilities as much as possible to reach the design-bearing capacity standard. However, in the process of ordinary use, multiple entrances and exits of underground human defense works are needed, and the installation of protective confinement facilities will hinder the normal use of underground human defense works for ordinary use. Therefore, more entrances and exits can be opened during normal use, and the protection and reinforcement treatment can be carried out uniformly before the war.

(3) The internal facilities of the civil defense project "peace and war conversion" are mainly the normal use of the main equipment for normal use, wartime use, but usually do not need the equipment cannot be installed, but the equipment purchased in the civil defense project, and to do regular maintenance to check to ensure that the integrity of the equipment. Pro-war by the norms of the demand for the installation of wartime supporting equipment, and wartime equipment room in peacetime cannot store large facilities.

3. How to Integrate Human Defense Works with Economic Development in an Era of Peace

With the rapid development of the socialist market economy, how to reform state-owned assets so that it is combined with social and economic development has become a key issue facing the human defense system sector, but also a difficult problems [10]. How does the underground space human defense project enter the market? What aspects can be combined with the market? All these aspects of the problem are worth repeated discussions in practice.

First of all, it can be clear that the underground space human defense facilities to enter the market. "Combination of peace and war" is the starting point for the development of human defense, with the increase in investment in urban infrastructure construction, combined with the urban construction of human defense projects more and more for the human defense project to enter the market to create the external conditions.

Additionally, the market plays a crucial role in determining the orientation of economic entities. To build a strong economic foundation, it's essential to identify and map out existing public works, unit works, air-raid basements, and other such facilities that can be immediately put to use. Some of these facilities have a specific purpose and should be used only for that purpose. The high-value facilities should be focused upon and managed through self-financing under the umbrella of market-oriented self-management.

Finally, the ownership and operation of underground space human defense facilities need to be coordinated, human defense projects belong to the state-owned assets, and an important issue in the market economy is the deployment of state-owned assets management issues. (Figure 1)



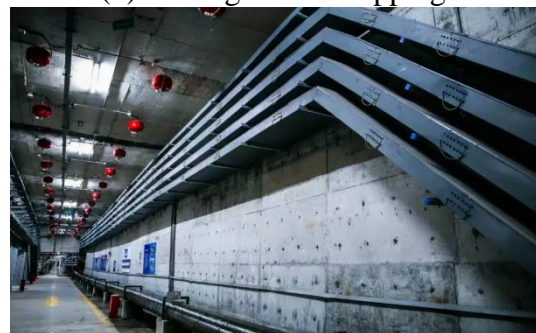
(a) underground parking



(b) Underground Shopping Street



(c) Underground Transportation Facility



(b) Comprehensive Underground Tube Corridor

Figure 1: Economic use of civil defense work

4. How to do a good job of social promotion of underground human defense projects in times of peace

"The country cannot stand without defense, and the people are restless without defense." A long-term peaceful environment is easy to make people to forget to think of danger in peace, paralyzed thinking, and protection awareness fades. The current world is not peaceful, terrorist attacks and local wars occur from time to time. We live in a great and peaceful country, our society is stable and prosperous, making people's concept of safety and danger turn to carefree. But the crisis is always accompanied by danger everywhere. Therefore, it is necessary to broaden the horizon of human defense propaganda and improve human defense education [11].

The publicity work of human defense education should be close to the development of the times, and innovative forms of education. The current emerging media era should follow the wave of the times, in line with the direction of the times to walk, the traditional news journals, and newspapers do not apply to the way people get news. Using official public platforms, microblogging, and other online media to share information about self-defense is becoming increasingly popular. Platforms like TikTok and Fast Hand have made it easier to create and share videos about self-defense tips and techniques with a wider audience than traditional newspapers and journals. This approach helps spread awareness about self-defense and ensures that more people understand the importance of self-defense [12].

5. Conclusion

The construction of an urban human defense project is a long-term process and cannot be tested unless during a war period. Once in a wartime state, testing becomes significant. Therefore, this paper is based on some of the current underground space human defense facilities that exist in the problem and puts forward some personal insights.

1) The prerequisite for the civil use of human defense engineering facilities is to ensure the rapid implementation of "peace and war conversion".

2) The marketization of human defense engineering facilities can effectively solve the problem of insufficient funds for the Human Defense Office, but it is necessary to clarify good ownership and operation.

3) The knowledge of human defense is the basic knowledge of people's protection and security, and it is still necessary to increase the scope of popularization, through the combination of emerging media and traditional media, so that people know human defense, and understand human defense.

Currently, our country's human defense measures involve slow and uncertain progress, similar to crossing a river by feeling for stones. As a worker in human defense, it is important to educate and raise awareness among the public about the importance of human defense. This includes being responsible for the maintenance and management of human defense engineering facilities so that they can be accessible and utilized at any given time.

References

- [1] Lu Manchang. *Exploration of human defense engineering design in contemporary architectural design*[J]. *Building Materials and Decoration*, 2020(15):61-62.
- [2] Ma Jingyue. *Urban underground space and development and utilization planning*[J]. *Underground Space*, 2002(03): 200-204+208-281.
- [3] Lei Shengxiang, Shen Yanjun, Xiao Qinghua, Xi Jiamei, Gu Linjun. *Current situation and future development concept of urban underground space development and utilization*[J]. *Journal of Underground Space and Engineering*, 2019, 15(04):965-979.
- [4] Xie Xinxing. *Discussion on the underground space of civil defense project combining peace and war* [D]. Hunan

University, 2013.

[5] Wei Lihua, Tang Jun. *Exploration of integration development and utilization of urban underground space and human defense project* [J]. *Planner*, 2016, 32(05):54-58.

[6] Zhu Xingping. *The generation and development of existing commercial facilities for human defense in China* [J]. *Journal of Underground Space and Engineering*, 2020, 16(S1):12-16.

[7] *People's air defense "13th Five-Year" construction work plan*. 2016.

[8] *People's Air Defense Law of the People's Republic of China*. National People's Congress of the People's Republic of China. 1997.

[9] Min Fang. *Why do we need to build human defense projects in the age of peace* [J]. *Life and Disaster*, 2020(09):40-41.

[10] Yao Yuhui. *Based on the market economy requirements of human defense engineering facilities into the market analysis* [J]. *Silicon Valley*, 2008(23):171.

[11] Li Yanrong. *Based on the reform and innovation to do a good job of human defense publicity and education* [J]. *National Defense*, 2015(12):49.

[12] Pu Wei, Chen Jingru, Shao Wenjun. *Endeavoring in the new era, gathering strong military dreams, and casting shield for strong human defense--Shanghai city carries out publicity activities for National Defense Education Day 2020*[J]. *Life and Disasters*, 2020(10):44-47.