

Study on Emergency Reconstruction Design of Industrial Buildings Based on Major Public Health Emergencies

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Abstract : The repeated sweeping of COVID-19 's epidemic situation has brought severe tests to the medical facilities in various places. Whether the patients can be treated completely by medical facilities has a significant impact on the prevention and treatment of the epidemic. In order to improve the emergency transformation efficiency of industrial buildings in response to major public health emergencies, the feasibility of industrial buildings in emergency transformation is clarified. When the original use nature of industrial buildings is transformed into medical treatment, the needs of medical use should be analyzed, the transformation templates of each functional space should be constructed and different types of streamline should be planned.

Keywords : Major Public Health Emergencies; Industrial Building; Emergency Transformation; Reform and Design

Introduction

The global outbreak of the COVID-19 epidemic has prompted people to update the medical treatment system. In order to quickly improve the efficiency of admission and control the number of infections, measures were adopted to transform the existing buildings in the city into square cabin hospitals. As one of the existing building types in the city, industrial buildings are also taken into consideration, and the "Technical Guide for the Construction and Operation of Industrial buildings into Square Cabin Hospitals (trial)" has been issued. It is used to strengthen the guidance for the transformation and new construction of the treatment facilities for COVID-19 patients, so as to further improve the efficiency of the practical application of the guidelines. This paper puts forward a reference for the basic configuration of the epidemic prevention unit in the emergency transformation of industrial buildings, so as to quickly determine the number of people who can be treated after the transformation and quickly determine the composition of each functional zone.

1. The concept of emergency reconstruction of industrial buildings

The emergency transformation design of the industrial building is to change a series of functional properties such as production, transportation and storage originally undertaken by the industrial building into a treatment place with the nature of medical treatment, with the characteristics of rapid transformation and a large number of treatment.

2. Design strategy for emergency reconstruction of industrial buildings

For the specific division and allocation of the interior space of the emergency transformation of industrial buildings, it is necessary to integrate many influencing factors, although the transformation requirements of each section and the corresponding strategies are emphasized in the Guide, however, the space proportion of each zone after the transformation and the space area required for each functional space under it are not put forward. This paper takes "three zones and two channels" as the core design principle of interior space division. According to the relevant provisions of indoor functional zoning design in the Guide and relevant codes and regulations, and combined with the above influencing factors and the relevant dimensions in ergonomics, the composition of the basic functional units of each functional space is put forward. and get the basic unit configuration of epidemic prevention in the clean area, polluted area and semi-polluted area corresponding to doctors and patients.

2.1 Configuration strategy of epidemic prevention unit for emergency reconstruction of industrial buildings

2.1.1 Contaminated Area

For the configuration of the group in the contaminated area, it is mainly divided into two blocks: the patient living area and the medical treatment area, plus the storage auxiliary area and the equipment room, as the name implies, the patient living area contains all the living activities of the patient during the isolation and treatment period; the medical treatment area is the main treatment place equipped with professional medical equipment, medical means or preparation work. The storage auxiliary block is mainly used for the storage of bedding, temporary storage of dirt and storage of patients' personal belongings.

2.1.2 Clean Area

The clean area is mainly for the medical staff to live, rest and work, and contains the area of material operation, so it is divided into the medical living area and the material guarantee area.

2.1.3 Half-contaminated Area

The half-contaminated area is the buffer zone connecting the clean area and the contaminated area, providing medical staff with access to the two blocks, and providing medical staff with space for wearing and removing protective equipment, self-cleaning and disinfection, including buffer zone, dressing cleaning area and storage auxiliary area. among them, the buffer zone is closely related to the contaminated area, and the dressing cleaning area provides perfect disinfection and cleaning supplies for medical staff. The storage space of cleaning and dirt shall be placed in the corresponding position respectively. And for the streamline planning of this area, the incoming and outgoing streamline must be set up separately, do not interfere with each other, and it is best for men and women to be set up separately.

According to the basic functional space of emergency transformation proposed in the Guide and relevant rules and regulations, it is applied to the early design of the interior space of industrial buildings, and the article only considers the most basic operation and use space. in the actual emergency transformation design, the area of each functional space needs to be changed flexibly according to the actual situation.

2.2 Basic configuration of epidemic prevention unit

Taking 50 beds as a ward group, assuming that there are 20 male patients and 30 female patients, the functional spaces of each block in the polluted area are arranged according to the relevant norms and regulations. According to the fact that 1000 patients are 1000 beds, it is necessary to allocate at least 2000250 doctors and 200,000 nurses, it is concluded that the 50-bed ward needs 100.13 doctors and at least 10 nurses, and the number of medical staff in the same shift is determined by the shift time of three shifts, so as to determine the use area of medical staff in the clean area, and combined with the personnel area quota of each functional district in the above three districts. Summarize and draw a basic configuration map of the epidemic prevention unit serving a ward group, in order to form an integrated spatial form, this diagram discharges only 48 beds, as shown in figure 1.

In the functional distribution of this configuration map, the plane layout is based on the common rectangular shape of industrial buildings, and the integrated layout is classified and integrated according to the cleaning properties of each functional zone.

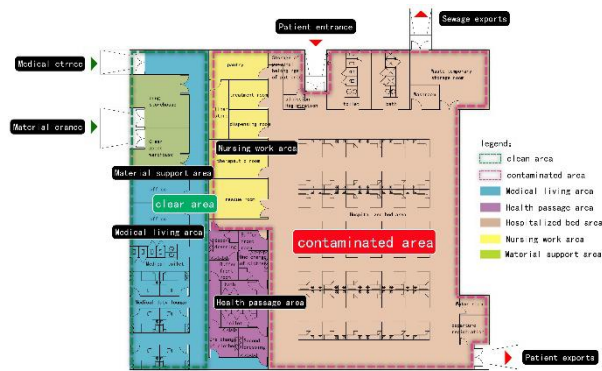


Fig. 1 schematic plan of basic functional space for emergency reconstruction of industrial buildings

2.3 In line with indoor use functions, planning outdoor site zoning

Combined with the division of indoor functional zones for emergency reconstruction of industrial buildings above, and with multiple indoor operation lines and sanitary needs to be met for emergency transformation, the outdoor site is divided into five areas, which are in turn the patient admission and transfer area, which is divided into patient admission, transfer and ambulance disinfection, and the auxiliary area in the contaminated area, which is used to build temporary sanitation facilities and temporary dirt storage space to support patients' life and operation. Emergency materials loading and unloading area for the handling of medical materials and clean materials; medical preparation area for placing large-scale mobile medical precision equipment; medical outdoor distribution area for medical staff count and temporary collection and distribution. For the connection of outdoor sites in various districts, it is also necessary to set up the cleaning isolation according to the cleaning properties of the sites in each district, and under this premise, plan the relevant streamline of the outdoor site, such as clean streamline, doctor-patient streamline, passenger-vehicle streamline and so on.

3. Conclusion

Based on the research direction of emergency transformation of industrial buildings under the background of major public health emergencies, this paper puts forward the "basic unit of epidemic prevention" for the application of industrial buildings in emergency transformation, and provides a reference for the follow-up emergency transformation design of industrial buildings. further standardize the design mode of industrial buildings at the emergency transformation level, and improve the emergency transformation efficiency of industrial buildings.

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