

The Discussion on Fire problems of large urban complexes and Countermeasures

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ABSTRACT The fire danger in large urban complexes and fire problems for design review and daily supervision to bring proposed targeted countermeasures for future large-scale urban complex design review and supervision to provide an effective solution methods and measures.

KEYWORDS

Large urban complex
Fire safety issue
Countermeasures

1. Introduction

In recent years, with the rapid development of the city, for the construction of urban land increasingly tight, building density increases, the rate of construction of increasingly high volume, followed by the emergence of some large urban complex. The so-called large-scale urban complex means large area, total construction area of large, commercial, entertainment, hotels, restaurants and residential as an integrated, multi-functional large building body or group of buildings. It is characterized by a large area, high volume, multi-function and internal accessible. The emergence of large-scale urban complex land is effectively alleviating tension, and provides residents with better services played a positive role. But also to the fire service has brought new problems and challenges, how to solve these problems be placed in front of us a new topic.

2. The basic situation of development of large urban complex

In recent years, the construction and development of urban complex are rises very quickly. Construction of the major cities all have, in some cities, but also for the future development of the construction complex development plan. So far the country has built some big cities the number of large urban complexes, respectively; Hangzhou 100; Chengdu 80; Shanghai 50; Nanjing 50; Wuxi 50; Foshan

22; Canton 20; Heilongjiang Province, there are 84 large urban complex, planning and construction and is building nearly ten, the capital city of Harbin in the planning and construction have Tallahassee Wanda Plaza, Intime Qunli CBD complex, Western Red Square and other 29 large urban complexes. Invest at least several billion, more than the tens of billions. An area of at least hundreds of thousands of square meters, as many millions, even tens of millions of square meters. Among the largest in South China City project planned construction area of 12 million square meters. Yiwu Small Commodity Wholesale City single building along the street length amounted to 2000 m.

3. Large urban complexes fire risk analysis

Diversity integration and use of large complex nature of urban functions, determines the time of the fire than the average building fire has its notable features.

3.1. More type of fire behavior at the same time and space appear

After the large urban complex on fire, because relatively independent functional interior space through corridors, walkways are linked together in the fire development will feature a variety of types of fire in the same space to show characteristics. For example, as a single object when there are hotels, shopping malls, hotels, apartments, underground garage fire its unique characteristics, but these places are interconnected at free-standing building complex in vivo characteristics of these fires would be in the same space to each other overlay and amplification. Fire in the development process, the interior corridor and high temperature flue gas flow channel has become way communication, causing multiple fire points, and even lead to a fire burning body surrounding the associated integrated architecture of the building. Within a certain period of time the fire will quickly change from one type to another

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type and types.

3.2. People gather, space complex, very difficult evacuation assistance

Large urban complex in personnel composition of complex has high occupant density and mobility. According to the statistics: Usually large urban complex flow of people up to 20 million passengers per day, up to 5–6 persons per square meter peak hours, when the fire broke out, people panic crowded, chaotic, prone to congestion and stampede. Coupled with building body mass, evacuation long distance is difficult to see from the inside of the outlet, resulting in staff not to escape from the scene. Customers itself on the surrounding evacuation routes and direction are not familiar with, it is more difficult in the case of an emergency evacuation of personnel and relief.

3.3. More decorative materials, fire load, toxic smoke and high temperature flue gas

Most urban complex requirements in order to achieve a comfortable and luxurious, with a large number of combustible flammable decoration materials, which will inevitably increase the fire load in case of fire, not only burn fiercely and spread quickly, easy to form a three-dimensional combustion, and release large amounts of toxic gases flue gas issue for large urban complex, the harm will be more amplified, can easily result in a large number of poisoning or suffocation. Space multi-level changes, streamline complex, smoke spread is relatively difficult to control, to escape the crowd and more easy to get lost, causing heavy casualties.

3.4. More internal vertical tube wells, multi-lateral channels, the fire spread fast

Elevator shafts, cable wells, tube wells, all kinds of staircases, glass curtain wall building vertical through-cracks and other makes. Atrium and other shared space intercommunication between the floor, the upper and lower space even as a whole, has become the main way the flow of toxic gas heat, and easy to produce, “chimney” effect, fireworks flow speed; common evacuation corridors, evacuation channel, “Yaan region” and laterally connected, accessible, boosting the rapid development and spread of the fire.

3.5. Use of fire, electrical equipment and more, the probability of fires is high

Often used in large urban complex lighting, high-power air-conditioning equipment, computer equipment and other sound control electrical equipment and circuit complexity, power consumption [1]. Kitchens, boiler room and other fixed fire site, liquids, gases in case of fire or fuel leak once the careless use of fire can easily lead to a fire, the use of fire during construction and maintenance of electrical welding and gas cutting when mishandling, also easy to cause a fire.

4. Fire safety issues in large complex urban

Because large area, body mass, the various functional areas inside the building are interrelated, leading to the design of building fire many projects beyond existing regulatory requirements. In order to go beyond existing norms which are taken after the performance-based design by experts is as the basis for the required audit. Additional performance-based design is often a lot of restrictions. Large complex from the city put into use, due to profit-driven businesses and supervisors are not familiar with the project to replace the contents demonstrate some regulatory issues, and these issues are often difficult to find, but the nature very serious consequences in the event of fire brought immeasurable.

(1) The pursuit of maximization of commercial interests, arbitrarily reduce unit standard performance of the proposed design, without changing the original design of the qualification, in strictly limited fire load and smoke regional placed sofas, merchandise and other flammable fuels. In the area of prohibition, the use of fire power electrical equipment is prohibited to avoid open flame [2]. Place in an enlarged foyer area counter and stall operators, the non-functional area originally defined into functional areas. Especially as the region Yaan pedestrian street, in the courts, original design without any business function, on fire load has been strictly limited, but after a period of time counter display, set up recreational areas, setting the landscape, so that loss of the region’s Yaan Features. Such event of fire, is bound to cause a large amount of toxic fumes in the region, and became a way of fire spread and smoke flows.

(2) The original design and fire through a closed channel through the buildings on both sides of the argument of performance-based design into business areas. When the review and acceptance of fire road unobstructed, after a period of operation closed doors installed on both sides, and then placed inside a temporary counter, developed to finally become fixed business district.

(3) The use of unauthorized changes in regional function. Such as business area adjusted to the dining area, recreation area. Underground garage or device level is order to Class C warehouse. Moreover the refuge floor he used to do to change. Over 100 m building a large commercial complex in the middle building according to “*Fire protection design of tall buildings*” requirements should be set refuge floors, refuge floors do not only cater to the device layer and the evacuation unrelated functions. But in practice, the individual units will be changed into the refuge floor offices, warehouses, spare occasionally laundry room, and even converted commercial rooms.

(4) Due to the large complex in time for the site operators are not synchronized, borrowed or shared channel leading to the day when you cannot open. Various functional areas are interrelated, borrow channel, shared stairs more common. But in the business operations and independently, a functional area to stop using it shuts off some

exports or channel, resulting in borrowing exports Ribbon lack of a safe exit. Such as shopping malls set in the theater, KTV and other entertainment venues, shopping malls normal business hours to ensure theater or entertainment at least two emergency exits. When the mall after work, in order to ensure their own mall fire, theft security should close some security export and foreign channels. Provided upstairs theater at the mall, KTV and other entertainment are often open until late at night, with the mall closed shop time is not synchronized, then borrow and shopping malls, a common outlet cannot be used, it would be a big problem in the event of a fire evacuation.

5. The fire protection measures of large urban complexes

5.1. Strictly control the scope and the number of performance-based design and expert assessment

Large urban complex design applications firefighting experts to strictly follow the “fire engineering supervision and management regulations” requires checks, the firm does not meet the conditions will not be reviewed. To take resolute measures to achieve the regulatory requirements in accordance with the standard design. From the source to check and eliminate up for commercial purposes without breaking the norms.

5.2. Develop more stringent standards

Combined with the bureau’s “In the big cities to develop requirements higher than the national standard”, to develop a special targeted safety standards, particularly management standards. The planar arrangement of 2 underground floors and try to limit the following as the commercial development of space; space restrictions basement, ground four and four more as entertainment use;; limit fire compartments and asylum walkway over 20,000 square meters separated in usage. In terms of fire and rescue applications can consider increasing descended evacuation and fire and rescue, fire fighting and rescue mouth set in a different outer wall and set clearly marked. Take widened in terms of evacuation routes and the ground on both sides and fixed visual continuity can be maintained evacuation diversion signs and yellow markings. The use of advanced fire control facilities and equipment in the configuration of the facility, the use of different functions with different sprinkler alarm valve control, conditional region with fast response sprinklers, large space smart water cannons and the like.

5.3. Large urban complexes should establish a unified fixed fire management agencies and fire security agencies

Unified and coordinated management. The various functional areas of the organization to have their own sound system and organization, clear fire safety responsible person in charge of fire safety in this area. Fire management

agencies and fire security agencies to regularly organize various functional areas to be checked. Found hidden in a timely manner to urge the rectification, to regularly organize various functional areas to carry out coordinated evacuation drills. Fire management agencies with the various functional areas, each functional area to the subordinate departments signed their fire safety responsibilities shape. Responsible for primary level.

5.4. Strengthen the unit’s own management, supervision units implement various fire safety system

Establish and improve the more stringent fire safety regulations and fire liability system. Such as a total ban on smoking; strictly prohibited flammable, flammable decoration materials; strengthening the use of fire, electricity, gas and electricity (gas) welding and other hot work management; and urge the units in the effective implementation of supervision and inspection. Units to increase investment in education, training, and development of self-defense self-help plan. Strengthen the unit’s own evacuation drills, and organize regular fire evacuation drills. Improve checks, the frequency of inspections; improve the facilities and equipment inspection, testing frequency. And with a qualified testing company signed a perennial maintenance contract, identify problems and timely maintenance to ensure facilities complete easy to use. For some key positions can be equipped with appropriate fire-fighting facilities and overweight and fire extinguishers. Units to establish a professional fire-fighting facilities and equipment maintenance team, implemented 24-hour shifts. Reserve sufficient maintenance equipment and replacement parts. To establish a voluntary fire brigade, large complex to set up part-time fire brigades, equipped with sophisticated portable rapid firefighting equipment. Once we arrived at the scene quickly extinguishing the fire the first time.

5.5. The development of improved fire rescue

Fire departments should strengthen fire troops, strengthen facilities and equipment with special equipment to carry out simulation and adaptive training of fire fighting and rescue operations for large urban complex, fire and rescue personnel to improve the combat capability at high temperatures, smoke, toxic and other conditions, form the backbone of large urban complexes fighting and rescue. Study and formulate the disposal of large urban complexes fire plans, conditional plans to develop three-dimensional. Governmental organizations often drew multisector joint combat exercises, improve firefighting and rescue capability [3]. Strengthen the urban area quadron large complex of six familiar and fire drills as to be familiar with the complex as six priorities.

5.6. Strengthen the supervision and management

Strengthen legal institutions and management personnel safety education and training, to enhance the legal aware-

ness and consciousness of their responsibilities. So that it can function in strict accordance with the audit inspection when zoning operations. Not without changing the function. To focus on their integration into the scope of regulation to include premium key units supervision, at the ground level of the city to direct supervision by the detachment, establish domicile of the file, the file you want to project performance-based design as key positions and key content labeling. Yaan region, etc. To set clearly marked. Supervisor to the performance of design and expert assessment understand the content. To strengthen supervision and inspection frequency, checks at least once per quarter. To Yaan foyer and other parts of the region and expand the focus of supervision and inspection to check content. Every time the use of the nature of the various functional areas to be checked whether the change. This transfer should work as a supervisor of the transfer of content. Large urban complexes in check before the opening of public gathering places must be strictly treated.

5.7. The strict control of each functional area use change functions

The use of functional change in one functional area may occur not only meet the requirements of the existing fire-fighting facilities are not the problem, but also may affect the fire performance of other functional areas. Therefore, when change approval to strictly, fully consider matching firefighting facilities and equipment, safe evacuation compliance requirements. Especially the new changed into entertainment, children space, children's play room, elderly apartments, multi-purpose hall and other special floor limits but also to strictly. In strict accordance with the

specifications set up to review whether the location meets the requirements, examine whether the special provisions.

5.8. The use of advanced technology, strengthen dynamic supervision

Things to actively explore the technology into the large urban complex fire safety management strengthen fire control facilities and personnel of dynamic regulation unit. Built a fire control center network monitoring city will be the first urban complex included in the scope of monitoring. But also with the local public security building eye in the sky project into the focus of the urban complex monitoring range. By installing monitoring sensors and radio frequency devices in building fire facilities, the key parts to install video cameras, back-office systems set SMS alarm function, the relevant departments, units and personnel by means of things fire control center, Internet access network side, you can clear are duty personnel understand key positions in place, fire facilities are in good condition, the need for maintenance, etc., to achieve the facilities operation and unit management, intelligent tracking, monitoring. This work has already begun to explore the implementation of Chongqing Corps.

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