

Research on Vertical Transportation Technology of Super Tall Buildings in Narrow Space in Malaysia

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Abstract: With the acceleration of urbanization in Malaysia, the core area of the city center of Kuala Lumpur is densely populated, super high-rise buildings are increasing in narrow Spaces. The narrow space limits the display of traditional transportation methods, and more efficient and safer vertical transportation solutions need to be explored. The research of vertical transportation technology involves the selection of transportation equipment, the optimization of transportation scheme and so on. This is of great significance for improving the quality and efficiency of super high-rise construction in Malaysia and adapting to the needs of urban development.

Keywords: Malaysia region; In a narrow space; Vertical transport technology for super tall buildings; KLCC

1. Introduction

In Malaysia, where land resources are limited, super high-rise construction in a narrow space faces many challenges, so the research on vertical transportation technology is particularly important. Reasonable vertical transportation technology can not only ensure the efficient construction, but also ensure the safety of construction. Through in-depth research on vertical transportation technology, it is helpful to solve the transportation problems of super high-rise construction in narrow space, and promote the development of Malaysia's construction industry.

2. Application principles of vertical transportation technology for super tall buildings in narrow Spaces in Malaysia

2.1 Security Principles

In the narrow space of super high-rise vertical transportation in Malaysia, the construction environment is complex, and vertical transportation faces many risks, such as falling from high altitude and equipment failure. Transport equipment must be inspected and maintained regularly to ensure reliable performance in strict compliance with relevant safety standards and specifications. Operators should be professionally trained so that they can be familiar with the operation process and safety precautions and improve safety awareness [1]. In the transportation process, reasonable planning of the transportation route, set up the necessary safety protection facilities, to avoid safety accidents, to ensure the safety of personnel and materials.

2.2 Efficiency principle

Due to the limited space, transportation time and efficiency directly affect the construction schedule. According to the structural characteristics and construction needs of the super high-rise, the appropriate transportation equipment should be selected and the transportation task should be reasonably arranged. Optimize transportation processes, reduce unnecessary waiting and transit times, and improve transportation efficiency. The use of information management means to monitor the transportation process in real time and adjust the transportation plan in time to ensure that materials and equipment can be delivered to the designated location on time and accurately to meet the construction schedule requirements.

2.3 Adaptability Principle

The principle of adaptability requires that vertical transport technology can adapt to the geography, climate and construction conditions of the Malaysian region. Malaysia's hot and humid climate can have an impact on the performance and service life of transport equipment. When selecting transportation equipment, it is necessary to consider its adaptability to the environment, such as waterproof, moisture-proof, high temperature resistance and other properties. The narrow space site conditions also put forward special requirements for the selection and layout of transportation equipment. It is necessary to flexibly adjust the transportation plan according to the actual situation of the site, so that the vertical transportation technology can better adapt to the construction environment and ensure the smooth progress of the transportation work.

3. Vertical transportation technology of super tall buildings in narrow space in Malaysia

3.1 Spatial layout optimization of transportation equipment

In the construction of super tall buildings in narrow Spaces in Malaysia, the number and type of transportation equipment should be reasonably determined according to the structure and construction needs of super tall buildings. For example, for material transportation, tower cranes, construction elevators and other equipment can be selected; For personnel transportation, construction elevators are mainly used. Carefully plan the location of transportation equipment to avoid interference between equipment. The layout of the tower crane should consider its coverage and lifting radius to ensure that the entire construction area can be covered; The construction elevator should be set up for the convenience of personnel and connected with the entrances and exits of each construction floor [2]. It is also necessary to consider the relationship between transportation equipment and surrounding buildings, roads, etc., to ensure the safety and smooth transportation process.

3.2 Efficient design of transportation process

In order to achieve high efficiency of vertical transport of super tall buildings in narrow Spaces in Malaysia, the transport process needs to be carefully designed. In terms of material transportation, it is necessary to establish a sound material supply plan and distribution system. According to the construction progress, arrange the procurement and arrival time of materials in advance, and store materials in a reasonable classification to avoid material backlog and confusion. In the transportation process, information management means are used to monitor and schedule the loading and unloading, lifting, transportation and other links of materials in real time to ensure that materials can be quickly and accurately delivered to the construction floor. For personnel transportation, it is necessary to develop a detailed personnel access management system, reasonable arrangement of personnel up and down the floor time, to avoid personnel congestion and waiting. Special safety channels and emergency evacuation channels are set up to ensure the safety of personnel.

3.3 Application of intelligent scheduling system

In the ultra-high-rise vertical transportation in Malaysia, the application of intelligent scheduling system can effectively improve the transportation efficiency and management level. The intelligent scheduling system can collect real-time information such as the operating status of transportation equipment, the transportation needs of materials and personnel, and formulate the best transportation plan through data analysis and algorithm optimization. For example, according to the lifting task and position of the tower crane, the lifting task is automatically assigned to avoid the collision and conflict between the tower cranes; According to the operation of the construction elevator and personnel needs, the elevator stopping floor and operation time should be reasonably arranged to reduce personnel waiting time [3]. The intelligent scheduling system can also be integrated with other management systems to realize information sharing and collaborative work, and improve the management efficiency of the entire construction process.

3.4 Collaborative planning with the surrounding environment

The ultra-tall vertical transport in the narrow space in Malaysia requires collaborative planning with the surrounding environment. In the planning process, it is necessary to fully consider the influence of surrounding buildings, roads, traffic and other factors on vertical transportation. For example, in the selection and layout of the tower crane, it is necessary to avoid the collision between the crane boom and the surrounding buildings; When setting up the construction elevator, it is necessary to consider the connection between its entrance and exit and the surrounding roads to facilitate the entry and exit of materials and personnel. It is necessary to communicate and coordinate with the surrounding traffic management departments, rationally arrange the transportation time and route, and avoid affecting the surrounding traffic. It is also necessary to consider the impact of noise and dust on the surrounding environment and residents during the construction process, and take corresponding environmental protection measures to achieve the harmonious development of vertical transportation and the surrounding environment.

4. Innovative development of vertical transportation technology in narrow space of super high-rise buildings in Malaysia

4.1 Integration of green energy-saving technologies

Energy-saving transportation equipment, such as tower cranes and construction elevators using high-efficiency motors, variable frequency speed regulation technology, are selected to reduce the energy consumption of equipment [4]. The use of

renewable energy sources to power transportation equipment, such as solar photovoltaic power generation systems to power some equipment. Improve energy efficiency by optimizing transportation processes, reducing idling and standby time of equipment. The intelligent control system is used to automatically adjust the operating state of the equipment according to the actual transportation needs to avoid energy waste. The integration of green energy-saving technology can not only reduce construction costs, but also reduce the impact on the environment, in line with the requirements of sustainable development.

4.2 Improvement of information management means

Establish a sound information management platform to achieve real-time collection, transmission and processing of transportation equipment, materials and personnel information. Through sensors, surveillance cameras and other equipment, real-time monitoring of the operating status of transport equipment, material handling and personnel flow. Big data analysis technology is used to conduct in-depth analysis of transportation data, excavate potential problems and optimize space, and provide basis for adjustment and decision-making of transportation schemes. Through the information management platform, the construction parties can share information and work together to improve transportation efficiency and management level.

4.3 Application exploration of multi-technology integration

Integrate vertical transportation technology with other advanced technologies such as automation technology, Internet of Things technology, artificial intelligence technology, etc., to realize the automation, intelligence and information of transportation process [5]. For example, the use of automation technology to achieve the automatic loading and unloading of materials, improving transportation efficiency and safety; Through the Internet of Things technology to achieve connectivity between transport equipment, information sharing and collaborative work; Use artificial intelligence technology to analyze and forecast transportation data and formulate response measures in advance.

5. Conclusion

The research on vertical transportation technology of super tall buildings in narrow space in Malaysia is very important for the construction of super tall buildings. Through continuous exploration and innovation of vertical transportation technology, it can effectively solve the transportation problems caused by narrow space, improve construction efficiency and safety, and provide strong technical support for the sustainable development of super high-rise construction in Malaysia.

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