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Contents

The Application of Three-Dimensional Integrated Protection Technology in High Slope Control of Mountainous Highway

Jun Han

Sichuan Guangba Expressway limited liability company, Guangyuan, Sichuan, 628000, China

Abstract: In the process of China's national economy construction, the role of highway traffic is unquestionable. And with the continuous development of society and the continuous improvement of highway grade, the work of the highway slope governance become a top priority, especially for some mountainous area highway, strengthen management of slope is very critical. The emergence of three-dimensional comprehensive protection technology has created great convenience for the management of the slope of the mountainous highway, and the safety of the mountain highway has been improved effectively. In view of this, the paper focuses on the application of three-dimensional integrated protection technology in the treatment of highway high slope in mountainous areas for reference and reference.

Keywords: Stereo synthesis; Protection technology; Mountain roads; Slope control; Apply

Corresponding Author: Jun Han, 751039300@qq.com

1. Introduction

In some mountainous area highway construction in China, due to the limitation of terrain, make the digging depth of fill is deep and this cause serious influence to the safety of the highway, easy to cause a series of slope hazards, which to some extent, hindered the effective of the national economy level ascension.[1] In order to effectively strengthen highway safety, especially the mountainous area highway, highway construction related departments need to use the advanced equipment and technology, reasonable slope management, effectively reduce the slope diseases are caused by accidents, thus effectively improve the safety and reliability of the mountainous area highway.

2. Overview of 3D Comprehensive Protection Technology

In the construction of some mountainous roads in China, it is difficult to reinforce the slope because of the influence of the terrain. In order to effectively reduce the risk of slope decline, slope reinforcement is usually used in mountain highway construction. Relatively than the other way, anti-slide pile in construction process not only has the characteristics of simple operation, and it is also the safety and reliability of the relatively high, so has been widely applied in the mountainous area highway construction. But due to the mountainous area highway unique terrain and hydrological effect, often appear makes deep bedding rock slope, the emergence of the problem is usu-

ally transient, and falling fast, damage degree is higher, so the traditional slope supporting technology (such as bolting, anti-slide pile, etc.) is not well to control and prevention, so must adopt advanced supporting technology for slope management and prevention. Comprehensive slope protection technology is combined with a variety of supporting technology in the integration of technology, it can effectively prevent the formation of the slope slide diseases, reduce injuries caused by the decrease of slope, and the surrounding mountain highways the protection of the natural environment also has played a certain positive role. Therefore, the three-dimensional integrated protection technology has become one of the most widely used technologies in highway slope control in mountainous areas.[2]

3. The Application of Three-Dimensional Comprehensive Protection Technology in the Treatment of Highway High Slope in Mountainous Areas

Comprehensive slope protection technology is by far the most ideal treatment technology, in order to explore the three-dimensional integrated protection technology in the application of mountainous highway high slope governance, based on a governance mountainous area road side slope as an example, the main points in the application of comprehensive protective technology in-depth discussion and instructions, detailed as follows:

3.1 Project Overview

At the bottom of the slope of a mountainous highway, the surface of the surface of the residual silty clay and the slope of the slope is more than 50 meters, and the groundwater is deep.[3] The highest altitude difference in the region is 4,041 meters above sea level. It is mainly in the valley and mountainous terrain, with more lithology and severe fracture after weathering. The following is an in-depth study and analysis of the application of three-dimensional integrated protection technology in the slope control of the region, aiming to provide the following advice and help for the industry.

3.2 Application Point Analysis

3.2.1 Prepare for the Preliminary Work

First of all, before the highway slope in mountainous areas, need to be prepared for the following aspects: first, the analysis of the mountainous area highway elevation, completes the data record and statistics, as normal in order to lay a solid foundation for the subsequent slope; secondly, the surface of mountain highway slope is treated with loose soil, which is mainly for the preparation of the next measurement. Only when the above two points are prepared, can we ensure the further implementation of the three-dimensional comprehensive protection technology.[4]

3.2.2 Measuring Line

In the completion of preparatory work, to implement measuring unreeling process, the specific implementation process is as follows: first, need according to the requirements of design drawings on the basis of lofting processing, and with the aid of steel rule, effective excavation position for accurate positioning, so as to improve the accuracy of measurement. Second, for measuring unreeling procedures, once encounter arc structure, will need to measure related staff in accordance with the circular arc structure for center position, the effective analysis according to the center of the circle, so as to determine the specific location of pay-off.

3.2.3 Foundation Groove Excavation

In order to make the excavation depth more reasonable and standard in the process of excavating the slot, manual excavation is usually used instead of mechanical excavation.[5] In the excavation of the artificial foundation, it is necessary for the relevant personnel to have a good professional quality. According to the actual situation of the slope, the reasonable depth should be excavated, not too deep or too shallow.

3.2.4 Plant Protection

In the use of comprehensive governance in mountainous area road side slope protection technology, effectively for the surrounding plants need protection, this is the slope of governance requirements, detailed protection measures are as followed: first, slow down the water and soil erosion caused by side slope treatment. In the process of highway slope control in mountainous areas, when the surrounding hydrology is not analyzed, the occurrence of soil erosion can be caused, causing serious damage to the surrounding plants, therefore, need to related staff in front of the slope governance on surrounding hydrological environment were analyzed, and combined with the conditions of surface runoff will function to minimize soil erosion, thus effectively protect the surrounding plants are not destroyed; second, avoid soil erosion. Wide spreading because of the mountainous area highway surrounding some of the plants, in the face of precipitation and vegetation root system to absorb moisture, in order to achieve stability of topsoil, so in the slope governance, relevant staff to reasonable vegetation, avoid water and soil erosion.[6]

3.2.5 Prestressed Anchor Cable and Concrete Frame Girder Construction

In the construction of prestressed anchor cable, the basic

work of construction preparation and anchor hole drilling should be done in combination with anchor reinforcement, anchor hole grouting and concrete reinforcement work. Place the anchor hole on the slope to ensure the stability of the slope and adjust the anchor point. The application of drilling equipment, combined with the drilling rig, crushing rock structure, application and drilling technology, combined with the corresponding carrying capacity. Drilling emplacement process, completes the slope measurement work, install the rig, and fixed, adjustment, meet the requirements of normative drilling process, using the form of air drilling, analyzing the characteristics of the drill main performance, avoid drilling is in a state of distortion.[7] The actual drilling process needs to be combined with the change of strata, effectively deal with the cementing process of the solid wall, ensure the depth of the hole depth and the effectiveness of the anchor cable. The effectiveness of the anchor hole cleaning, need to deal with the combination of high pressure air, reduce cement mortar, combined with the hole wall rock mass basic bond strength, high pressure water to rinse the actual anchor hole inspection stage, the need to design the aperture, combined with the bit and the main form of standard pipe, analyze the practical situation of anchor hole as far as possible, install the anchor body. Straighter steel wire, control medium bracket, fixed outward winding engineering. Before cutting excavation, to drain water treatment, and in the process of anchor cable of the slope excavation, to adopt reasonable blasting methods, as far as possible the realization of the excavation of stratification and the layered anchor.

3.2.6 Construction of Stone Arch

Stone arch frame construction is a comprehensive protection technology is an important link in practical application, in the concrete construction, the related construction personnel combined with design drawings required for Central Line control, and shall, in accordance with the mountainous area highway elevation, do a good job, add the anti-slide pile finishing lofting processing.[8] In addition, in the governance of the highway slope in mountainous area, also need to do a good job, crumpling renovation is specific in accordance with the requirements of design drawings, optimized for slope rate, at the same time do a good job in layered construction to achieve the actual requirements of the stone arch frame construction, finally complete the management work of the highway slope in mountainous area.

4. Conclusion

To sum up, as the mountain economy level rises, it is becoming more and more demanding for highway safety in mountainous areas. In the construction of mountain highway, due to the influence of the topography and hydrological factors, the slope damage often occurs, which seriously affects the normal use of the highway. In order to effectively control the hazards of highway slope in mountainous areas, this paper introduces a kind of three-dimensional comprehensive protection technology, which is the most ideal support technology in highway slope control. Through the actual slope engineering geological environment and the analysis of the hydrological environment, the comprehensive protection technology in the application of the mountain slope points are detailed analysis, for our country mountain area highway safety and reliability of ascension to lay the foundation.

References

[1] Kaifeng Jiang. Analysis of the application of three-dimensional comprehensive protection technology in the treatment of highway high slope in mountainous areas[J]. Architecture Knowledge, 2016(02):74. (in Chinese)

[2] Ran Tian, Xu Peng. The application of three-dimensional integrated protection technology in the treatment of highway high slope in mountainous areas[J]. Low Carbon World, 2016(21):204-205. (in Chinese)

[3] Yongchang Ann. Optimization design and application of protective structure of highway retaining wall in mountainous area[D]. Chongqing Jiaotong University, 2015. (in Chinese)

[4] Bing Wu. Application of three-dimensional integrated protection technology in highway slope control in mountainous areas[J]. Traffic Standardization, 2014(01):20-22. (in Chinese)

[5] Guirong Qi, Xiaoyan Zhang, Yungui Lu. Application of three-dimensional integrated protection technology in high slope slope control in mountainous areas[J]. Chinese and Foreign Highways, 2009(03):51-53. (in Chinese)

[6] Yushun Zhang. Flexible ecosystem pyramid slope protection technology in the river/lake/sea embankment, road slope, the application of[A]. China Water Conservancy Technology Information Center. The river ecological restoration technology and governance[C]. China Water Conservancy Technology Information Center, 2010(7). (in Chinese)

[7] Baocong Liu, Yanhong Yang. Application of SNS active flexible protection technology in high slope control in mines[J]. Journal of Luoyang Institute of Technology (Natural Science Edition), 2014(02):32-34. (in Chinese)

[8] Guoyan Huang, Hongjun Qian. Application of active flexible protective net in high-slope slope control in lockmont expressway[J]. Highway Traffic Technology (Applied Technical Edition), 2013(09):38-40. (in Chinese)

Construction Technology and Strategy of Natural Light Environment in Urban Underground Space

Jinyao Wang[1] Xinming Jia[2]

1. The Experimental Division of Information and Technology, Yunnan University, Yunnan, 650091, China
2. School of Architecture and Urban Planning, Chongqing University, Chongqing, 400044, China

Abstract: In underground space, daylighting plays an important role in increasing the spacious sense, improving the ventilation effect, and more importantly, reducing the negative visual and psychological effects brought by the underground space, such as enclosed monotony, unknown direction and isolation. In this paper, the technical means of utilizing natural light in underground space were elaborated from the two aspects of passive daylighting method and active daylighting method, aiming to bring natural light into the underground as much as possible so as to fully satisfy people's longing for nature for those who work and live in the underground space.

Keywords: Urban underground space; Natural light; Passive daylighting; Active daylighting

Corresponding Author: Jinyao Wang, Yunnan University, Jinshi Community, Jinchen Street, Panlong District, Kunming, Yunnan, China, 152615911@qq.com

1. Introduction

In underground space, daylighting is not only to meet the requirements for illumination and energy saving, but more importantly, to meet people's psychological requirements for perceiving such natural information as natural sunlight, sense of direction, day and night shift, weather change, season and climate. At the same time, daylighting in underground space can improve the spacious sense of space and improve the ventilation effect to greatly reduce the visual and psychological negative effects brought by the underground space, such as enclosed monotony, unknown direction and isolation. Therefore, it can be said that the design of daylighting has a multi-faceted role in improving the underground environment, including but not limited to meeting the physiological needs of human beings. There are two kinds of methods of utilizing natural light in underground space.[1]

2. Passive Daylighting Method

Passive daylighting is used in buildings that lie directly below the surface. The skylight and atrium cannot be placed on those near-surface structures whose ground is used as road or for other functions.

2.1 Skylight Daylighing

Skylight lighting, also known as the top lighting, is a lighting method which introduces the natural light into the room via the window in the top of the room or hall. For daylighting method in underground space, there are five major skylight forms according to different building functions, which are rectangular skylight, zigzag skylight, flat skylight, horizontal skylight, sunken (or pit) skylight.

Due to the diversity of skylight layouts and shapes, underground space with skylight lighting also varies. Some of the skylights are narrow as the gap, such as Thermal Baths Vals designed by Peter Zumthor, creating a dark and quiet atmosphere for the underground space. Some of the skylights correspond to small squares, courtyards, gardens and other outdoor open spaces, which not only provide sufficient light for underground space while keeping the ground space open but also introduce the above-ground landscape into the underground space. A good example is Glass Pyramid, the extended project of the Louver, which enhances the openness of underground spaces and the communication of aboveground and underground spaces and thus creates an open dynamic space.

2.2 Side Window Dayighting

It is feasible to open a clerestory window on the outer wall of the semi-basement above the ground level (about 1/3 of the height of the semi-basement)[2] for daylighting or a light well interlinking with the ground along the outer wall of the basement and open a window toward the light well to collect natural light. Such daylighting forms in underground buildings are suitable for underground warehouses, garages or some business offices which are usually attached to the main body of the above-ground buildings and require little illumination and visual environment art for daylighting.

The advantage of using side window daylighting in underground structures is that in the side-lit room, the user is able to feel as if they were in the above-ground building. For example, in an underground hotel on St. Michael's

Peak, the main entrance, the lobby, and the rooms are all adopting side window daylighting which allows the main function room to have plenty of natural light.

2.3 Patio Daylighting

The combination of underground buildings and sunken courtyards is one of the direct ways to acquire natural light. The underground buildings can be connected with the natural environment through sunken courtyard or patio, and the visual circulation can be formed by opening large lighting glass doors and windows in the indoor open space, thus forming an interaction. It is more suitable for spatial organization change in small and medium-sized cultural and entertainment venues.

The advantage of patio daylighting is that it is not constrained by the terrain. Natural lighting and outward viewing can be achieved either on slope or flat ground.

2.4 Sunken Plaza

The sunken plaza is commonly used for open space in large areas of the city (such as downtown plaza, traffic plaza in front of station, plaza and greening plaza in front of large building). A part of the ground is built to "sink" to the natural ground standard and below. Generally, the height is about 4 m. The sunken plaza makes the plaza space present the changes of space forms, such as positive or negative, light or dark, noisy or quiet and closed or spacious. Large lighting glass doors and windows or a transparent colonnade can be established towards the sunken plaza on the underground buildings surrounding the sunken plaza, so as to let the surrounding underground space integrate with the open space in the plaza. Natural light of the underground space can be acquired through the sunken plaza. At the same time, because the people enter the underground space across the sunken plaza, the difference between the above-ground and the underground space is reduced to a great extent. For example, in the Rockefeller Center, if the people enter the underground plaza from the Fifth Avenue, they do not feel that they are in the underground. While in the Wave Culture Town, by use of a large number of plazas and ramps to strengthen the connection between the above-ground and the underground, the people unwittingly shuttle between the above-ground and the underground, thus the concept of ground layer is obscured. The underground buildings with sunken plaza mostly refer to multi-functional public activity types, such as shopping, entertainment, leisure, walking traffic etc.

Because of the similar daylighting methods, the underground buildings relying on the sunken plaza daylighting have similar shortcomings with those relying on side window daylighting, that is, requirement for the site. The establishment of the sunken plaza needs a large open urban space.

2.5 Underground Atrium Sharing Space Daylighting

The sharing space of underground atrium is a straight atrium space directly formed through the vertical superimposition of all layers and relatively independent functional spaces of a large underground multi-storey building complex. The large daylighting dome over the top is composed of space grids and lighting glass surfaces. Therefore, the effects of bad weather may be avoided like wind, rain, scorching sun and severe cold etc. And the underground space surrounding the atrium will absorb the natural light to a certain extent.

The advantage of the sharing space in the underground atrium is that it has a significant effect on natural lighting in the underground buildings with no connection to the above-ground. But its disadvantage is that it depends on the progress of science and technology to a great extent. For example, the loss of light inevitably exists in the system and it is not realistic for the outdoor scene obtained from the periscope. Therefore, the development of science and technology, especially in optics, is a key factor in improvement of the lighting vertical shaft system.

2.6 Combining with the Entrance

In areas short of urban land, natural lighting is usually combined with the entrance and exit of underground space. The aim is to maximize the introduction of natural light and improve the environmental quality of underground space on the smallest ground. The usual practice is to do a transparence disposal in the entrance. This approach is commonly used as an underground space for transportation hubs. For example, the famous DABASHI subway station in Japan are combined with ventilation tower and rain cover on its entrances and exits, with a transparent and conspicuous "wind wing", which marks the subway entrances and exits and also becomes a landmark of the city.

3. Active Natural Daylighting Method

The underground space is completely isolated. Therefore, the natural light can not be acquired by use of side window and skylight. Active sunlight system is hereby required to transfer the natural light to the isolated underground space through channel, pipe and optical fiber. The basic principle of active sunlight system is to calculate the change of the sun' position (Solar altitude angle, azimuth)[3] according to the season and time, take the heliostat tracking system as sunlight collector and adopt efficient light-guiding system to send the natural light to deep underground space which needs light.

3.1 Mirror Reflection

The mirror reflection daylighting is to use the reflector of the plane or curved mirror to send sunlight to the part of

the room that needs to be illuminated through one or more reflections. This kind of daylighting method usually has two ways: one is to combine the plane or curved reflector with the sun shading facility of the lighting window, which is both reflection and sun shading; the other is to install the plane or curved reflector on the device to track the sun, as the heliostat, after its once or twice reflection, the sunlight is sent to the room for lighting. Heliostat is a device for positioning reflection of sunlight. It can accurately reflect the sunlight to a fixed position by tracking the sun. Comparing with the direct introduction of sunlight by ordinary skylight glass, it not only improves the illumination, but also prolongs the time of lighting with natural light within the room. In addition, the light is scattered to avoid the glare and uniformity of the illumination is improved to acquire more comfortable lighting effect.

3.2 Light Guiding by Using Light Pipe

The daylighting method with light pipe varies with different system equipment forms and operation places. The light pipe is a kind of natural lighting product of health, energy saving and environmental protection. Its working principle is to use the physical properties of natural light to collect natural light and transmit it to the use space through the material of high reflectivity.

The whole system consists of seven parts. In fact, it can be summed up in three parts: sunlight collection, sunlight transmission and sunlight irradiation. The sunlight collector is mainly composed of such three parts as heliostat, concentrator and reflector. There are many ways to transmit sunlight, including air transmission, mirror transmission, transmission of light pipe, optical fiber transmission and so on. The materials used in sunlight consist of diffusing panel, light transmittance prism or special materials for lighting, which make the light from the light pipe have a different distribution. The corresponding light distribution materials should be selected as required by the lighting place in the design.

In terms of type, the light pipe can be divided into active and passive type. The passive guide pipe mainly uses the shape of light cover and material treatment to collect the sunlight. The cover is mainly made from organic glass. Internally, the array of triangular reflector is used to gather the light. This method is greatly affected by direction of sunlight. The whole structure of the light pipe consists of light cover, rain proof plate, adjustable light pipe, extended light pipe, sealing ring and astigmatic plate. The active light pipe is a condenser installed in the lighting part that can be adjusted along with the direction of sunlight. The rest is basically the same as the passive light pipe. The device can obviously improve the efficiency of sunlight collection. But the disadvantages exist in the high cost and low popularity of the equipment.

3.3 Optical Fiber Light-Guiding Daylighting

Optical fiber light-guiding daylighting is a method by using optical fiber to transmit the sunlight to the position where the light is needed within the room. The idea of optical fiber light-guiding daylighting has been proposed for a long time, but it's been only over ten years for wide applications in engineering. The core of optical fiber light-guiding daylighting is the optical fiber (for short optical fiber), which is also known as optical waveguide in optical technology. It is a kind of conductive material. This material is an optical fiber drawn from the principle of full reflection of light. It has a serial of advantages including fine wire diameter (usually only tens of microns, and one micron is a millionth of a meter, thinner than a human hair), light weight, long service life, good softness, anti-electromagnetic interference, water resistance, chemical corrosion resistance, rich raw materials of optical fiber and low energy consumption of optical fiber production. Particularly, the light derived from the optical fiber has no ultraviolet line and infrared radiant line. So it has been widely used in many fields, such as building lighting and daylighting, industrial lighting, aircraft and automobile lighting, and landscape lighting and so on. The effect is remarkable. In terms of technology, this method needs corresponding equipment to cooperate in realization of the lighting function. Similar to the light pipe, the solar optical fiber optic conduction system is composed of three parts including light condensation, light guiding and astigmatism.

In the natural daylighting mode, due to the excellent optical conductivity of the optical fiber, the attenuation of natural light is very small in the conduction process. As the sunlight is collected only from the sun, daylighting efficiency in the system is greatly affected by the weather. In a cloudy day, because the energy density of natural light is too low, daylighting effect will be reduced greatly. In physical properties, optical fiber has a poor resistance to ultraviolet and high temperature, which is easy to aging and poor in durability. Additionally, the cost is high for the optical fiber system, and the structure is relatively complex for the lighting device[4].

3.4 Daylighting Method by Light Transmission of Prism

The main principle of dalylighting by light transmission of prism is to rotate two prisms to generate refraction of four times of light. The light-receiving surface always controls the direct light on the vertical direction. This technology was developed in 1981, and was mainly used to transmit and allocate light at that time. This principle for controlling mechanism is to make the prism rotate on the horizontal plane when the azimuthal angle and altitude angle of the sun change. When the sun is lowest, two prisms are used on the same direction, which enlarges the refraction

angle, so the light injection increases. In addition, when the altitude angle of the sun enlarges, it is necessary to reduce the refraction angle. Under this condition, appropriately adjust the direction of each prism, that is to say, set up proper rotating angle, so that the refraction light of each prism will be offset to some extent. When the sun is highest, control the two prisms on mutually opposite directions.

For large-scale daylighting in underground space, light transmission system of prism is generally formed by multiple light treatment interfaces, which give it certain morphological characteristics and construction shape.[5] The improvement project of main workshop of power plant in south city at Shanghai World Expo Park is a typical case adopting this kind of daylighting mode.

Light guiding system of reflector group is mostly used in the design of daylighting of the interface of the top of the space, and it is a daylihgting method integrating function and landscape as a whole. In the meantime, due to its complicated structure, this system causes certain limitations. From the aspect of technology, this complicated structure has high technological requirements, which increases construction difficulties in the aspect of light treatment. The components can realize the treatment of natural light via mutual coordination. Therefore, each element involved in natural light transmission should sundergo detailed analysis of space.[6]

3.5 Photovoltaic Effect Indirect Daylighting Illumination

Photovoltaic effect indirect daylighting illumination (established photovoltaic daylighting illumination)[7] is to convert the light into electricity and then convert the electricity into light for illumination by using the optical-electrical characteristic of solar energy battery, but not directly use the illumination method of daylighting.

The advantages are as follows: (1) energy conservation and environmental protection; (2) power supply method is simple and the scale will not affect the power generation efficiency; (3) long service life, simple maintenance and management, unmanned operation is possible; (4) relatively low comprehensive cost, the investment is economical; (5) the installation is not restrained by regions, the scale can be determined as required, solar energy power supply is considerably appropriate for solving the power problems in mountainous areas, deserts, offshore and high space without electricity, with wide application fields.[8]

4. Conclusion

One of the main reasons for psychological disorders of people who enter underground buildings or move around in it is the closure nature of underground environment. Therefore, the design of underground space should take more consideration of introduction of natural light. If condition permits, passive daylighting should be applied to fully make use of natural light ray. If the condition is worse, active daylighting should be applied by using available technological means, to transmit natural light into the secluded underground space via holes, pipelines, optical fibers, etc. To make urban underground space to be the organic continuation and expansion of aboveground space by all sorts of means, eliminate the seclusion and closure state of its basic shape, and link the underground space with the aboveground space and form an entity in space shape is the major way to solve the psychological and physiological problems of people who are in underground buildings.

References

[1] Wei Bao, Fupeng Zong, Jianping Zhao, et al. Current Situation and Prospect of Underground Space Lighting and Light Pipe System[J]. China Illuminating Engineering Journal. 2009(3). (in Chinese)

[2] Design Criteria for Architectural Lighting (GB 50034-2004). Beijing: China Architecture & Building Press, 2004. (in Chinese)

[3] Yu Bian, Ruoqi Fan, Haoming Wu, Qiseng Dong. Exploring the Ways to Optimize the Design of Architectural Lighting[A]. The Special report and Thesis Collection of the 22nd Symposium on Lighting Science & Technology and Marketing on Both Sides of the Taiwan Straits[C]. 2015. (in Chinese)

[4] Zhengwang Wu. Ecological Design Combined with Natural Ventilation and Lighting for Underground Space in Northern Cities[J]. Huazhong Architecture, 2011(10). (in Chinese)

[5] Gongwei Li. Design Handbook for Architectural Lighting[M]. Beijing: China Architecture & Building Press, 2004. (in Chinese)

[6] Zhengwang Wu, Yanqiang Wu. Using 'Mirror Reflection' to Improve Energy Saving and Lighting of Buildings[J]. Huazhong Architecture, 2017(06). (in Chinese)

[7] Wenqing Wang. Urban Underground Space Planning and Design. Nanjing: Southeast University Press, 2000. (in Chinese)

[8] Bin Zhang. Preliminary Exploration of Underground Space Lighting Design with Simulated Natural Light[A]. The Architectural Society OF China Architectural Physics Branch. The Architectural and Physical Urban Environment in the Process of Urbanization: The Thesis Collection of the 10th National Symposium on Architectural Physics[C]. The Architectural Society OF China Architectural Physics Branch:2008:4. (in Chinese)

Present Situation and Problems Analysis of Waterproof and Seal of Prefabricated Building Exterior Wall

Qizhi Zhang
Huanghuai University, Zhumadian, Henan, 463000, China

Abstract: With the continuous development and progress of China's social economy, the construction speed of our construction industry is also accelerating. Compared with the traditional cast-in-place reinforced concrete and masonry building, it has been unable to meet the requirements of the construction industry and the development of the times. Because the prefabricated building has the advantages of fast speed, water saving, land saving, noise reduction, material saving and energy saving in installation. Compared with traditional buildings, the prefabricated building is more energy efficient and practical. Therefore, the new type of precast assembly architecture is constantly highlighted and has become the mainstream of the development of the future construction industry. However, the technology started late in China, and the immature technology and imperfect supporting standards led to slow progress and even stagnation in China's construction industry. Through the analysis of the present situation and problems of the waterproof and sealing of the prefabricated building exterior walls, the suggestions for the healthy development of the construction industry in China are put forward in time.

Keywords: Prefabricated housing; Waterproofing on the exterior wall; Seal; Problem

Corresponding Author: Qizhi Zhang, 13939676800@163.com.cn

1. Introduction

Since the founding of the people's Republic of China, China's construction industry has developed rapidly, and high buildings have risen to the ground. With the continuous accumulation of experience in the construction process and the continuous innovation of construction technology, many problems will be produced in the traditional way of building. For example, increasing labor force and prolonging the construction period; adopting the traditional on-site casting method can not effectively guarantee the quality of construction, and will also cause great impact on the environment.[1] Noise pollution and construction waste pollution happen all the time. In the construction process, in order to reduce the formation of construction joints, will be working all night, affecting the normal rest of the surrounding residents; the construction site work in the open air, for the weather, will reduce the construction personnel's working efficiency, and even safety problems. As a result of the traditional architecture, there are all these problems. Subsequently, the technology of prefabricated building was developed. Many developed countries began to emphasize the promotion of prefabricated building in the late 1940s. However, 60 years ago, China began to explore prefabricated building. Precast technology has been widely used in various types of construction, but due to the current technology is not mature enough, the lack of supporting standards and other issues, in the process of building use will produce some problems, which led to China's construction of industrialization process is slow, even stagnant. Therefore, in order to improve the prefabricated assembly technolo-

gy, the current situation and existing problems of waterproofing and sealing of such buildings are deeply analyzed and explored.[2-3]

2. Discussion on the Difficulty of Waterproof Weight of Prefabricated Building

The degree of building waterproof directly affects whether the building function can be completely realized. The gaps between traditional building windows, brick walls, kitchen and toilet are easy to leak. In order to ensure the waterproof function in the assembly building, the assembly component should be adopted in the construction process, and the joint casting process is added at the same time. Prefabricated construction bay window is not prone to leakage, because when the workshop production line, have been assembled and assembled; building external wall is prone to seam leakage situation, mainly is the emergence of a large number of stitching seam caused in the construction process. At the same time, the repair difficulty of the composite thermal insulation exterior wall is increased. To some extent, the assembly building has increased the difficulty of leakage. Therefore, the sealing and waterproofing of the assembled exterior wall joint is the key of the assembly building waterproof.[4]

3. Waterproof and Sealing Methods of Two and PC Outer Wall Joints

1) PC outer wall joints not only have horizontal joints, but also vertical seams. The commonly used waterproof seals have two kinds of waterproofing and material waterproof. The cavity is important in the back surface of waterproof joints, forming a cavity, first of all to the sealing strip or cast-in-place concrete, should be properly selected according to the frame structure, different functions, thus forming the two seal, two sealing cavity can be formed between the so-called waterproof waterproof material; for it is in the cavity of waterproof on the contrary, mainly in the joints of the water face, through the upper and lower panels reserved position to form the level of joint and the groove, on the filling materials, filling materials belong to seal material.[5]

2) Cavity waterproof. To achieve the purpose of waterproofing, we need to set up a more reasonable and proper linear structure on the side of the outer wall board, such as drip lines, rapids and water retaining platforms, so as to form a pressure balanced cavity. Has a very important significance to the pressure balance cavity, once the water flows into the cavity, there will not be a problem, because the particularity of the medial and lateral cavity, high low, drainage channel flow will follow the cavity has been set up, directly into the joint vertical cavity, the cavity drainage through it in the most low-end tube exhausted, you can play the waterproof effect. The drainage pipe is arranged in the vertical cavity bottom, so that not only can the inflow of water in the cavity, from the inside out; meet the effect of wind, also can ensure the air pressure inside and outside the cavity will not change, still the same pressure, water vapor will not be because of the action of the wind, into the cavity. But if they block the internal precast wall precision and cavity, resulting in cavity not waterproof, but also rely on the cavity is completely waterproof, waterproof function can not be achieved prefabricated construction, in this case, the rubber sealing strip or cast-in-place concrete can have a certain role.[6]

Table 1. Comparison of the advantages and disadvantages of common building glue

Project	Classification of Sealant			
	SR	SR	SR	SR
Resistance to displacement	Fair	Fair	Fair	Fair
Bonding capacity	Fair	Fair	Good	Good
Weather resistance	Good	General	Fair	Good
Resistance to pollution	Poor	Fair	Fair	Fair

Sealant and PC exterior wall board are closely related, so the sealant must meet the following characteristics according to the features of the application parts of the PC exterior wall plate.

First, it has good resistance to displacement and creep. In the process of implementation of existing prefabricated components, because there will be expansion and contraction effect, joint size will be affected to a certain extent, he will be cycle changes; for some building walls, which is non structural prefabricated external walls, in order not to affect the impact of the earthquake force, can withstand certain resistance in the design of a rigid requirements of the requirements of the plan, to precast wall panels, in a certain range of activities so only achieve anti displacement ability and sealing good creep properties, in the process of using PC wall panels can be performed safely.

Second, it has excellent cohesiveness and compatibility. The PC exterior wall itself belongs to the concrete prefabricated structure, which is a porous

material. The bonding effect of sealants is influenced by many factors. The size and distribution of holes and the condition of concrete will directly affect the bonding effect of sealants. The hole size and uneven distribution are not conducive to the sealant is good bond; the concrete characteristics, which itself is alkaline, some alkaline substances in migration to the bonding process, it will directly affect the bonding effect of sealant; the key is in the production process of precast wall panels, demoulding agent be sure to use, in many degree on the bond performance of sealant will also play a certain impediment. Therefore, in the production process, the matching sealant and the concrete base material must have good compatibility and bond.[7]

Third, it has good weatherability. In the process of production, the selection of sealing materials is very important. The selection of sealing materials directly affects the life and safety of PC building. The sealant and concrete should not only be compatible, but also have the properties of low temperature flexibility, mildew resistance and water resistance to a certain extent. It is necessary to choose the sealant with weatherability as waterproof material in order to achieve the due effect.

Fourth, it has good pollution resistance. Because of its small molecular material sealant contains a certain amount of, and did not participate in the reaction, and the executive service time is also increasing, so no small molecules involved in the reaction, and gradually penetrate into the concrete free; in some cases will produce static, the surrounding concrete slab on the will some part of the dust stuck phenomenon, which will produce black, and with the shape of the pollution, has certain effect on the exterior surface of the building is beautiful.

4. Implement Prefabricated Building by Using BIM Technology

According to the present situation, is still in the form of expression of the 2D drawing design work now for prefabricated buildings, buried in the operation process of connection node location and pipeline pre-need an accurate expression, while the traditional two-dimensional expression was unable to accurately express the content, cause communication difficulties to a certain extent. This requires us to express it in a new way, using three-dimensional expression, BIM technology can solve these problems in a timely manner, and solve problems with design and practice with all professions.

1) Structure professional synergy.

The shape, plane and structure of prefabricated building have some influence on the design of aseismic. Therefore, in order to meet the requirements and requirements of aseismatic design, it will be strict. In order to meet the requirements of industrialization, precast building components must be strictly designed, not only to meet the principle of reasonable force and connectivity, but also to be more convenient in construction. In order to process and transport, the size and weight of precast construction is the most critical. Reasonable size and weight should be established, which is conducive to improving the quality of the project and promoting the reasonable control of the construction cost. Besides, bearing walls and columns should also pay attention to whether the upper and lower cases are continuous, and the openings of doors and windows should also be aligned. And the doors and windows in the opening of the hole, also to meet the two reasonable requirements, that is, structural force and prefabricated components.

2) Water supply and drainage professional coordination.

Prefabricated buildings need the public space of the hole size and location of vertical wells in vertical lines will be reasonable to consider the relative concentration of the state, and to reduce the level of pipeline crossing. The contents of the reserved holes and the pre buried casing are different. The reservation hole is to pass through the prefabricated floor, and the pre buried casing passes through the pipe of the precast beam. But we must pay attention to the internal tube and ceiling pipeline status in the implementation process, to overhaul and replacement, convenient operation. The way of the same layer drainage can be used in the housing set, but the waterproof structure must be paid much attention. In the installation of bathroom and kitchen, the location and size of the pipe interface must be a good material with the manufacturer.

3) Cooperation of HVAC.

The indoor heating pipelines is arranged in the form of independent loop, the main vertical pipe heating system should not only be arranged in a public space, household control valve is also arranged in the public space of the vertical tube well, in order to facilitate future maintenance and management, in the heating, the surface radiation of low temperature hot water, and the water collector is divided to construct the ground cushion combination of relative rationalization layout. In the use of radiator heating, the distribution of the distribution of the radiator and

the direction of the pipeline must be rationalized. For the split type air conditioner, the bedroom and the living room should meet two conditions, first of all, the position of the air conditioning installation, which is in fact a pre-buried position. For the centralized fresh air system, the determination of all positions is very critical. We must pre-determine the layout of the air duct, the layout of the kitchen and toilet exhaust passage in the residence.

4) Coordination of electrical telecommunications.

When arranging the location of household distribution box, we should pay much attention to the dark mounted electrical equipment. We must ensure that the electrical equipment on both sides of the household wall is not connected. Prefabricated components not only need to consider the requirements of the internal assembly, but the locations of sockets, lamps and large interfaces have been determined. It is also necessary to consider the layout of the line and the building components in a comprehensive way. At the same time, the line pipe can play a protective role when laying the precast wall or the laminated plate in the dark. In order to install electrical switches, sockets, connecting pipes and other contents, we must make effective and reasonable present embedment in the corresponding position of precast wall. In addition, pipeline equipment is not what place can be buried on the interior wall and the exterior panels, lintels and anchorage zone etc. this area can not set the equipment pipeline.[8-9]

5. The Problems in the Research on the Waterproof of the Prefabricated Building Wall

Compared with traditional cast-in-place building, prefabricated building has no difference in design theory, but there are great differences in construction ideas. The prefabricated building can meet the requirements of the design to a certain extent. However, due to some other factors, there will be some problems in the practice of exterior wall waterproof.

1) The sealants commonly used in buildings are mainly SR sealants, PU sealants, MS sealants or SPU sealants. Sealants have different materials, so their performance indexes are different. However, due to the lack of current supporting standards and constraints, in practical engineering, there are many phenomena of sealants used when sealant is used in PC outer wall joints. It can be briefly summarized by two words of non confusion.

2) Nowadays, the research of PC building exterior wall waterproofing mainly focuses on design and construction. So we neglect the study of matching sealing materials, and have no corresponding research and Analysis on its durability, late maintenance and replacement. Through the durability index as an example, analysis of the problem, according to China's construction industry situation, for reference many conventional products, need analysis and evaluation standard, to a certain extent, not only the lack of PC wall plate features durability test, lack of artificial aging test method.

3) Sealant has different properties because of its own materials. Therefore, the size, depth and bonding properties of sealants will have a direct impact on the waterproof function of PC building. However, for the detection of PC sealant wall construction quality field, detection techniques, lack of professional technology, lead to the detection and on-site inspection of prefabricated building external wall waterproofing work, the use of human observation and measurement of the stage, its the inevitable uncertainty set.

References

[1] Fenghe Mi, Dawang Geng. Prefabricated construction technology[J]. Waterproof Construction Engineering Technology and Design, 2016(21):2994. (in Chinese)

[2] Shengli Lv. Research on waterproof technology of exterior wall of precast assembled concrete building[J]. Fujian Construction Technology, 2017(3):69-73. (in Chinese)

[3] Tao Ling. Assembly type construction waterproof and sealing technology[J]. Chinese Architectural Waterproof, 2016(5): 30-33,41. (in Chinese)

[4] Mingli Zhu. Assembly type building waterproof seal technology[J]. Urban Construction Theory Study (Electronic Edition), 2016(16). (in Chinese)

[5] Tianliang Li. Quality control of construction quality control of prefabricated building exterior wall waterproof joint[J]. Construction Engineering and Design, 2016(19):1922. (in Chinese)

[6] Kai Deng, Guoliang Zhu. Waterproof design and node structure treatment of an assembled building exterior wall[J]. Chinese Building Waterproof, 2016(24):15-17. (in Chinese)

[7] Xia Yang, Xiaoliang Zhong. Prefabricated exterior waterproof sealing status and existing problems[J]. Chinese Waterproof Construction, 2016(12):16-18. (in Chinese)

[8] Hong Zhu. Prefabricated assembly (PC) waterproof and seal design and material selection for exterior wall of building[J]. Waterproofing of China, 2016(06):26-29. (in Chinese)

[9] Zhe Zhang. Prefabricated building exterior wall waterproof construction and construction key points[J]. Construction, 2015(04):120-121. (in Chinese)

Design and Implementation of Police Mobile GIS Command System

Chao Wang
Wenzhou Institute of Surveying and Mapping, Wenzhou, Zhejiang, 325000, China

Abstract: The current situation and demand of police management based on geographic information, networking, cloud computing, webService, arcgisServer and Wencheng public security, put forward the general idea to build a set of mobile police office system, and discusses the SOA architecture, data integration, data mining, data storage and visualization of mobile Internet the key content of the final completion of a complete set of police mobile command system GIS.

Keywords: GIS geographic information; Internet of things; Sky map; Mobile office

Corresponding Author: Wang Chao (1983-), male, national registered surveyor, mainly engaged in surveying and mapping geographic information related work. Email, 122353122@qq.com.

1. Introduction

With the deployment of police geographic information system (PGIS), various demonstration applications based on PGIS are running on the line, and the GIS based police information construction is playing an increasingly important role.[1] The public security police command in Wencheng deployment, the police through the intercom and command center communication and confirmation, so the command center to understand the distribution of police dispatcher, but when there is an emergency command center, police personnel according to the distribution of knowledge, experience from the incident to the nearest police resources, and scheduling. This method has certain scheduling delay and uncertainty, and requires the dispatcher to have a deep understanding of the local terrain conditions, high requirements for personnel. When it is necessary to command and arrange multi police containment, it is a great test for the commanders. Therefore, it is urgent to study and construct a police command system based on mobile GIS, which can help command center spatial visualization to understand the distribution of real-time police force, and provide space analysis assistance for dispatching command.[2]

2. Architecture Design

2.1 Architecture Design

The project to the information infrastructure to support geographic information resources as the basis, the comprehensive use of computer technology, communication technology, GIS technology, data integration technology, the technical architecture of unified, the police data and geographic information resources organically, realizes

the online geographic information convenient, efficient and secure sharing service. Through the level of division was decomposed into several logical platform, reduce the implementation complexity, three-dimensional network structure characteristics of the whole structure presents a longitudinal multi-level, transverse grid, support layer, data layer, service layer, application layer, platform layer five parts of front-end users through hardware and software construction, realize integrated the application of integrated service management, geographic information data and thematic data such as police information of multivariate data. The system is divided into the following layers:

1) Hardware support layer: software and hardware support layer is the main platform running support, including database server, application server, network equipment, operating system software and other facilities for Wencheng County Public Security Bureau police electronic map based on the construction of police command system of mobile GIS to provide hardware and software support. The hardware equipment needed for this project mainly comes from the software and hardware purchased by Wenzhou public security PGIS platform. Including ArcgisServer basic GIS platform, Skyline three dimensional service platform, Oracle database software, etc.

2) Data layer: data layer is the main function layer of storage and management of data, responsible for data storage logic rules, data reading and writing, data backup and other functions. It includes database software, data processing program and database. The database includes spatial database and police integrated information database. Spatial database includes: map database, place name address, road network database, 3D scene database. Police comprehensive information resource database includes: the police information database, the deployment of police information database, light engineering database.

3) Service layer: service layer connection data and applications, will provide data to users in the form of services, all data access and processing logic is encapsulated into a service, make use of data more secure and convenient, efficient sharing. Including 2D map service, image map service, dynamic thematic map service, address matching service, spatial query and spatial analysis service, service, service, service three emergency police information etc.

4) Application layer: the application layer is the interface for users to provide various business functions and interaction, the service layer provides various services package provides users with friendly interface function, for user interaction. Including map browsing, map switching function and address query function, path analysis function, police information query and display function, the deployment of police function, online collection function, emergency function etc.

5) Front-End user layer: this project front-end users can use PC end and mobile end of these two kinds of hardware to view and use the system. PC can use any public security network machine, through the browser to visit the city public security PGIS platform, browse the data results of the project construction. Mobile police use standard communication equipment, connected through public security network security client in the PSTROE platform to download and install Wencheng police command system, you can log in using.

2.2 Network Architecture

Network architecture will mainly use public security private network, mobile terminal network using Telecom or mobile network operators VPN services and servers to connect, to form a reliable communication between internal and external network equipment. The police command system is deployed in the hardware server provided by the City Public Security Bureau, and uses the same computer room environment as the original PGIS server and PSTORE platform to ensure the normal and stable operation of the system. Project procurement server equipment is mainly used for emergency command system Wencheng deployment, through various departments linkage intranet docking emergency linkage.

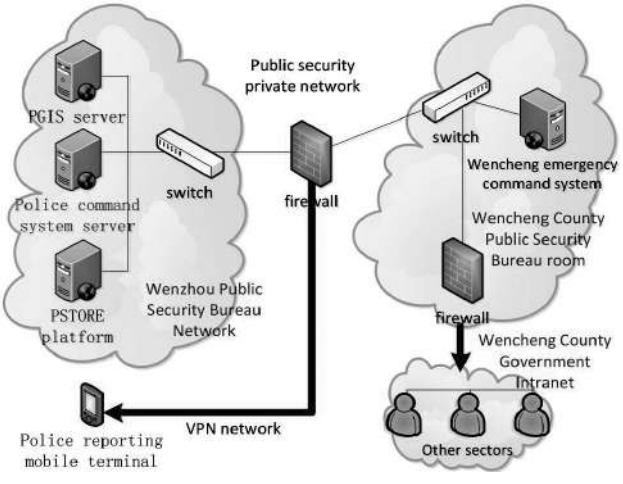

Figure 1. Network architecture diagram

3. Function Design

3.1 Police Online

In the map, the location of the online police officers is

displayed in the form of dots and icons, and the basic information of the online police officers can be viewed. You can also query the police at the query interface, and get the police information and locate it on the map.

3.2 Police Cars Online

Show the position of the online police car on the map, and view the basic information of the online police car. Provide vehicle query function, according to the keywords query police car, access to police car information and positioning on the map. It can be used to understand the position of the police car in real time, and provide the basis for the reasonable call of the police car.

3.3 Sentry Box Online

In the map according to a variety of box categories, classified display box position distribution, and can view the basic information of the box. Provide post query function for the user, according to the keyword search box, get information booth and locate on the map, so that the user can understand the real-time online public security status, provide the means for the public security lights project inspector.

3.4 Electronic Monitoring Display

The position distribution of the electronic monitoring equipment is displayed on the map, and the basic information of the electronic monitoring equipment can be viewed. Provide electronic monitoring query according to the keyword query function, electronic monitoring, electronic monitoring and positioning to obtain information on the map, based on the map, quickly find a point near the electronic monitoring equipment, to provide help for the rapid and accurate monitoring of video call.

3.5 Position Service

In the map to display their geographical location, and as a location information transmitted to the background command center, so that the auxiliary decision-making system can update the police position in real time, and shared to other police officers.

3.6 Place Name Address Service

We can query the address database according to the keyword, and locate the result of the query on the map. We can also query the nearest address description of the location according to the location selected on the map.

3.7 Path Planning

According to the two points on the map, the road path planning between two points is analyzed to find the path between two points, and show them on the map, at the same time express the starting point to the end of the path of travel.

3.8 Deployment of Police Force Command

Provide the police command function deployment in the mobile terminal, the deployment of police officers, police and other police checkpoints, facilities in the key position, set up patrol path, set the alarm range, the deployment of participants can see the specific circumstances of the deployment, and arrive at their posts according to the requirements. Deployment personnel can view all kinds of deployment through mobile phone, and adjust.

3.9 Emergency Plan Management

Plotting the emergency plan based on electronic map generation, aid distribution, rescue personnel evacuation routes, route plan, to prepare for the event of an emergency, can quickly call the emergency plan, the formation of a scientific and reasonable rapid decision-making.

3.10 Online Data Acquisition

On the map quickly and manually drawing point line area, mobile acquisition roads, residential, points of interest and other data can be saved offline, online upload space database, realize the dynamic updating of spatial data.

4. Concluding Remarks

The goal of this project is to build a set of internal and external cooperation of police command system combined with mobile GIS technology.[3,4] In Wencheng County topographic map data, image data, refinement of the road and cell data under the support of the PGIS platform and PSTORE platform mobile terminal security construction of two development based on providing public security intelligence data (Wencheng police officers, police cars, lights, booth, electronic monitoring) space display solutions. And value-added services, auxiliary police to quickly manage scheduling and deployment of police resources, serving the people.

References

[1] Deren Li, Zequn Guan. Integration and implementation ofspatial information systems[M]. Wuhan University of Surveying and Mapping Press, 2000. (in Chinese)

[2] Guang Liu, Jingwen Ceng, Qingfeng Zeng. WebGIS principle and application development[M]. Tsinghua University press, 2016. (in Chinese)

[3] Libo Yao, Renli Wang. GIS data management based on Oracle Spatial spatial database[J]. Mapping and Geospatial Information, 2006,29(2):81-83. (in Chinese)

[4] Gang Zhang, Yingjuan Shang. Spatial data organization and management based on[J]. ArcSDE Research and Development, 2007(9):58-65. (in Chinese)

Research on Cross-Regional Urban Development Under the Integration Strategy

Chunyan Liang[1] Chao Cui[2]

1. Jinan City Planning and Design Institute, Jinan, Shandong, 250101, China

2. Shandong Provincial Capital Town Planning and Design Research Institute, Jinan, Shandong, 250013, China

Abstract: Cross-Regional city construction is not only the inevitable trend of urbanization development in China. It is also an important way to improve the comprehensive competitive power of urban economy. Starting from the current situation of cross-regional city development, this paper puts forward the strategy of cross regional urban integration development, and probes into the implementation measures of integrative development, mainly in the integration of development planning, infrastructure, regional market, ecological construction and public service, and analyzes the significance of the development of trans-regional urban integration. In order to promote the coordinated development mechanism of cross-regional cities and strengthen the international competitiveness of China's urban agglomeration.

Keywords: Integration; Trans-Regional; Coordination

Corresponding Author: Chunyan Liang, 330829591@qq.com

1. Introduction

In the context of economic globalization, urban agglomeration "city belt" has become the basic form of urbanization and the main carrier of regional development, and also becomes the main form of competition between countries.[1] The 18 session plenary the deployment of a new type of urbanization road with Chinese characteristics and a sound urbanization system, emphasizing the "establishment and improvement of the coordination mechanism for urban development across regions". "National New Town Planning (2014-2020)" Proposed, "take the urban agglomeration as the main form, promote the coordinated development of large and medium-sized cities and small towns, take the urban agglomeration as the main platform, promote the Interregional industrial division of labor, Infrastructure, environmental governance and other coordinated linkage." The rise of globalization, regionalization and the concept of urban-rural integration has promoted the importance of integration in social and economic activities. The city is the bearing of the comprehensive competitiveness of the region and the country, the acceleration of the urban development process, the gap between the big and small cities, the city and the countryside, the new social contradictions, and the dual structure of urban and rural areas. The idea of urban-rural integration came into being, the party's 16 major proposed, overall urban and rural development, 17 clearly stressed its importance.

Under the guidance of the integration strategy, we should establish and perfect the coordinated mechanism of the cross-regional urban development, deepen the understanding of the characteristics and laws of the trans-regional city development, and create a new pattern for the coordinated development of the cross-regional region.

2. China's Cross-Regional Urban Development Status Quo

With the acceleration of regional economic integration, regional economic cooperation and joint response to domestic and foreign competition are increasingly urgent. In this situation, China's coordinated development of cross-regional cities has entered a new stage, with the central city as the core of the cross-regional economic network has been established, the Yangtze river delta, the pearl river delta, Beijing, Tianjin and Hebei three growth pole economic development quality continues to improve, Chengdu and Chongqing city group, the Yangtze river middle reaches of the city group, the central plains city group and other new regional growth pole is also accelerating the formation of.[2] At the same time of coordinated development of trans-regional cities, there are still a series of problems.

2.1 Unbalanced Development, Economic Center and Economic Hinterland Polarization is Serious

The core cities have weak links with the surrounding areas. In the development of urban and rural human resources, education development level, urban and rural infrastructure construction and other aspects of the gap is bigger. The economic development of the core cities failed to promote the prosperity of the whole Beijing--Tianjin--Hebei region. The increase of regional gap, so that the economic backward areas not only low personal income, people 's living difficulties, but also the development of urban construction, infrastructure and infrastructure and basic industries, such as the serious shortage of funds, and further exacerbated the imbalance of development, so that the economic development of backward areas into a vicious circle in Sichuan. Take Beijing--Tianjin--Hebei economic circle as an example, in 2012, the per capita GDP of Beijing and Tianjin were more than $ 13,000, the total economic volume of the two cities accounted for more than 50% of the whole region, Hebei province, as the economic hinterland, in addition to Tangshan city reached $ 12,000, the rest of the per capita GDP is below $ 7,000, compared with the central city, the economic hinterland development is significantly backward.[3]

2.2 Repeated Construction of Infrastructure, Serious Source Waste

The density of the Yangtze river delta airport is 0.8 per 10,000 square kilometers on average, exceeding the level of 0.6 per 10,000 square kilometers in the United States, but a new round of "airport construction war" is still underway in the region, and some cities are still building new airports.[4] With the increase of inter-city and inter-provincial fast traffic such as the Yangtze river delta highway, the "city--in --city effect" between Shanghai and the surrounding cities is becoming more and more obvious, and large-scale planning and construction of the airport will inevitably bring huge market risks. In addition, many areas in transportation, communications, information and other basic industries in the development of the lack of effective coordination and overall planning, in environmental protection, tourism and other aspects of the lack of overall consideration. Due to the structural convergence and repeated construction, the advantages of the regional economy are not complementary, and the scale effect of the regional economy and the comparative advantages between different regions and departments in the region are not exerted. Due to the lack of scale management, to a certain extent, affects the cultivation and development of the growth pole in the region, and further affects the" polarization" and "diffusion" effect.

2.3 Cooperation Mechanism Construction Lags Behind, the Lack of System Security

At present, the cooperation mechanism is mainly dialogue coordination, lack of institutionalization, legalization, cooperation in the common mechanism instability, organizational form is not systematic, strategic planning is not unified phenomenon, cross-regional cooperation also lack of perfect regional competition system, strict organizational structure and a solid micro -foundation.

3 Integrated Guidance of Cross-Regional Urban Development Strategy

3.1 Integration of Development Planning

Strengthen the leading role of planning leaders, highlighting the integrity and forward-looking, breaking the administrative division limits, promote the development of trans regional cities.

1) Improve the regional planning system.

Preparation of cross regional urban master plan, improve

the structure of urban scale, optimize the integration of large cities, focus on the development of large cities and mega cities, promote small and medium-sized cities, accelerate the development of small rural towns. Clear urban functional structure and industrial division of labor, urban and rural coordinated development, increase poverty alleviation efforts. Preparation of regional transportation, industrial development, land use, information technology, water conservancy, environmental protection and other special planning, the impact of promoting the planning area of resource development, urban integration, market development, environmental governance, important infrastructure facilities, public service facilities sharing.[5] Improve the regional urban system planning, clear focus on urban functions, scale and spatial layout. To determine the key to ensure the development of land, to guide urban development, industrial development, population distribution and construction land, ecological land coordination.[7]

2) Establish a coordinated development mechanism.

In-Depth implementation of the overall national regional development strategy and the province's key regional drive strategy, accelerate the construction of regional exchange and cooperation platform, promote the establishment of flexible and diverse exchange and consultation mechanism, build win-win cooperation and competition mechanism and complementary advantages of industrial integration mechanism. Scientifically and reasonably determine the function orientation, spatial layout, development priorities, improve policy measures, and further enhance the overall force.

3) Strict planning to promote the implementation.

Strengthen the authority, guidance and binding of the planning, clear planning and implementation steps and phased tasks, around the construction project, regional transportation, water system construction, environmental governance and other key areas, scientific development plan, accelerate the start of key construction projects. Give full play to the role of legal supervision, public opinion supervision and public supervision, to ensure the effectiveness of the implementation of the plan.[6]

3.2 Integration of Infrastructure

Infrastructure as the carrier of regional economic development, is an important content of regional integration, the development of trans regional cities, there must be a highly developed and coordinated infrastructure network, to speed up the airport, highway, railway, waterway, port, information, energy and other infrastructure construction, but also to speed up the traffic and information network management system reform, explore the coordinated development of regional infrastructure.

Improve the comprehensive transportation system, improve the integrated information network. Actively develop the big data industry, establish and improve the basic, application and public database, strengthen information resources collection and processing and integration; improve energy security capacity; to strengthen the construction of water conservancy facilities, planning and construction of regional unified water network system, the construction of centralized water supply projects, and effectively solve the problem of rural drinking water safety.[8]

3.3 Regional Market Integration

Improve the efficiency of resource allocation, break the conditions and regional blockade, promote the free flow of goods and all kinds of elements.

1) The establishment of local government coordination system.

There is a need for consensus among governments to establish a multi-level administrative coordination mechanism to reduce trade walls. Determine the implementation of specific tasks in the field of cooperation, the signing of bilateral or multilateral agreements, etc. At the same time, the establishment of professional cooperation working group, the specific development and implementation of cooperation plans in all relevant fields.

2) Improve the common market system.

Integration of cross regional urban development policies, improve the common market of the city circle, strengthen administrative coordination Jie Shang. For example, in investment promotion and capital introduction, land lease, foreign trade and export, talent flow, technology development, information sharing and other aspects to jointly develop a unified policy, and strive to create a city circle integration without differences in the policy environment, the thorough removal of market barriers, for enterprises to participate in market competition to provide a fair, just and open policy environment, the construction of a common property rights trading market, commercial logistics market, financial capital market, science and technology.

3.4 Integration of Ecological Construction

With "governance as the foundation, protection as auxiliary, construction as the main", jointly formulate envi-

ronmental protection policies, common governance and protection of the ecological environment, protect the "green space" in the same urbanization area. On this basis, the ecological landscape of small cities across regions is adjusted to shape the regional ecological security pattern.

Strengthen environmental governance to promote ecological construction, promote cleaner production, accelerate the elimination of backward production capacity. Establish an integrated platform for joint environmental supervision and promote the integration of urban and rural sanitation. Improve the farmland protection system, water resources management system, environmental protection system, improve the responsibility system for environmental protection and environmental damage compensation system. The development of low-carbon economy, the construction of green ecological city, improve the level of landscape greening, maintenance of farmland protection areas, farmland forest network and other green open space.

3.5 Integration of Public Services

To co-ordinate the construction of social undertakings and public service facilities, strengthen the regional security capacity of important people's livelihood facilities, and promote the equalization of regional basic public services.

1) Promote the sharing of science, education, culture and health resources.

Support institutions of higher learning in the region to strengthen joint construction, collaborative exchanges, promote the sharing of teachers, libraries, laboratories. Support the development of high-quality primary and secondary schools across the city, promote cooperative running schools, joint running schools and strong and weak schools to help counterparts. Strengthen the construction of disease prevention and control system, the formation of core cities as the center, covering the surrounding cities of the medical and health and epidemic prevention system.

2) Establish a unified public employment service system.

The implementation of employment priority strategy and more active employment policy, improve the employment of public service capacity, promote the realization of higher quality employment. Cultivate talent intermediary institutions, and gradually form a policy coordination, system convergence, service penetration, resource sharing, consistent interests of talent development mechanism.

3) Promote the equalization of urban and rural basic public services.

Public services can promote the free flow of elements, balance the cross regional urban market of public services including compulsory education system, social security system, public health system, public revenue and public expenditure system, public infrastructure system, social cooperation system, etc., improve the per capita access to service facilities, per capita disposable income, per capita financial income, reduce the income gap between rural and urban residents.

4. Conclusion

Integration development is the inevitable trend of trans-regional urban development. Is an important part of China's regional economic development strategy. Under the background of global economic integration and regional economic integration, taking the road of regional joint and coordinated development has become an inevitable choice for any place to achieve sustained economic growth.

References

[1] Mei Qiu. Research on the development of small and medium-sized cities with urbanization--taking kaiqing district of Liaoning province as an example, master 's thesis of Northeast Normal University, 2013. (in Chinese)

[2] Huali Cheng. China urban transformation research.[M] People 's Publishing House, 2013. (in Chinese)

[3] Jing Guo, Ping Zhou. Changes and development of international regional economic integration in post-crisis era[J]. Northern Economic and Trade, 2013. (in Chinese)

[4] Juan Li. Wuhan city circle economic integration research, PhD thesis of southwest university of finance and economics, 2013. (in Chinese)

[5] Hongyu Li, Shuisheng Dong, Jianxiong Wu. Research on the sustainable development planning of Beijing Tianjin Hebei economic circle. China Conference, 2009 China Langfang regional economic development based research on Beijing Tianjin corridor integration: Proceedings of Langfang Academic Conference on economic development and Beijing Tianjin corridor economic integration. (in Chinese)

[6] Bin Ma. The integration of the Yangtze River Delta and the construction of the cooperation mechanism of regional government[J]. Economy Frontier, 2004. (in Chinese)

[7] Lihong Wang. Research on the construction of small towns based on urban and rural co-ordination--a case study of Qingzhou[D]. 2011. (in Chinese)

[8] Chao Zhang. Multi-city spatial combination theory review[J]. Urban Issues, 2009(7). (in Chinese)

Discussion on Electrical Design of Passive Residential Building

Bin Shu Erbao Li Xianji Meng
Baoding Building Design Institute Co., Ltd., Baoding, Hebei, 071000, China

Abstract: As the national buildings in each climate zone and passive low energy consumption building demonstration projects expand, there has been a wave of innovation across the construction industry. China is also becoming a hot zone for energy-efficient and high-performance passive buildings. Along with the traditional passive building structure, steel structure passive construction, assembled PC structure passive construction such as the emergence of various types of passive construction, as well as a variety of new building materials, doors and Windows, and air conditioning air equipment, put forward a new challenge for building electrical engineering design personnel and requirements.

Keywords: Passive; Low energy consumption; Residential building; Electrical design

Corresponding Author: Bin Shu, 396699936@qq.com

1. Overview of Passive Architecture

Passive House, also known as passive low-energy building, passive house, etc., is a new concept of energy saving building, which refers to the construction design of the building itself, can achieve the comfortable indoor temperature and meet the demands of winter and warm summer, a building that needs to be installed separately from the heating facility and does not require "active" energy. At the same time, it is an important way to solve the winter haze and southern winter adoption in the north.[1]

The concept of passive houses includes the use of various energy saving technologies to construct the optimal building envelope, which greatly improves the insulation performance and air tightness of the insulation, minimizing heat transfer loss; by means of technical means, the indoor and comfortable thermal environment and lighting environment can be achieved. It minimizes dependence on active heating and cooling systems, such as making full use of indoor life energy and renewable energy, to achieve a comfortable living environment, so as to greatly reduce the energy consumption at a time.

2. Importance of Passive Building Electrical Design

According to the definition of passive building, the key of passive architecture is "heat preservation, air tightness, thermal protection and ventilation design". The electrical system has limited role. Building electrical systems of all kinds of lighting, socket, weak current, fire pipeline are complex, only electrical system fits the passive buildings, air tightness and heat insulating "stays bridge" requirement, which can supplement each other with other systems and finally realize the functions of the passive construction.

In addition, with the improvement of the integration degree of the building electrical system, the passive building has the effect of achieving high efficiency and energy saving. Other than ordinary buildings, it adopts more micro photovoltaic (pv) grid technology, intelligent home control system, energy-saving doors and windows system, intelligent shading systems, photovoltaic power generation system, optical lighting system, LED energy-saving lamps and other new technology and products, and the ground source heat pump system related to the electrical control system, solar water heating system, PM2.5 air purification system, air system, the central dust collection system, drainage system, rain water collection recycling system, water purification processing system and other new technology, increasing the importance of passive building electrical system design work.

In a word, in the design of passive building, completing the relevant design work of each electrical part can realize the low-carbon energy saving of passive buildings and improve the comfort of living environment.[2]

3. Key Points of Passive Building Electrical Design

3.1 Air Tightness of Passive Construction Electrical Pipelines

The performance of building gas is very important to re-

alize ultra-low energy consumption of passive buildings. Good air tightness can reduce the amount of infiltration in winter and cooling demand caused by uncontrolled ventilation in summer, avoid moisture intrusion, the damage, mold, and condensation of building, reduce the noise and air pollution outdoor adverse factors on the influence of the indoor environment, and improve the quality of life of the residents.

The air tightness of the electrical pipeline is the most important part of the passive building electrical design work, which is an important part of the overall air tightness of the passive building.

Reference in the design of a certain community is located in Hebei province to the atlas of J16J156--Passive and Low Energy Consumption Residential Building Energy-Saving Construction, the first cold area of passive guidance atlas, is also the first "passive architecture" album.

The passive ultra-low power consumption guidelines for the green building techniques proposed the concept of air barrier, a certain community adopts double air barrier structure, surrounding the entire envelope outside air barrier, making overall realize airtight construction; the inner airtight layer is the object of a single set of residential buildings, and each house is self-formed.

When the electrical design, the basement electric casing should adopt waterproof and thermal bridge construction when wearing the outer wall; the pipeline should adopt thermal bridge and air tightness method when entering the internal distribution box and terminal box; when the inner tube is not through the airtight layer, the two ends of the pipe are blocked.

3.2 Electronic Control Design of High Energy New Wind System

When the passive building demands air tightness reaches the extreme, the new wind system is indispensable in passive energy saving buildings.

The new wind system can provide enough fresh air for the indoor air to breathe fresh and clean. At the same time, the new wind system also reduces the content of various harmful substances indoors, which also produces the effect of purifying the air to a great extent.

The new wind system is not available in ordinary residential buildings, and the electrical design should pay special attention to the following two points:

1) The collision of piping and electrical pipelines of the new wind system.

At present, the passive building new wind system pipe has the roof lifting and the floor of the two kinds of ways, the domestic use of the roof lifting and fitting the ceiling. The electrical design should understand the position of the air duct, especially the position of the duct through the hole of the wall, avoiding the collision between the inner pipe and the wind pipe. Avoid the internal distribution box in the bottom of the duct, so as not to cross the pipe from the distribution box to the ceiling. The problem is obvious in the loft residence.

2) New intelligent control system of the fan.

The intelligent control system of the new fan is composed of the main engine and the detection module.

The main engine is used to set indoor ideal air condition (temperature, humidity, carbon dioxide concentration, PM2.5 concentration, etc.), monitor system operation, ring failure alarm, which is commonly located in porch, sitting room and other public area convenient operation place.

Detection module is located in the independent space of bedroom, sitting room, study, kitchen, toilet, for independent detection and independent adjustment of the air state of each space. In order to ensure the accuracy of the detection, the detection module should be kept away from the air supply port and should be close to the return air port installation.

3.3 Design of Indoor Gas Leakage Linkage

When the passive building demands high performance air tightness, it also increases the damage caused by gas leakage, and it is easier to reach the lower limit of gas explosion. Therefore, in according with the specification for design of automatic fire alarm system design of passive building fire automatic alarm system at the same time, the passive construction shall link gas emergency shut-off valve automatically, and appropriate link open exhaust ventilation equipment. Unfortunately, "Certain Community" project fresh air ventilation devices chosen by Party A do not support the fire linkage, custom exhaust fan can't meet the requirements of air tightness, so this project can realize linkage function of ventilated take a breath.

3.4 Linkage Design of the Lampblack Machine

Passive building high-performance air tightness causes inside the kitchen smoke lampblack machine opens, unable to form fill enough natural wind, smoke lampblack machine operation but reach the purpose of effective smoke lampblack to outdoor. Therefore, in the passive residential building design, the hvacr will set up a special air inlet for the external wall, and the exhaust shaft shall be designed for special exhaust vents. The air inlet and outlet

are equipped with the air valve to meet the requirements of the airtight, and the air inlet and exhaust air valves are simultaneously opened and closed with the lampblack machine.

In order to achieve the above functions, it requires that a lampblack machine can output the start-stop signal, but this kind of equipment may need to be customized specially since there is no such type of lampblack machine in the market. Special customization can be realized only when Party A is responsible for the unified purchase of equipment, it is not operable for the different users.

In the design of "Certain Community", a single-link switch is adopted to control the inlet valve and the start-stop of the exhaust valve. When the smoke engine starts to stop, the air valve can be opened manually. In order to prevent the residents from forgetting to open the air valve, the switch is in the obvious position close to the lampblack machine; to prevent users from forgetting to close the air valve, the switch uses a indicator light switch. However, this method can't solve the problem of synchronous start-stop and switch wind valve.

There is also a way, it is to use switch socket by smoke lampblack machine, the power of the wind valve to connect the fastening bolt hole of the outlet of lampblack machine. The opening and stop of the wind valve and the lampblack machine are controlled by the switch in the socket. It can be perfect to realize the wind valve and the smoke and smoke machine synchronously to stop, it doesn't need to custom to smoke lampblack machine.[3] However, in order to avoid smoke lampblack machine shut down the wind valve is not closed, requirements users smoke lampblack machine to give up smoke lampblack machine used to own switch button, only use the switch on the socket and the socket installation height and wind valve connection has asked, still not perfect to solve the problem.

Therefore, "Certain Community" does not solve this problem perfectly, it merely adopted the way Party A approved of, and I welcome your better recommended ways to solve this.

3.5 Control of the New Wind System

As mentioned earlier, the passive residential building has a new air system. The new fan is equipped with air inlet valve, exhaust valve, return air valve and other signal points, each room and other independent space have the detection module, the ventilation valve each signal point, the public area has the control host one. A two-bedroom passive house, the signal point generally has about 12; a three-bedroom passive house, the signal point generally has 16.

In the project of "Certain Community", according to the products selected by Party A, the new fan adopts the analog signal, which requires the new fan to use the radioactive wiring method at various signal points. When considering the partial pipeline voltage, the function is the same, and the mutual interference can be co-managed, the output line of the new fan to each signal point still has 9 to 11. These pipelines are not available in the general residential design, and new requirements are put forward for the pipeline laying in the design and construction. At the same time, the structure strength of the floor slab and the thickness of the floor are higher.

With the development of the passive construction industry, the equipment manufacturers can develop the bus control system to reduce the consumption of pipes and wires, and reduce the cost of construction and construction.

4. Conclusion

At present, the industrial chain of passive building is not perfect, at least the construction equipment manufacturing and the use link need to be further improved. It is believed that with the continuous development of passive construction industry in China, the emergence of new materials, equipment and technologies will be solved perfectly.

The passive residential building electrical system, as a ring of the overall effect of passive building, has a significant impact on the energy saving and residential comfort of passive buildings. As designers, therefore, we should constantly improve the level of passive building electrical design, keep learning and master the cutting-edge technologies, promoting adjustments of architectural design, making it more in line with design requirements of "safe, reliable, advanced technology, reasonable and economical, low carbon environmental protection", which is our work and responsibility.

References

[1] Energy-saving design standards for passive low-energy residential buildings. DB13[J]. T177-2015 (in Chinese)

[2] Passive ultra-low-energy green building technology guide (Trial). 2015 edition (in Chinese)

[3] Management method for evaluation and identification of passive ultra-low-energy buildings (Interim). 2016 edition (in Chinese)

The Simulation Analysis of Long-Span Membrane Structure

Zhongcheng Wang Yunpeng Ma
School of Aeronautic Science and Engineering, Beihang University, Beijing, 100871, China

Abstract: The analysis of wind load characteristics of gas-ribbed film structure plays an important role in the performance of the long-span membrane structure. This paper mainly researches on the long-span rib membrane structure. Surface wind pressure of the membrane structure is calculated by fluent, the distribution of force and surface pressure of the membrane structure under different angles and wind speeds is obtained. The worst working condition of the wind approach angle is 60°. Maximum force angle is positively correlated with windward angle and the length of structure.

Keywords: Long-Span; Simulation; CFD; Surface pressure; Windward angle

Corresponding Author: Zhongcheng Wang, Email:loywang@163. com

1.Introduction

Inflatable membrane structure include gas-bearing structure and air-ribbed structure. The inflatable structure has the advantages of short molding time, low construction cost and light structure weight, which has been gradually attracted worldwide attention in recent years.[1-4] The U.S. military has developed various inflatable hangars, which have im-proved the aircraft attendance rate and reduced the cost of the aircraft's whole-life maintenance costs. The long-span inflatable structure is greatly affected by wind load, many accidents occurredunder the influence of typhoons. This paper presents a simula-tion analysis of the long-span gas-rib membrane structure. The modeling and simulation is carried out in different windward angles and wind speeds, and the worst condition is carried out, this simulation can help provide helpful reference for the construction of membrane structure.

2. CFD Modeling

In this paper, the wind load characteristics of long-span gas-ribbed film are analyzed by means of CFD.

The model is established every ten degrees from 0° to 90°, model coordinates are shown in Figure 1.

Theturbulence model adopts k-ωSST model, the boundary condition are shown in Table 1.

Table 1. The boundary condition

Name	Boundary type
inlet	velocity-inlet
outlet	pressure-oulet
inwall	wall
outwall	wall

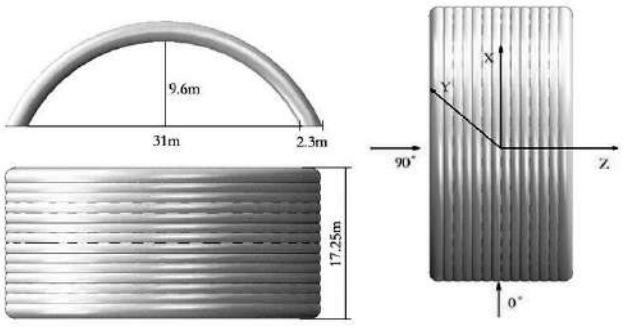

Figure 1. Initial model of CFD calculation

3. Simulation Results

The distribution of wind pressure under different angles and wind speeds of the same model is calculated respectively, wind speed increased from 5 meters per second to 25 meters per second， with a spacing of 5 meters per second.

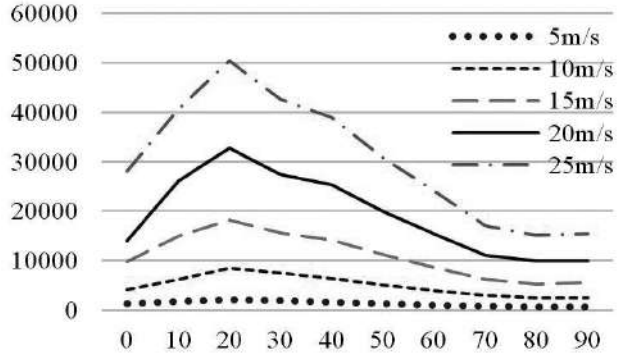

Figure 2. Drag force of X direction under different angles and wind speeds

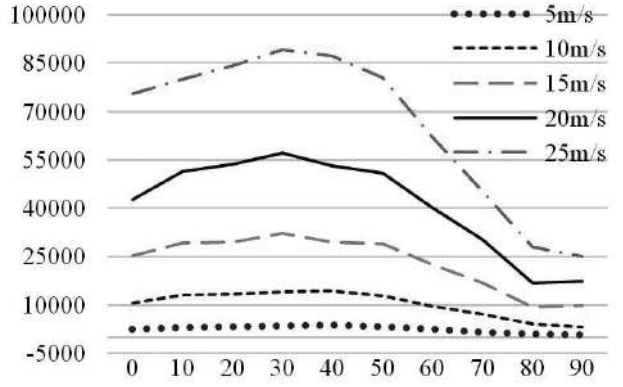

Figure 3. Lift force of Y direction under different angles and wind speeds

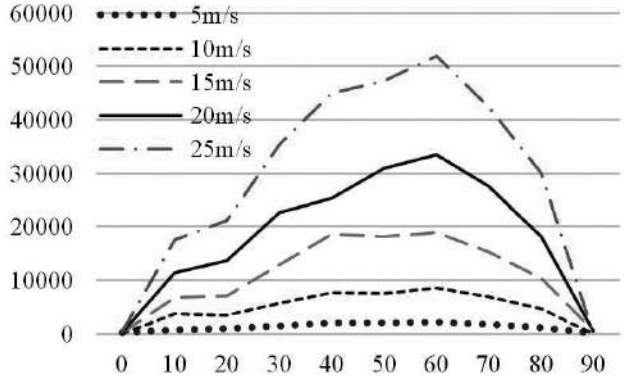

Figure 4. Drag force of Z direction under different angles and wind speeds

The angle of maximum drag and lift force at the same wind speed is different in dif-ferent length-width ratio. Under the wind speed of 20 meter per second, the wind load of the same span ratio with different width models is shown in Figures below.

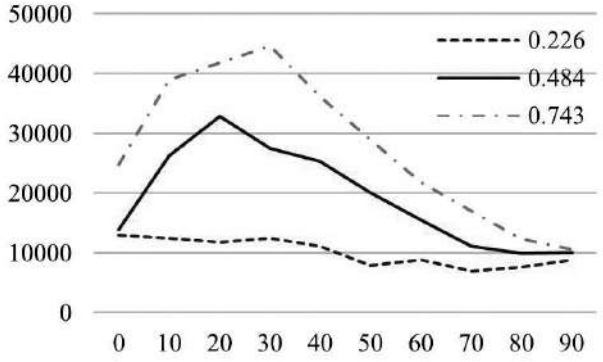

Figure 5. Drag force of X direction under different angles and length-width ratios

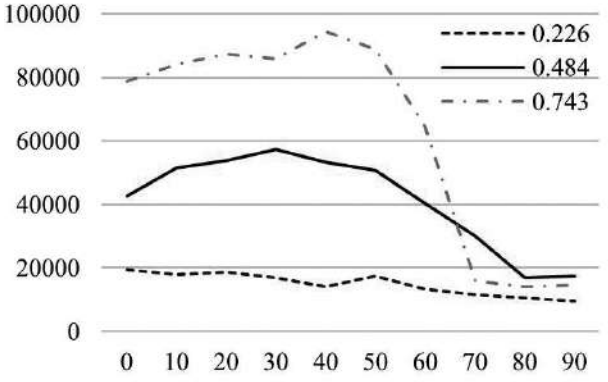

Figure 6. Lift force of Y direction under different angles and length-width ratios

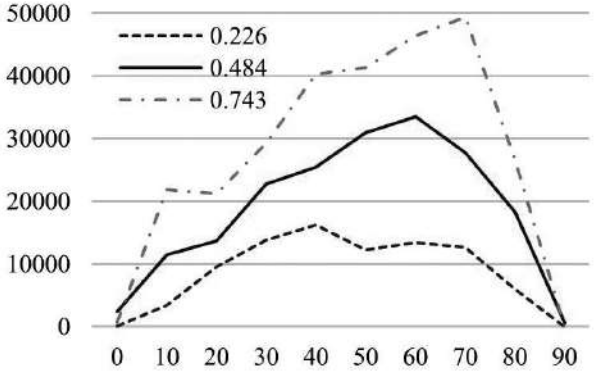

Figure 7. Drag force of Z direction under different angles and length-width ratio

4. Simulation Results Analysis

The wind load of the long-span arch film structure in-

cludes horizontal drag force and lift force, both the drag and the lift are influenced by the structure and wind direction.

4. 1 Effect of Windward Angle on Surface Wind Pressure

From the calculation above, wind direction has a great influence on the lift and drag. The length-width ratio of the initial model is 0. 484, drag force of X direction reaches maxi-mum in the angle of 20 degrees of different wind speeds in Figure 2, lift force of Y direc-tion reaches maximum in the angle of 30 degrees in Figure 3, and the drag force of Z di-rection reaches maximum in the angle of 60 degrees in Figure 4. Maximum force degree is not related to wind speed but to the wind direction according to the calculation.

4. 2 Effect of Length-Width Ratio on Surface Wind Pressure

The result indicates that length-width has a great influence on the surface wind pressure. Take the inlet wind speed as 20 m/s, Figures above show the influence of the length-width ratio. When the ratio is small, the worst working condition may be less af-fected by the windward angle as the Figures shows above, the changes of lift force and drag force in X direction is relatively smooth when the length-width ratio is 0. 226. As the ratio increases, the effect of wind load becomes more obvious.[5]

Figure 5 shows that the develop of the ratio increase the maximum angle of drag force in X direction, the same rule is shown in lift force and drag force in Z direction.

5. Conclusion

The air flow can pass through the membrane structure, with the increase of windward an-gle, drag force changes rapidly. The increase in lift force caused by wind angle changes is relatively small, however the drop is obvious after reached the maximum.[6-8]

The drag force of X to the drag of Z is approximately symmetrical. However the dis-tribution is different at 0°and 90°, because the force of Z direction is close to zero.

The worst working condition is 60 degrees in the wind direction. The air flows along the oblique, the outer of the windward side and the inner of the lee side are subjected to higher wind pressure, when the air bypassed the gas-rib structure, turbulence generated, thus the inner of the windward side and the outer of lee side are subjected the negative pressure.

In which the drag force reaches the maximum, while the lift force is relatively small, in this case, membrane structure is more likely to collapse.

In the case of equal wind speed, maximum force angle increase as the length-width ratio, however if the ratio is too small, the change is not so obvious, as the calculation shows.

References

[1] Yue Wu, QingshanYang, ShizhaoShen. The current status and prospects on analysis theory of membrane structures[Z]. Special Invitation Report of the 22nd National Structural Engineering Academic Conference. 2013. CSTAM2013-P28-E0012. (in Chinese)

[2] Xiaoying Sun, Yue Wu, shizhao Shen. A combined numerical approach for wind-structure interaction of membrane structure[J]. CHINA Civil Engineer Journal, 2010:31-35. (in Chinese)

[3] Gonghui Zhang, Zhihang Li, Zhihong Zhou. Air-Passage Structure Improving of Pneumatic Electromagnetic Valve Based on Flow Field Simulation withing Fluent[J]. Hydraulics Pneumatics & Seals, 2010:41-42. (in Chinese)

[4] Taibi He , Shuai Wang, Qipeng Yan, et al. Failure mechanism of civil mem-brane-structure architecture with gas rib[J]. Journal of Southwest Jiaotong University, 2016:714-720. (in Chinese)

[5] Xihu Jiang, Buying Xie, Huijin Chen. Satic and dynamic non-linear finite element analysis of air-supported membrane structure by ANSYS[J]. Structural Engineers, 2006:38-42. (in Chinese)

[6] Yuanhong Feng, Wenkui Yang, Jigang Yin, et al. Experiment and analysis of the mechanical performance of air-inflated arch during inflating stage[J]. Spatial Structures, 2009:75-77. (in Chinese)

[7] Yongqiang Yang, Yunpeng Ma , Kang Lin, et al. An optimizing design method of large span inflatable structure based on genetic algorithm[J]. Journal of Harbin Institute of Technology, 2014:86-91. (in Chinese)

[8] Changguo Wang, Xingwen Du, Xiaodong He. Bending-Wrinkling behavior analysis for inflatable membrane boom[J]. Engineering Mechanics, 2009:210-215. (in Chi-nese)

Research and Application of Complete Set Technology of Green and Energy Saving Assembly Building

Yu Wu
Shanxi Yuchang Real Estate Development Co. Ltd, Taiyuan, Shanxi, 030024, China

Abstract: According to the survey, environmental pollution is serious in China. Air pollution and water pollution are all serious. Therefore, the state pays more and more attention to green environmental protection. The building design is a creative activity in all kinds of energy decreasing, green energy-saving concept becomes an important content of architectural design engineering, green energy-saving design technology with architectural style is the inevitable trend of the development of our country, but also people focus on the problem. This paper analyzes the green energy-saving assembly building, studies the characteristics of the green energy-saving assembly building, and makes a systematic analysis of the green energy-saving assembly technology.

Keywords: Green energy saving; Architectural design; Technical research

Corresponding Author: Yu Wu, 114499315@qq.com

1. Introduction

With the rapid growth of China's social economy, the speed of our major cities' planning is also developing. Therefore, the development space of the construction industry has also been greatly improved. The past buildings are not integrated into the green energy saving consciousness, so the material in the building often has the characteristics of high pollution and high energy consumption. In recent years, the state has paid more and more attention to the environmental protection problem. Under the guidance of Scientific Outlook on Development, new type of environmental protection materials have been used in the building. Nowadays, scientific and rational construction management, building decoration, decoration and other aspects of energy saving and environmental protection design work have been carried out orderly. The environmental problems have been improved, but also promoted the development and progress of building environmental protection and energy saving design.

2. A Brief Introduction of Green and Energy-Saving Assembly Architecture

Since the twentieth Century, people began to study assembly structures until they were used in 1960s. The assembly architecture has the characteristics of fast construction and low production cost, so this kind of architectural design is quickly swept all over the world. The early assembly architecture was not very mature, so the shape of the building was monotonous and dull. With the development of economy, people have made in-depth research on the fabricated buildings, so the design has been improved, which makes the building more flexible and diverse. The improved assembly building can be built in batch and rich in style. There is a prefabricated building more advanced in the United States, in this building, every household is like a large car, need to use a large car to pull it to the venue, and then by crane to the floor pad and pre buried channel, power supply, telephone system is you can use.[1] Investigation and research shows that compared with traditional buildings, the green energy-saving assembly building is

greatly shortened, and the noise and other pollution has also been improved, which is conducive to the urban green planning.

3. Characteristics of Green and Energy-Saving Assembly Architecture

The assembly architecture is the representative of the green building. Most of the structure of the assembly building is completed in the production workshop, which is well assembled on the site after the prefabricated components. The assembly construction project has the characteristics of short cycle period, basically without environmental system, to a certain extent, it can save labor, strong flexibility, novel style and so on. The new green energy-saving assembly building mainly adopts various parts of the cold pressing light steel structure and all kinds of light-weight material combination houses, which has good insulation, sound insulation, fire protection, insect protection, energy saving and moisture-proof function.[2] There are five main types of building: block building, plate building, box building, skeleton plate building, lift board and floor building.[3] The traditional brick and concrete structure housing needs a lot of labor, at the same time the production efficiency is low, which leads to the slow construction speed, the material consumption and the environmental pollution. There are many problems in the design of the traditional residence, which can not meet the needs of the society for housing. Therefore, the green energy-saving assembly type building will adapt to the development of the times and comply with the call of the state, and will become the future development direction of the building.

4. Analysis of Complete Set Technology of Green and Energy Saving Assembly Building

1) Complete assembly technology of the main body of building.

The design of prefabricated building is mainly for the sake of environmental protection, the green building refers to the premise of ensuring the building has a comfortable and healthy indoor environment, through the use of reasonable and effective building energy saving and environmental protection technology, improve the efficiency of energy use, but also can effectively reduce the total energy consumption, so as to realize the ultimate goal of environmental protection and energy saving building[4]. Most of the assembly buildings are completed in the workshop, and the specifications of the buildings are specified by the customers, which are made by the workers in the workshop. The balcony windows, beams, etc. in the workshop according to different environmental protection materials for production, and then to the construction site of these parts to be assembled. Nowadays, there are many kinds of sample rooms in assembly buildings, and customers can choose according to their own needs. When the specifications of the rooms are determined, they can directly enter the production stage. The assembly architecture has many characteristics such as energy saving, short period of work, flexibility and so on. People can customize it according to its own preferences.

2) Complete set of technology for doors and windows.

The doors and windows open the door window frame is mainly traditional way of installation, installation of doors and windows so often there will be a gap, need to fill this gap, affecting the appearance and tightness. The assembly building has a model, which can be poured out of the suitable hole at one time so as to ensure the seamless connection between the hole and the window. In architecture, the design of windows is very final. Because the main function of windows is ventilation and lighting, so the room can take the principle of direct external doors and windows, so that indoor and outdoor air can circulate each other, so as to ensure the natural ventilation and in buildings.[5] There are many energy-saving designs in the assembly building, and the design of the size of the windows is one of them. For the window design, we must first go through the wind monitoring, wind field analysis and sum up the law outside the building, and then determine the magnitude and direction of a window, in order to increase the use of the area, we should use new energy-saving windows, this area at the same time in the window to increase, can realize the energy saving and environmental protection advocacy state.

3) The matching technology of the load-bearing wall and the non load-bearing wall.

In the traditional wall design, the load-bearing wall and the non load-bearing wall are constructed separately, and the connection between the bearing wall and the non load-bearing wall has the possibility of cracks. The load-bearing wall of the assembly building and the non load-bearing wall are constructed at the same time, which solves the crack problem well.[6] The energy saving and environmental protection of the assembly architecture mainly refers to the energy saving and environmental protection in the design of the building, the structure of the building and the material of the building. In the assembly process of architecture design, building materials should be selected in the green environmental protection materi-

al, try to use local materials, transportation cost control in a certain extent, so reduce the cost of transportation at the same time, but also greatly reduce the loss and exhaust of energy transport in the process of architectural design, we should try to make use of the thought of reuse of waste as far as possible, do all the planning well before the incident, and ensure the smooth and scientific construction process. Every link is perfectly matched. We should fully understand the functions of chemical materials, ensure safe construction, and avoid environmental pollution, and take green and environmental building materials as much as possible.[7]

4) Assembly design of building heating system.

In the environmental protection and energy saving design of fabricated buildings, the housing thermal performance is a very important design link, because most of the time, we mainly consider the warmth of exterior walls and windows, and the indoor heating system is also very important. There are three ways of indoor heating, which are central heating, low temperature hot water surface radiation heating system and electric heating film. Central heating can maximize the use of heat, while low temperature and hot water radiant floor heating system can control indoor temperature. When the indoor temperature reaches the prescribed temperature, it can reduce the indoor average temperature and to a certain extent, save energy. Third kinds of electric heating film belongs to intelligent heating, indoor temperature can be controlled at any time, when the room when no one can be directly closed, tenants can according to their own preferences on the indoor temperature setting, the indoor temperature is constant, the electrothermal film heating is environmental protection, no waste gas has no noise, in the assembly building, mostly using this heating method.

5) Complete set of technology for architectural decoration.

In the traditional architecture, often take the wall after the completion of construction on exterior wall decoration, this is often the construction of high-altitude operations, has a certain degree of risk, and assembling building wall and wall decoration can be poured together to save a part of high-altitude operations, reducing the risk of. And assembly building in energy conservation and environmental protection can also be good to meet the requirements of people. The assembly architecture can be produced in batch, and the decoration of the building is also decorated in one time. This kind of decoration is not only suitable for the assembly building, but also for the traditional high energy consumption building, it can also be used in this decoration method. This can improve the energy efficiency of the building by strengthening the energy saving function of the building, so as to improve the energy efficiency in the building, and then reduce the energy consumption.[8]

5. Conclusion

In conclusion, with the rapid development of economy, people's pursuit of green life is getting higher and higher. The green energy-saving assembly type building section is not only designed to meet the needs of the development of the current era, but also an inevitable trend of the development of the construction industry. The green and energy saving assembly architecture not only shows people's thinking about the value of the building, but also shows the harmonious relationship between man and nature. At the same time, the green energy-saving assembly building design can make full use of the existing resources, and effectively improve the living level of people through the development and utilization of renewable resources.

References

[1] Xuyang Guo. Discussion on environmental protection and energy saving design of architecture[J]. Journal of Yangtze University (NATURAL SCIENCE EDITION), 2013(07):83-85. (in Chinese)

[2] Bin Lou. Building environmental protection and energy saving design[J]. Engineering Construction and Design, 2013 (05):57-59. (in Chinese)

[3] Chunbo Chen, Hongguang Gan. Environmental protection and energy saving design in green building[J]. Chinese Folk House. 2012(03):49-50. (in Chinese)

[4] Lijun Mo. On environmental protection and energy saving building design of[J]. China New Technology New Product, 2011(09):18-177. (in Chinese)

[5] Huayong Chen. Discussion on environmental protection and energy saving design in architecture[J]. Sichuan Cement, 2014(12):12-18. (in Chinese)

[6] Baofu Qi, Changfu Li. Establishment and evaluation of evaluation index system of assembly building construction quality evaluation system[J]. Construction Technology, 2014(15):20-24. (in Chinese)

[7] Jianghong Cao, Fanrong Ji. The assembly building quality management based on BIM[J]. Journal of Civil Engineering and Management, 2017(03):108-113. (in Chinese)

[8] Minghai Wei, Ruxuan Ma, Lihong Li. Construction of green degree evaluation index system of prefabricated buildings[J]. Journal of Shenyang Architecture University (social science edition), 2017(03):10-11. (in Chinese)

Application of UG Software in Mechanical Design

Shuochun Feng
Equipment Development Department of Tianjin China Electronic Technology Group Corporation Forty-sixth Research Institute, Tianjin, 300220, China

Abstract: UG software is powerful, and has been widely applied in machine design. The following is an analysis of the development of UG software. It also analyzes the characteristics of use and analyzes the specific application, hoping to give some references to the people concerned.

Keywords: UG software; Mechanical design; Practical application

Corresponding Author: Shuochun Feng, 215081939@qq.com

1. Introduction

The basic CAD module in UG, including the creation, storage, open file manipulation; view operation, including zoom, blanking, coloring; in addition, the single also includes other functions, such as curvature analysis, query expressions, plotter queue management, layer management, analysis of surface fairing Macro, automatic macro command records, users can quickly access the common functions, or two times the development of function.

Parameterized software UG is a three-dimensional integrated function is very powerful, for example, can carry on the design of computer aided engineering, computer aided manufacturing can be carried out, can also be related to the design, the main focus of CAD, CAM, CAE and other software, and its current design software compared to UG is the most advanced analysis manufacturing software, can build different shapes, also can be a variety of complex entities to construct. UG obvious advantages, so a number of designers of all ages in the practical application, developers continue to gather feedback in practice, using some advanced technology, UG The version has been upgraded, the actual application performance has been greatly improved, the relevant function has also been improved, can fully meet the design requirements of modern mechanical enterprise, on the basis of this, in mechanical manufacturing, mechanical design has been widely used, the specific form is not complex, including the module of computer aided engineering, computer aided manufacturing module computer aided design module, etc., has been completely adapt to and meet the needs of mechanical design.[1]

2. Analyze the Practical Features of the Application of UG Software

UG software is an interactive environment, to ensure the work efficiency of the designers, for all its interface, can be combined with personal preferences set, combined with the actual needs, design a high quality scalable tools,

high-quality information and information window, window friendly design, right-click menu, convenient operation, can quickly access to commonly used commands. The design of dynamic interactive operation, convenient operation, direct manipulation of objects in the window, the workflow interaction operation, can effectively reduce the number of mouse, ensure the work efficiency. For intelligent operation, can quickly select Operation to avoid the waste of time and ensure the efficiency of work.

3. Analysis of the Application of UG Software in Mechanical Design

3.1 Analysis of the Apsplication of UG software in the Modeling of Parts

Use the UG design software, its advantage is very obvious, can be combined with the characteristics of different parts, parts selection of different design methods, this design is not only convenient, but also easy to learn, in the different toolbar also contains different commands, designers can according to the actual requirements, select the most suitable design method, can quickly complete the design of different parts. On this basis, UG software using the method of parametric design, the design has some relevance between different toolbar commands to modify the design, components, with convenient and reliable advantages. The change in parts design module, you can choose to automatically. As can be rapid response to the assembly drawings, correlation module and fast response. In the assembly model and engineering drawings of parts, modifications can be a direct reaction to the change in part for, do not need to use two-dimensional CAD diagram to modify the parts, do not have to make changes in the assembly drawing, so prone to low error, change or leakage problems. Using the UG software designers can take the work focus to structure design, is convenient for modification and design, designers can design parts of the structure.[2]

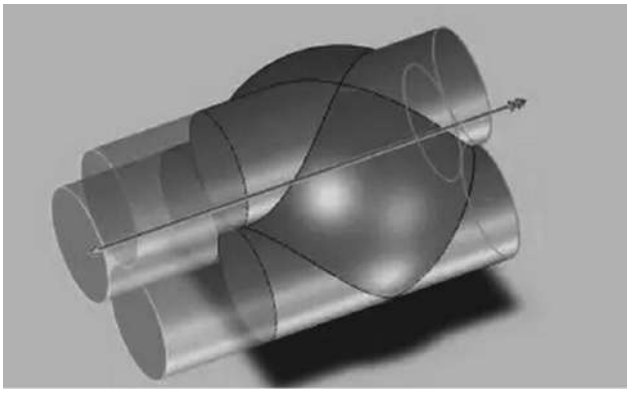

Figure 1. Part modeling

3.2 Analysis of the Application of CAE Module

The CAE module belongs to the utility of a highly integrated, can make parts of finite element pre post in a very short period of time, this module focuses on the finite element analysis in the design, products with high quality can be obtained through optimization, at the same time does not affect the product quality, reduce product development time. CAE module can turn into the specific geometric model for all tools in the theory of finite element analysis model, not only can effectively complete the network division, also to carry out the basic definition, this module completes the processing before the post, the concrete results of finite element analysis of finite element for transmission to As the core of the solver, after calculation so as to complete the calculation, this module can be calculated by the form of animation, the output in different ways, such as contour map, image, on this basis can also implement dynamic simulation.

3.3 Analysis of the Application of CAM Module

For the CAM module, can provide a multi function processing module with Motif environment as a basis, this module can meet different user observation requirements under certain conditions, more specific observation content, such as graphic change, graphics editing, tool movement, on the basis of this, this module also includes a variety of processing the design task procedures, operating procedures, types of tasks including tapping, drilling, the specific needs of users can combine the single user dialog box, modify it, or for some special menu, the operating module support, user function has been significantly enhanced, besides Besides, the operation module also has the characteristics of individuation, which is helpful for different users to build specific operations, such as parts finishing, rough parts processing, etc. these operations can be standardized gradually in practice.

3.4 Analyze the Motion Mechanism of UG

The UG module provides the motion mechanism design and analysis of mechanism, can also be used for simulation, document generation, but in the UG model, or the definition of agency in the assembly environment, mainly has the initial conditions of motion, damping, spring, hinge, definition of mechanism elements, for the definition of good institutions can direct analysis in the platform of UG, can also be used for the study of different aspects, including trajectory envelope, minimum distance, interference check, can realize the simulation of the mechanism movement. Users can carry out the acceleration curve in this platform, analysis of reaction force, the graphic

method of speed, displacement and so on. For the reaction In terms of force, we can input finite element analysis. On this basis, we can build a comprehensive mechanism movement connection element library, achieve seamless connection between UG and MDI, and pass the results to MDI directly.

3.5 Analysis of the Application of UG in Cartography

Cartographers, engineers can make the entity model, drawing engineering drawing, using Unigraphic composite modeling technology, the construction of the geometric model and the size of the model in the process of change, the image will be updated in a timely manner, reduce the update time, improve the working speed. For the view, including cross section view,. Hidden line view, modify the model will automatically update the automatic layout of views can provide a quick map layout, mainly involves the detail view, auxiliary views, sectional view, orthogonal projection view. UG support in the drawing standard main industry, such as ANSI, IS O, DIN, JIS in the build graph, its main component is a complete graph creation, annotation tools. Use UG to create the assembly information, can effectively construct the assembly, such as the timely establishment of the assembly decomposition view ability, can make a single sheet or a single pieces of the details of the assembly and component drawings the use of UG mapping, short time, low processing cost. For the UG engineering drawing module, provides a partial view, anisotropic view, section view, automatic layout view, automatic view layout tools, so designed to meet the application needs.[3]

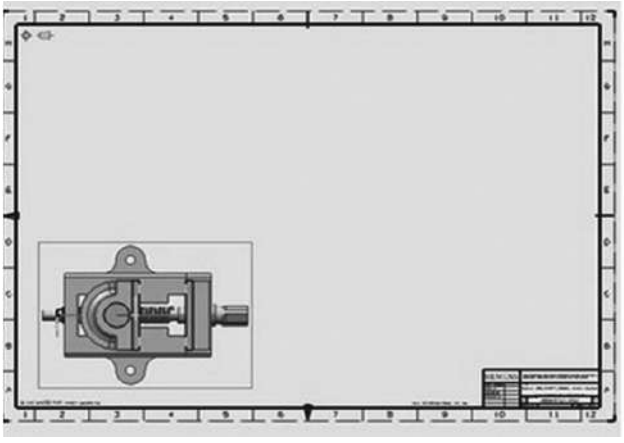

Figure 2. UG drawing

3.6 Analysis of the Application of UG in Assembly

UG in the design of the assembly module design professional, has assembled a top down method, there is a bottom-up method. The method of assembly from bottom to top, according to the different parts of the good design, according to the requirements in the assembly with the pattern parts in the position directly before the assembly, design the designer has a clear design ideas, and positioning parts, connection point, structure, size has been determined. The designer can design the good parts into the assembly module, and add the coordination relationship effectively, guarantee the correctness of the location of parts in the assembly model for the design. Personnel for example, according to their own design intent, according to the location relationship of parts in assembly drawing, according to the characteristics of parts, we constantly adjust their design models to achieve the actual matching requirements, so that the structural design of parts will be more reasonable and achieve the final design function.

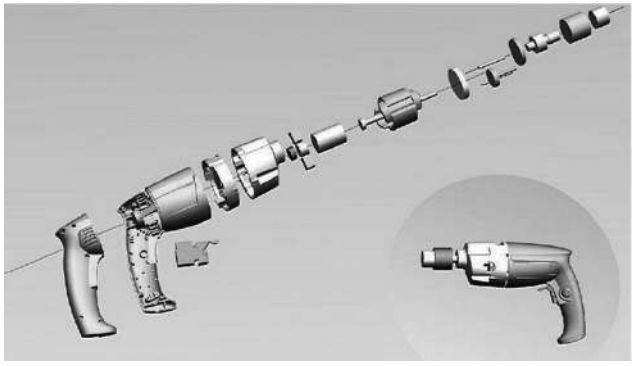

Figure 3. UG assembly

4. Conclusion

Through the analysis of the application of UG software in mechanical design, it is found that its operation speed is fast, compared with other methods, cost saving, design quality and assembly quality are high, and there will be a new development in the future.

References

[1] Dengke Zhou. The auxiliary application of UG software in the teaching of mechanical drawing[J]. Journal of Harbin Vocational and Technical College, 2016(2):51-53. (in Chinese)

[2] Nan Li. UG software in the mechanical design of the application and research[J]. China Equipment Engineering, 2016(11):130-130. (in Chinese)

[3] Nihua Zheng. On the application of 3D modeling software in mechanical design -UG to the strength design of parts[J]. Chinese Machinery, 2014(13):237-238. (in Chinese)

Highway Construction of Soft Soil Foundation Processing Analysis

Zhao Zhao

1. Nuclear Industry Survey Remote Sensing Center, Shijiazhuang, Hebei, 050002, China
2. Hebei branch, Beijing Zhonghedadi Mining Exploration and Development Co., Ltd, Shijiazhuang, Hebei, 050000, China

Abstract: Highway is an important channel to connect regional economic development, and is an indispensable part of modern transportation system. In view of the extensive nature of highway cover space and the existence of diversified construction environment, climate and geological influence in highway construction, soft soil foundation is one of the more typical geological forms. With wide distribution in our country, seen as a big difficulty, highway construction technology and directly affect the quality of highway construction, cost, if not properly handled, will cause the soft soil foundation highway engineering structure is not stable, prone to accidents in use. In this paper, we study the treatment of soft soil foundation in highway construction, and put forward some reasonable Suggestions.

Keywords: Highway construction; Soft soil foundation; Construction technology; Processing; Analysis

Corresponding Author: Zhao Zhao, zz_841009@163.com

1. Introduction

Highway traffic is an important support for China's economic development and is also a key support project of the national economic fixed investment. Figures show that as of 2016, China's highway mileage reached 130000 kilometers, secondary and above total mileage of 590000 kilometers, highway density continues to grow at the same time, the economic construction, population flows, cultural exchange, etc., providing convenient conditions. But at the same time, the highway as a form of ground transportation, its construction must also received various elements such as geography, geology, climate, hydrology, the influence of our country has wide distribution of soft soil base form, easy to cause the instability of building structure, therefore, in the highway construction in soft soil foundation treatment is very important.[1]

2. Adverse Effects and Human Factors of Soft Soil Foundation in Highway Construction

2.1 The Adverse Effects of Soft Soil Foundation

The so-called "soft soil" is a typical architectural concept, which is generally referred to as the soft plastic, plastic and plastic soil with large amount of water, high compressibility, low shear strength and weak bearing capacity. Obviously, "soft soil" is not a specific soil and soil quality, but a class with the same response characteristics of the soil building, usually divided into in the construction of silt, peat, soft clayey soil, etc. The definition of soft soil foundation in the highway industry is basically similar to the construction industry, namely, "low intensity, high compression, poor permeability," etc., which can be classified into the category of weak soil. Adverse impact of the soft soil foundation in highway construction is very big,[2] this is mainly due to the properties of highway

"ground transportation", the topography, geology, hydrology, etc have the very strong dependence, and, for any kind of construction project, the foundation is the most basic component.

The highway foundation directly determines the stability of highway structure, which will affect the cost and difficulty of highway construction, and the safety of the latter. By analyzing the bad influence of soft soil foundation, the attention to related aspects is strengthened.[3-4]

First, the road surface settlement. Surface subsidence is the biggest influence in highway subgrade construction quality, also the most common phenomenon, objectively, many causes of the settlement,[5] such as foundation under existing cave, cracks, or the problems caused by construction technology and operation process. Combining with the analysis of soft soil foundation, due to the construction of failed to grasp the roadbed compaction degree, resulting in reduced stability, or in the transition and cohesion section of the highway construction processes improper, such as adopt traditional strap structure, easily lead to strap fracture under overload traffic. Relatively, highway transition section, cohesion of settling problems more likely, this is because the settlement itself is closely related to the surrounding environment changes, such as will change after rain enters the soil structure, lead to soil erosion, intensity is abate, the road cause settlement after rolling.[6]

Second, the road surface erosion and loose. "Hardening" is the basic requirement of road surface treatment. From technical analysis, the pavement structure layer is mainly composed of gravel, concrete, asphalt and other materials. After prolonged passage and rain erosion, the material tightness can be seriously damaged, especially during the rainy season.[7] Paved roadbed material will be scoured loose and permeated to the soil layer. Soft soil foundation will accelerate the stability of the road surface.

Third, it causes irregular hardening of road surface. Due to the mixed pattern in the composition of the soft soil foundation, and composition proportion, lack of unity, under the influence of soft soil foundation is not stable, and pavement construction materials, prone to irregular hardening phenomenon. This is because, the main material of asphalt and concrete pavement construction, and its matching with the road surface hardening problem has a lot to do, if not in a reasonable scope, will cause inflation, settlement and other signs, then form the road show irregular sclerosis.

2.2 Human Factors

Soft soil foundation has objective influence on highway construction quality, cost, progress, etc., but at the same time, human factor cannot be ignored. As the only active element in highway construction, the construction personnel have the control ability of equipment, materials and technology.

First, the construction personnel of highway engineering have caused inaccurate and incomplete problems in survey and design, such as detailed understanding of the location of soft soil foundation treatment.

Second, in the construction of road engineering construction personnel neglect to known to improve the soft soil foundation treatment, lead to market stability, embankment and pavement construction late even endanger nearby buildings.

Third, the construction technology, process, materials and equipment used by the highway engineering construction personnel are not reasonable, causing the subsidence or pavement collapse.

Fourth, improper storage of materials in the construction of highway, such as failing to carry out the layered filling in accordance with the requirements, causeing the soil to be too fast and compacted, and the instability is prone to instability.[8]

3. Analysis and Suggestion of Soft Soil Foundation Treatment in Highway Construction

3.1 Analysis and Suggestion of Riprap Extrusion Sludge

Riprap crowded silting method is the current domestic treatment of soft soil foundation in highway construction, a common method is the basic principle, in the middle of the bottom of the roadbed and toss a certain proportion to each side is gravel, silt by physical mechanism will "crowd out" the subgrade range, in order to improve the subgrade strength.

In this method, it is important to note that the size of the gravel can not be too small (the diameter is greater than or equal to 0.3 m).[9] In the selection of crushed stone materials, it is necessary to avoid the stone that is easy to be weathered and broken. Using this method has the advantage of construction is convenient, rapid and cost is low, very suitable for drainage difficulty, perennial water depressions, and this kind of soft soil foundation under the thickness is very thin, usually there is no scale block, so you can meet the needs of the rapid rule out.

But, it needs to pay attention to the ripped-rock crowded silting method is not available everywhere, some swamp areas, for example, although in theory for the

ripped-rock crowded silting method, but in the operation will find large mechanical parts inaccessible, stone transportation cost is very high. Therefore, this method is recommended to be used in the environment of abundant stone materials and short haul.

3.2 Analysis and Suggestion of Cement Mixing Pile Method

This method mainly USES cement as the "curing agent", and has adaptability to soft soil foundation in various forms. Its use principle is that using a blender to get cement into soil, and then fully mixing, cement (main) reacts with soft soil composition after curing, so as to realize the need of improving stability.

It is proved by practice that the cement mixing pile method can achieve obvious reinforcement effect, and it has good effect on most soft soil forms such as silt, peat soil and silty soil.

It is important to note that, although the cement mixing pile method can be rapidly put into use, it still has to choose according to the material injection state, which includes two types of wet and dry. Refers to the "wet" refers to the slurry for material, easy to mix, but the hardening time is longer, while "dry" use of cement powder as the main agent, this method shortens the hardening time, but the mixing uniformity effect is not good. When choosing, it can be considered according to soft soil moisture content and composition ratio.

3.3 Analysis and Suggestion of Drainage Consolidation Method

The method also known as "preloading", the characteristics of its low cost has been widely applied, especially in the municipal road construction, a number of ways in the soft ground setting out the drainage channel, A horizontal or vertical drainage pattern, which improves the boundary condition of the old foundation, increases the pathway of the gap water, and USES the additional load or structure of the self, remove excess water from soil to prevent foundation settlement and improve the strength of foundation. Obviously, the drainage consolidation method is mainly a way of ease in the soft soil water conditions, specific applications, the drainage consolidation method can be divided into different forms, such as the precipitation preloading method, the pile of sand drain preloading method, bagged sand well method, etc. The same applies to different soft land forms. The defect of this method is obvious, the filling rate must be strictly controlled in the whole process, and the period of construction is also longer, so it is not recommended to use in areas where soft soil foundation covers a wide area.[10]

In addition, new technologies, new equipments and new technologies have been springing up in recent years, which can be enhanced to explore the methods of soft soil foundation treatment.

4. Conclusion

Highway construction level to a certain extent reflects a country's economic development level, at the same time, the most basic part of the development of modern transportation, highway engineering itself has factors of large investment, long period, more features, to ensure its effective role in national economic development, it is necessary to strengthen the importance of soft soil foundation. Objectively, the soft soil foundation treatment technology is an international problem, there is no a unified standard and unified model for processing, to comprehensively use the technical side, overall arrangement, constantly introducing new technology, new equipment, improve the quality of the construction personnel technology, can effectively guarantee the engineering quality.

References

[1] Zhen Lu. Application of soft soil foundation construction technology in highway bridge construction[J]. China Standardization, 2017(18):176-177. (in Chinese)

[2] Zhiqiang Hu. Application of soft soil foundation construction technology in highway bridge construction[J]. Construction Technology Development, 2014,44(03):122-123. (in Chinese)

[3] Lihe Duan. Analysis of construction technology of soft ground in highway and bridge construction[J]. Resource Information and Engineering, 2016,31(02):154-155. (in Chinese)

[4] Wen Zhou. Construction treatment of soft soil foundation in highway construction[J]. Transportation World (engineering technology), 2015(12):74-75. (in Chinese)

[5] Zhanwei He. Treatment of soft soil foundation in construction of road bridge[J]. Private Technology, 2015(03):136. (in Chinese)

[6] Rong Dang, Wen Xu. The application of soft soil foundation treatment technology in highway engineering construction[J/OL]. Transportation World, 2017(29):71-72. (in Chinese)

[7] Jinwei Ren. Analysis of construction technology of soft soil foundation in highway bridge construction[J/OL]. Engineering Technology Research, 2017(11):45-67. (in Chinese)

[8] Guipu Yuan. Analysis on the treatment of soft soil foundation in highway engineering construction[J]. Jiangxi Building Materials, 2017(22):140. (in Chinese)

[9] Wanyu Xie. Analysis on the technical measures of soft soil foundation treatment in highway engineering construction[J]. Jiangxi Building Materials, 2017(24):165-169. (in Chinese)

[10] Yan Li. Application of soft soil foundation construction technology in highway bridge construction[J/OL]. Transportation World, 2017(12):38-39. (in Chinese)

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