International Journal of New Developments in Engineering and Society
ISSN 2522-3488 Vol. 4, Issue 2: 33-37, DOI: 10.25236/IJNDES.040207

Exploring the Construction Technology of Concrete Structures in Civil Engineering Buildings

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ABSTRACT. *In the current stage of civil engineering construction, the use of concrete structures is relatively wide, so the quality of concrete structures directly affects the level of the quality of the entire project. Therefore, this paper analyzes the construction technology of concrete structures in civil engineering buildings, expounds the characteristics of concrete structures, points out the problems of concrete structures in civil engineering buildings, and proposes effective measures for construction technology.*

KEYWORDS: *Civil engineering construction, Concrete structure, Construction*

1. Meaning and characteristics of concrete structure in civil engineering construction

The main material used in building materials is coagulation, which mainly mixes lime, water, and cement. The coagulation upper structure in civil engineering buildings uses coagulation as the main part of the overall structure and mixes other materials. Because the coagulation structure is made of many kinds of raw materials, it is a mixed building raw material. Due to the constant limitation of load capacity and its own composition, it will appear to varying degrees of cracks with the continuous change of time and the continuous influence of external factors [1].

The main features include the following: the concrete can be moved and can be transported for a long distance; the abrasion resistance is relatively strong, and it will be damaged by other factors in a more special environment. Adding this and other steel bars to the concrete, the upper structure can greatly improve the overall performance on coagulation.

2. Current Problems in Concrete Structures of Civil Engineering Buildings

2.1 Cement Hydration Heat

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Concrete is a kind of mixture composed of cement, water, gravel, fly ash, admixture, etc. It has good physical properties and load-bearing capacity after solidification. Among them, cement is the most important component of concrete. After the cement and water are fully stirred, the cement and water will react chemically, causing the heat to rise. At this time, the heat emitted is called cement hydration heat [2]. After the concrete is poured, especially after the mass concrete structure is poured, its volume is large, which leads to an increase in the end face coefficient. The heat inside the concrete cannot be efficiently dissipated in time, which causes the heat to gradually accumulate inside the concrete, and the internal temperature is greater than the surface due to the temperature. the temperature difference between the inside and outside is too large. Under the effect of thermal expansion and contraction, cracks appear in the concrete structure.

2.2 Self-Shrinking Reaction Crack

After the concrete structure is poured, the concrete surface will undergo a self-shrinking reaction during the hardening process [3]. During the self-shrinking process, external factors will affect each other, resulting in cracks in the concrete and affecting the quality of the project. The main reason for the self-shrinking cracks in concrete is that the water on the concrete surface evaporates too quickly, and the water consumed greatly exceeds the self-shrinking value of the concrete, which causes the concrete surface to shrink too fast, and then causes cracks.

3. Technical Measures for Construction of Concrete Structures in Civil Engineering Buildings

3.1 Control Cement Dosage and Reduce Temperature Stress

As the commonly used building materials in the construction of concrete structures, the quality of cement has an important impact on the quality of the project. The performance and amount of different cements have a direct impact on the functionality and structural stability of concrete. Generally, cements that produce less hydration heat and have higher strength are used as engineering materials. Before the concrete is mixed [4], it is necessary to carry out rigorous tests and inspections on the mix ratio of the concrete, select the best mix ratio, control the proportion of cement, and appropriately add additives to reduce the effect of cement hydration heat on the concrete structure and effectively avoid the generation of temperature cracks. In the initial setting stage of concrete, a large amount of heat is released inside. When the temperature difference between the outside and inside exceeds the limit value, the internal temperature stress will increase. Therefore, during the pouring process of the concrete, it is necessary to strictly control the pouring temperature and try to avoid When pouring in a high period of time, when

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pouring in high-temperature weather, corresponding cooling and shading measures need to be done to control the pouring temperature of the concrete, and then effectively control the internal temperature of the concrete, and effectively reduce the occurrence of temperature cracks.

3.2 Improve Concrete Crack Resistance

Improving the crack resistance of concrete is of great significance for improving the quality of concrete structure construction. During the construction of concrete structures in civil engineering construction, if there are insufficient construction details, structural cracks will occur, which will affect the safety of the building structure and threaten people's lives and property. Therefore, it is necessary to improve the crack resistance of concrete and the construction quality of concrete structures. In the process of mixing concrete, admixtures such as fly ash and water reducing agent are added to reduce the hydration heat of the concrete, while improving the workability of the concrete, maximizing the performance of the concrete and making the concrete structure have certain crack resistance, and thus improve its crack resistance ability. In addition, some materials with good tensile properties, such as organic fiber materials and metal fiber materials, are added to the concrete mixture as configuration materials to improve the crack resistance of the concrete materials [5].

3.3 Strictly Control the Quality of Concrete Construction

3.3.1 Pouring

When the concrete structure is poured, the formwork and the steel bars should be inspected first to confirm that the reinforcing bars are bundled and placed in a qualified position. The formwork is installed and placed accurately [6]. When pouring, it is necessary to ensure that the concrete is sufficient and the equipment and machinery are in good condition to avoid the interruption of pouring due to equipment failure or insufficient concrete supply, especially during the pouring of large-volume concrete structures. In particular, insufficient supply of concrete should be avoided. In such cases, it is necessary to reduce the pumping speed of the concrete in a timely manner, and at the same time, the mixing of the concrete cannot be interrupted. In the process of concrete pouring, it is necessary to strictly control each construction link in the pouring process according to the design requirements to avoid affecting the quality of the concrete structure construction due to the quality of the pouring.

3.3.2 Vibration

Each layer of concrete needs to be fully vibrated before pouring the next layer of concrete. When vibrating the concrete, the vibrating rod needs to be inclined or inclined at 45 ° to the concrete surface. The vibrating rod should be inserted and pulled slowly at a uniform speed to avoid frictional collision between the vibrating

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rod and the formwork or steel bar. Vibration needs to ensure sufficient vibration to avoid leakage or over-vibration [7]. It is appropriate to vibrate until the concrete surface does not sink or bubble. Before the initial setting of the concrete, the flat surface vibrator needs to be used to vibrate the concrete surface, which can effectively prevent the shrinkage of the concrete due to bleeding due to evaporation.

3.3.3 Dealing with Concrete Cracks

Letting cracks in concrete structures develop and not deal with them will bury hidden dangers to the structural stability of the entire project. Therefore, cracks appearing in the construction of concrete structures need to be treated in a timely and effective manner to reduce the impact of cracks on structural stability. Cracks appear during the initial setting of the concrete, and they need to be compacted in time to keep the surface flat. If there is undulation on the concrete pouring plane, it is necessary to correct the concrete pouring method in the upper layer in time to reduce the probability of concrete crack, to improve the compressive performance of concrete. In addition, it is necessary to formulate corresponding emergency measures, carefully divide and analyze the occurrence and formation of different cracks, develop effective countermeasures, effectively control the further development of cracks, and improve the structural stability and engineering quality of the building.

3.3.4 Strengthening the Maintenance of Concrete Structures

After the construction of the concrete structure is completed, the subsequent maintenance work is needed to strengthen the durability of the stabilization project. In the specified construction period, sufficient time for the maintenance of the concrete structure must be reserved. Concrete strength is mainly formed during the concrete curing stage. Therefore, the maintenance work of concrete structures is directly related to the safety and strength of concrete structures. After the concrete is poured, it needs to be maintained with heat and moisture. The moisture can be moistened by watering the concrete surface and covering it with a plastic film to keep the concrete surface wet, reducing the evaporation of water on the concrete surface, and effectively avoiding water disperses quickly and causes the concrete surface to shrink and form cracks. During the solidification of concrete, cracks are easily caused by external factors. The generation of cracks greatly affects the stability of the concrete structure and reduces the service life of the building. Therefore, concrete maintenance work is indispensable. Through watering, spraying protective agents, covering plastic films, etc., it can reduce the occurrence of concrete cracks, effectively control the temperature difference between the inside and outside of the concrete, ensure the overall integrity of the concrete structure, and provide benefits for improving the quality of civil engineering buildings Protection.

4. Conclusion

In summary, during the construction of civil engineering buildings, concrete

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construction has a direct impact on the overall quality of the building. Effective construction techniques are needed to strengthen the overall structural control and avoid various hidden construction risks and safety issues.

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