

# Research on Application of Mass Concrete Structure in Civil Building Construction

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**ABSTRACT.** *In terms of construction technology, the construction of large-volume concrete structures has begun to be valued, Its own advantages have also begun to show up in civil engineering. Due to the rapid development of the construction industry, the requirements in the development of the industry are also constantly increasing, The technical requirements for building construction are also more stringent. in this article, A shallow analysis was carried out from the construction technology of mass concrete structure, and the main points of the mass concrete structure in civil construction were expounded, and some suggestions were put forward for the better implementation and development of the mass concrete structure construction technology. Hope that in the future in the construction of large-volume concrete structures, they can better leverage their own advantages and contribute to civil engineering.*

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

## 1. Introduction

Development and reform of technology in the construction industry, the construction industry has entered a good period of rapid development and comprehensive development. Due to the continuous improvement of technology, it is necessary to use better construction technology and adjust the construction process to build better construction results in construction, this also requires that the performance of concrete be grasped in the course of carrying out construction projects. Although mass concrete construction has huge advantages in civil engineering construction. However, during the construction process, it is still necessary to grasp the surface coefficient of concrete and the temperature of concrete, so as to ensure the construction of large-volume concrete structure safely and stably. Only a better grasp of construction technology can avoid unnecessary danger, to make better use of its advantages, play its greater role, and build more beautiful and stable buildings.

## 2. Main Features of Mass Concrete

Large volume concrete in concrete can be as small as 1 meter. This type of large volume concrete is greatly affected by temperature during construction, which will cause shrinkage problems during construction, resulting in cracks during construction There is a lot of trouble. In the construction of buildings, the number of concrete used is very large, for example, from tens of cubic meters to thousands of cubic meters. At the same time, the size and thickness requirements of concrete are very huge. Secondly, during construction, in order to ensure the better completion of construction results and the stability and safety of the construction building, at the construction site, it must be ensured that there is no damage to the building structure, the pouring of concrete can not have cracks and other problems, to avoid cracks Safety problems caused by the later stage of construction. Therefore, in order to meet the strict requirements in civil engineering construction, the construction technology of mass concrete should be more strictly controlled. The mixing and transportation of concrete construction must be strictly managed, so as to ensure the good operation of mass concrete construction technology, make it shine its own advantages, and avoid defects in construction.

The physical properties of concrete materials are brittle, which also makes the concrete's ability to stretch and tension very weak. Due to the large tonnage requirements for concrete used in the building, its own cross-sectional range is very large. After the concrete is poured, the heat inside the concrete will not gather and it is not easy to dissipate, which is caused by the large volume, this is also caused by the low heat transfer capacity caused by the large volume of concrete. In addition, tensile ability of concrete also makes it easy to cause problems such as cracks in the concrete during construction, it also leads to the shortcomings of concrete

penetration.

### **3. Technical Analysis of Mass Concrete Structure Construction**

The construction of mass concrete can be seen literally, and his main feature is its large volume. In addition, compared with ordinary concrete structures, mass concrete structures also have other disadvantages. For example, during the construction of large-volume concrete structures in construction projects, hydration often occurs, resulting in an increase in temperature and the heat cannot be discharged in time. In turn, the internal temperature of the building structure is higher than the external temperature, which leads to the occurrence of cracks. This is caused by excessive temperature difference. With the large-scale application of large-volume concrete structure construction, it is also forcing the better operation of large-volume concrete structure in construction to avoid cracks. Therefore, in the construction technology, more attention should be paid to the configuration of large-volume concrete to meet the proportion of raw materials. In addition, after construction, the massive concrete structure should also be regularly maintained, in civil engineering, the most important construction technology for mass concrete structure is to grasp the temperature of the concrete during construction to ensure the stability of the concrete structure Make building construction meet certain target requirements.

Therefore, for the construction of large-volume concrete structures, it is necessary to pay attention to maintenance in the later period, and certain measures must be taken to reduce the temperature and constant temperature treatment, and adjust the concrete configuration structure according to the environment of the construction site, so as to avoid the cracks caused by the excessive concrete difference. Secondly, for the construction of concrete, it is also necessary to control and adjust according to the thickness required by the building, and do a comprehensive supervision. When a problem occurs, it should be reported and resolved in a timely manner. At the same time, the formwork position must be simulated in the early stage of concrete pouring, and the position and height must be qualified before construction.

### **4. Problems in Mass Concrete Structure in Civil Construction**

#### ***4.1 Overflow Problem***

The construction work carried out in the construction of civil engineering buildings is carried out layer by layer, and the casting of concrete is also carried out layer by layer. Therefore, there will be time intervals on the construction level, which will lead to differences in the temperature of the concrete at different levels and intervals between the concrete, which will cause the problem of water overflow, and also cause problems such as poor connection between the gaps between the levels.

#### ***4.2 Crack Problem***

In the construction, for the construction of large-volume concrete, crack problems often occur, and the factors that cause crack problems are also various. First of all, due to the large volume of the mass concrete itself, the temperature difference problem caused by the cracks is the most common. It is the crack caused by the increase of stress in the structure of the mass concrete. Second, because the main material component in concrete is cement, cement has the problem of large area and thick density, so heat will be released during the mixing of cement and water, but when this heat cannot be discharged in time There will be a certain temperature difference, and it will also cause cracks. Third, after the concrete is poured and the construction is completed, the water gets a lot of evaporation, It causes the structure of the concrete to become stiff, and the evaporation of water may take away the water of the building structure itself, and evaporation also occurs, then the concrete will shrink in a large volume. Due to the brittleness of concrete itself, cracks occur.

### **5. Technical Points for Construction of Mass Concrete Structures in Civil Engineering**

#### ***5.1 Optimize Building Design***

Before carrying out any building construction, we must carry out environmental surveys and understand the local climate of the construction site, and carry out early concrete configuration construction design according to climatic conditions and temperature, so as to design a more reasonable concrete configuration ratio, to reduce

problems that occur during construction. Secondly, a certain amount of steel bars should be installed at the construction site where temperature difference cracks are prone to balance the brittleness of concrete. In addition, considering the hydration phenomenon of large-volume concrete, it is necessary to expand the radiating range of hydration reasonably during construction, to reduce the temperature difference between inside and outside, thus, the tensile stress caused by the heat generated by the hydration reaction is dispersed, reduce the occurrence of cracks.

### ***5.2 Reasonable Selection of Materials and Improvement of Matching Technology***

The main construction material used in the construction of large-volume concrete is cement, so the selection of cement in the early stage should be more strict, and the cement with strong hydration reaction ability and high tensile strength should be selected. Secondly, other auxiliary materials such as fine sand or crushed stone are also used in the construction of the concrete structure. Under certain conditions, sometimes related additives are used to enhance the stability of the building. Therefore, reasonable additions should be made in the proportion of various ingredients, and the corresponding proportion experiment should be carried out in the early stage of building construction to obtain the proportion design requirements more in line with the building, so as to determine the most suitable proportion scheme to invest use. Secondly, when determining the final plan, it is necessary to take into account the demand for the amount of cement, and choose the plan that uses less cement. Reducing the amount of cement used in the construction of concrete structures can reduce various problems in the construction of cement. Secondly, the construction and mixing of large-volume concrete in civil engineering should choose a reasonable location as much as possible, as well as mixing measures at the same location as much as possible, so that the construction route can be kept smooth during the construction process.

### ***5.3 Mixing Technology of Mass Concrete***

Concrete needs to be mixed with water during construction before it can be put into use. Therefore, strict requirements are also required for the preliminary mixing of concrete. Good mixing technology can ensure the safety and stability of the concrete production and put into use in the later period, to avoid problems. The mixing of large-volume concrete structures must comply with the national specifications for related parties and must work in accordance with certain construction procedures. The use of raw materials, the introduction of raw materials, the use of raw materials and the mixing time must be strictly carried out in accordance with the regulations. Secondly, it is necessary to make slight changes according to the actual situation of the building, but it must follow the principle of safety and stability, when carrying out the mixing technology, it is necessary to pay attention to the reduction of various problems when the amount of water put into the cement cannot be constructed. Secondly, the construction and mixing of large-volume concrete in civil engineering works must conform to the standard concrete, in order to make the later operation of civil engineering works safer and smoother.

### ***5.4 Temperature Control Technology of Mass Concrete***

Most of the crack problems that occur in the construction of civil engineering are cement cracks caused by the temperature difference between inside and outside. Therefore, temperature stress of the massive concrete structure should be controlled to avoid the occurrence of crack problems. In terms of temperature control, the first thing to do is to reduce the temperature of the internal structure of large-volume concrete. A water pipe can be inserted into it, and the flow of water can be used to reduce the internal temperature to balance the temperature difference. Secondly, the amount of cement can be reduced during the use of cement during each mixing, so that the temperature can be well dissipated. Finally, in the aspect of heat dissipation, other added materials can also be used to achieve the cooling effect, such as the mixing of water reducing agent and materials. In addition, reasonable mixing measures during the mixing process can also reduce the temperature of the concrete. In order to cast large-volume concrete, suitable conditions should be selected. Try to avoid construction in hot summer, so as to achieve better heat dissipation goals in terms of external conditions.

### ***5.5 Improve Safety Awareness of Construction Personnel***

For the good operation of civil engineering construction, it is necessary to continuously improve the technical level of the construction personnel, so as to ensure the safety and good construction status in construction. Therefore, the construction unit should regularly carry out safety awareness training and technical capacity

improvement training for the corresponding personnel, so that the technical level of the construction personnel is continuously improved, and the safety technical specifications are continuously improved to ensure the safety and good development of the construction.

### ***5.6 Strengthen Quality Control in Construction***

First of all, the construction unit should do a good job of inspection, maintenance and management of technical equipment in the early stage of construction. In the construction, the construction personnel must be well trained in safety awareness, as well as the strengthening of construction technology and the audit of the good operation of mechanical equipment. In addition, the social supervision department should also perform timely supervision, strictly review the materials selected for construction, carefully select the management of construction technology schemes, and promptly correct any deficiencies or shortcomings during construction To ensure the quality of construction results.

## **6. Conclusion**

In the construction of mass concrete, there is still a lot of room for improvement. Due to the development advantages of large-volume concrete in the construction industry, it also makes it more stringent in terms of construction quality. This article analyzes the general problems of mass concrete structures, and puts forward some measures to improve the technical level, hoping that the mass concrete construction technology can make a better contribution to the construction of civil engineering, ensure the stable development of civil engineering.

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