

# Construction Technology of Concrete Structure in Civil Engineering Building

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**Abstract:** In civil engineering, concrete plays a vital role, but for the construction technology of concrete, it is necessary to have a perfect management and supervision system to ensure the quality and ensure the smooth progress of the project, so as to improve the implementation process of construction projects. At present, most of the construction projects in China are large-scale composite buildings using concrete materials. Therefore, the implementation of concrete structures and the quality of construction technology are directly related to the quality of the whole project. It can be seen that concrete engineering plays a vital role in the whole construction project. However, as far as the current building projects are concerned, there are still many problems in the construction of concrete projects. Cracks also occur in the high-rise buildings. Cracks also exist in the bottom of high-rise buildings and the bottom of some bridges, which makes the buildings have potential safety hazards. This has to worry people.

**Keywords:** Civil Engineering, Architecture, Concrete, Structural construction technology.

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## 1. Concept Description of Civil Engineering and Concrete

### 1.1. Civil Engineering Concept

The so-called civil engineering refers to a series of technical activities such as materials, equipment and machinery as well as a series of survey activities and later maintenance and repair in the process of building construction. Civil engineering has three basic attributes: comprehensiveness, sociality and practicality. However, with the development of science and technology and the progress of the times, civil engineering covers more and more knowledge and operations, and has more and more types. Therefore, the complexity of the combination becomes higher and higher. With the progress of the times, the buildings in different periods and backgrounds are slightly different. These differences are based on the economic, technological and cultural levels, so civil engineering is also social[1]. Civil engineering is also very practical, so civil engineering can be said to be developed by the accumulation of practical experience, which requires continuous operation and practice.

### 1.2. Concrete Concept

Concrete is known by its name as a mixed material, so the concrete we say generally refers to a composite material that mixes some prepared materials for building construction. Its main raw material is sand and stone. In the process of raw material preparation, the sand and stone and water are mixed and blended together according to a certain proportion to form a cement style mixed concrete. This kind of mixed concrete is the most common material in construction engineering and is widely used in civil engineering. The raw materials of concrete are relatively abundant, and the raw materials are relatively common, so the cost is relatively low, the technical content required in production is also relatively low, and the total cost price is relatively thin. However, the concrete formed by mixing together is of good quality, with certain compression resistance and durability.

## 2. Structural Characteristics of Concrete

We know that concrete is a composite building material, which is made by mixing water, sand, cement and lime in a certain proportion and then adding a small amount of other materials. As the most commonly used building material in architectural design projects, concrete must have certain engineering characteristics:

### 2.1. Ability to Be Transported and The Convenience to Be Moved

Durability should be guaranteed. The cycle of a building project can not be completed in one or two days. This is a relatively large project. Therefore, concrete should have the ability to be stored for a long time. In general, it can not be easily damaged or corroded by external factors or chemicals.

#### ① Certain plasticity

In the process of engineering construction, mixed concrete needs to be molded into various shapes. Therefore, concrete needs to have certain plasticity to meet the requirements of molding model shapes in the process of construction.

#### ② Strong internal fixation

Reinforcement or other relatively rigid objects will be used inside the concrete to enhance the strength of the concrete, mainly to enhance the strength of the concrete so as to better carry out compression and earthquake resistance.

#### ③ Common concrete materials

For construction projects, concrete is used in a large amount and consumes a relatively large number of raw materials. Therefore, it is required that the raw materials of concrete be relatively easy to produce in daily life and have a wide range of origins to meet the construction needs of construction projects.

### 3. Main Factors Causing Cracks in Concrete in Civil Engineering

#### 3.1. Reasons for Cement Heating

The first reason is that the concrete needs to add equal proportion of water in the process of mixing. Lime and water combine to form cement, which will release certain heat in the process of continuous mixing. In the process of building engineering construction, the area of concrete construction is relatively wide, and the thickness of the covering ground is large, resulting in a relatively small coefficient of low surface. Under the interference of external factors, the heat dissipation generated in the cement is hindered, so it will be concentrated in the concrete. At this time, the temperature inside the concrete will be increased, and the difference between the temperature inside the concrete and the temperature of the ground surface will be widened, Concrete cracks will occur.

#### 3.2. Principle of Thermal Expansion and Cold Contraction

① Cement itself causes the shrinkage of concrete area and cracks

When the concrete is covered on the ground, it needs a long process of air drying. In this process, the air drying of cement needs to constantly consume the water in the concrete. When the cement can completely dry and become hard and solid, the consumed water accounts for about 20% of the total water in the concrete, and the remaining 80% is evaporated inside the concrete. Therefore, the water in the concrete is not stable, and it can expand and contract, causing shrinkage of the concrete and affecting the cracks of the concrete.

② The additive caused cracks in the concrete

In the process of concrete paving, construction personnel often add a certain amount of superplasticizer in order to set the cement faster. The added superplasticizer can effectively accelerate the fluidity of concrete and affect the self shrinkage value of cement to a certain extent. High range water reducing agent will play different roles according to different materials, and different materials will have different effects on concrete. However, the influence of dry water reducing agent on concrete is most obvious, and the expansion agent has a certain influence on the self shrinkage value of concrete.

③ The inclusion of mineral materials leads to self shrinkage of concrete

Generally, in the process of concrete production, the construction personnel will add a certain amount of silica fume according to the amount of concrete[2]. Silica fume has a certain impact on the self shrinkage value of concrete. When a certain amount of silica fume is added to the concrete, the self shrinkage value of the concrete will increase with the addition of silica fume. The effect of coal ash and silica fume on concrete is just the opposite. Coal ash will reduce the self shrinkage value of concrete. When the amount of coal ash is added, the reduction range of self shrinkage value in concrete will also increase. Therefore, to a certain extent, the self shrinkage value of concrete in the production process will change with the minerals added from the outside.

#### 3.3. Influence of Temperature Change Factors

Temperature also has a great impact on the construction of civil engineering. During the construction process, the pouring of concrete will change with the change of temperature. For example, when the external temperature

gradually decreases, there will be a certain difference between the internal temperature of the concrete and the ground temperature. When the temperature becomes lower, the time difference will gradually increase, and a certain temperature stress will be formed. The temperature stress formed is related to the temperature inside the concrete and the temperature on the surface. The temperature stress will change with the temperature difference between them. When the temperature difference between them is relatively high, the temperature stress will also increase. In addition, the occurrence of cracks in concrete is directly related to the temperature stress. When the temperature stress becomes larger, the concrete is more prone to cracks. Therefore, in civil construction engineering, the area of civil concrete engineering construction is relatively wide, and the thickness of large-area concrete pouring structure is also relatively large, so the concrete will be restrained by the foundation. When the thickness of the concrete is stronger, the binding force of the foundation on the concrete is stronger. This binding force is caused by the outside rather than the concrete itself. Therefore, the impact on the concrete will cause cracks in the concrete. In the process of concrete pouring, there are also a large number of internal constraints, which will also have a certain impact on the structure of concrete. Under the influence of external factors, the temperature effect is formed, which makes the concrete crack.

### 4. Analysis of Concrete Construction Technology

#### 4.1. Scheme Design Principle of Concrete Construction

In the concrete social work design of civil engineering buildings, we should adopt a scientific way to design the construction scheme, strictly control the relationship between the temperature effect and self shrinkage of concrete, try to avoid or reduce cracks in concrete, use high-quality raw materials for mixing, and ensure the construction quality of concrete.

#### 4.2. Analysis of Construction Technology

##### 4.2.1. Strictly Control the Temperature Stress of Concrete

In order to ensure that the temperature stress of concrete is within the specified range, the following points need to be done during the production process: first, the amount of cement should be controlled. When water meets ash, a certain amount of heat will be released, and the heat will be affected by the surface in the process of dissipation, resulting in a difference in temperature between the ground and the concrete, resulting in cracks in the concrete. Second: control the temperature during concrete pouring: in the process of concrete pouring, it may be affected by the outside world, so it is necessary to strictly control the temperature during concrete pouring. Third: take compulsory cooling measures when necessary[3]. In order to ensure the quality of concrete, when encountering high temperature, a series of measures should be taken to reduce the temperature and solidify the concrete.

##### 4.2.2. Reducing the Constraint of Ground Surface on Concrete

To deal with the relationship between the surface and the concrete in a timely manner and reduce the constraint of the

surface to the concrete, it is necessary to reduce the internal constraint of the concrete, that is, to reduce the internal temperature, and also to reduce the external constraint, which comes from the surface. Therefore, the thickness of the concrete can be reduced to reduce the constraint brought by the surface.

## **5. Construction Technology and Process Monitoring Measures for Concrete Structure**

### **5.1. Controlling the Raw Materials of Concrete**

Construction engineering is a large-scale construction project, which has a very important impact on society and people's lives. Therefore, in the process of purchasing concrete raw materials, it is necessary to pay attention to whether the raw materials have corresponding product certificates. After purchasing, relevant staff should check them. If conditions permit, they can be sent to relevant departments for testing. In the process of concrete configuration, the content of mud in the aggregate and the content of harmful substances in the fine sand shall be controlled. In the process of construction and production, we should always pay attention to the proportion of water and cement in concrete. The cement shall be repeatedly tested before use, and the first batch of cement shall be retested. The quality of reinforcement shall be strictly controlled[4]. It is forbidden to use expired silicate in cement. The processed reinforcement shall be properly protected. A series of measures shall be taken to prevent rusting.

### **5.2. Controlling the Blanking of Reinforcement**

In the process of construction, the construction personnel should strictly follow the drawing operation procedures. Therefore, during the blanking of reinforcement works, there should be strict regulations on the model of reinforcement and it is not allowed to replace it at will. For the joint problem between frame columns, the two reinforcements need to be placed with densified reinforcement for fixation during the process of continuous connection. Therefore, the welding between reinforcing bars must meet the requirements of relevant regulations. The welding slag existing after welding must be removed from the interface in time to do a good job of protection, ensure the stability of reinforcing bars, and prevent deformation of steel plates and reinforcing bars.

### **5.3. Construction Monitoring of Formwork Works**

Regarding the construction control of formworks, before construction, formworks with relatively smooth and clean surface shall be selected and spliced together without leakage. The splicing of formworks shall be carried out in a professional manner according to a certain construction sequence, and shall not be arbitrarily changed. The height of formworks shall be strictly selected according to the

requirements, When the formwork with a thickness of more than 8cm or a span of more than 18m is under construction, a special tall formwork needs to be developed for support to ensure safety. This tall formwork can only be used after being formulated and reviewed.

### **5.4. Paying Attention to Curing During Concrete Pouring**

There are many types of concrete, so it is necessary to prepare a sample during the production process. Make a sample block before the construction so that it can be easily detected in the future and monitored. In order to ensure the quality of concrete, in the process of concrete production, use vibrators to fully vibrate the concrete, and the particle size should be uniform to avoid omission. Construction should be carried out according to the scheme to avoid unnecessary accidents. After pouring, the poured concrete shall be pressed for several times, and then covered with plastic film bags or fresh-keeping films for curing. After a period of time, the concrete needs to be watered tomorrow after initial setting[5]. If it is ordinary port land cement concrete, its curing period is relatively short, about 7 days a week. If the curing work is not done well during the curing process, cracks will appear on the surface of the concrete, and the removal of the film must wait until the specified period, so as to ensure the normal progress of the next process.

## **6. Conclusion**

In civil engineering, concrete plays a vital role, but for the construction technology of concrete, it is necessary to have a perfect management and supervision system to ensure the quality and smooth progress of the project, so as to improve the implementation process of construction projects.

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