

# Discussion on Test and Detection Technology of Building Engineering Materials

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**Abstract:** The quality of building materials is one of the key factors in building engineering, which has a very significant impact on the overall construction quality of building engineering. Combined with the actual needs of current construction projects and the constantly updated and developed new building materials and technologies, the inspection of construction materials also needs to be strengthened and improved. In this paper, the possible problems and the original problems of material testing in construction engineering will be discussed, aiming at providing some theoretical reference for material testing in construction engineering.

**Keywords:** Building Materials; Testing; Problem Inquiry

At present, China's construction technology has made great progress. However, due to the ever-changing international and domestic market situation, people's requirements for construction are constantly changing. Therefore, China must constantly update relevant construction technologies to ensure the quality of construction projects. The testing of building materials in China is still at a low level, and the related technologies cannot be mastered skillfully, which will bring inconvenience to specific construction projects. Therefore, it is of great practical significance to discuss the common problems and their solutions in the testing of building engineering materials.

## 1. The importance of building engineering materials test technology

From the perspective of research, mastering the testing technology of materials test can make the results of building engineering materials test more real and effective, which has the following important functions: (1)

It can guarantee the engineering quality. Materials are the basic elements and occupy a very important position in construction projects, and the quality of materials determines the overall quality of the project. If the quality of materials does not meet the standards, the quality of construction projects cannot meet the standards. Strengthening material testing and strictly controlling material quality can prevent inferior materials from entering the site to a certain extent, and achieve the purpose of preventing and controlling quality. (2) It can popularize new materials. The sustainable development of construction industry is closely related to science and technology. New materials and new processes have obvious advantages in terms of cost and use function. Applying them to construction engineering can not only improve engineering quality, but also reduce engineering cost. Strengthening material testing can help people grasp the advantages of new materials more intuitively and clearly, promote and apply new materials better, and increase economic benefits. (3) It can optimize construction tech-

-nology and configuration. Through the application of material testing technology, the material properties under different mix proportions can be analyzed comprehensively, and the best mix proportion and select excellent construction technology can be determined. At the same time, the mixture ratio can be selected according to the actual demand.

## **2. The construction engineering materials test technical points analysis**

### **2.1 Cement test and detection**

Cement is a kind of building material that is often used in building engineering construction, and the quality of cement material affects the construction effect of building engineering to a certain extent. Therefore, when testing the quality of cement material, it is necessary to ensure that the cement quality conforms to the relevant standards and specifications stipulated by the state (Portland Cement and Ordinary Portland Cement). When testing and accepting cement materials on the construction site, it is necessary to check whether there are loopholes in the packaging bags, and at the same time, check the varieties and grades of cement materials, then check the strength grade and stability of cement, and also check other properties and indicators of cement, so as to know the production date and quality of cement materials clearly and in detail. Once it is found that the production date of cement is more than three months, it is necessary to check the various properties and indicators of cement again to ensure that all the properties and indicators of cement conform to the requirements of relevant standards. Secondly, the quantity of cement materials should be checked, and then the cement grade and variety should be checked in combination with the concrete conditions of cement manufacturers, in which the bagged cement unit is 200 t, and the bulk cement unit is 500 t. In addition, after doing a good job of sampling cement materials, select the same batch of cement materials in different positions for testing, with more than 20 sampling points, mix the obtained concrete evenly, and package it in moisture-proof containers, in which the standard weight of concrete is 12 kg.

### **2.2 Sand test**

Sand and gravel is also a building material which is

used frequently, and it has been widely used in building engineering construction. The performance of sand and gravel from different producing areas is different, so it is necessary to test the sand and gravel. When sampling sand and gravel test, in order to ensure the accuracy of data, random sampling should be carried out at different parts of sand and gravel pile, and multiple sampling should not be carried out at the same position. In addition, in order to avoid the influence of dust on the test results of sand and gravel in the external environment, the sand and gravel in the material pile should be taken when sampling, and the taken sand and gravel should be divided into many parts for uniform blending, and divided into many groups of samples to carry out the test in turn.

### **2.3 Steel bar test**

For construction engineering, steel bar is also an important material, which is the main object of testing, mainly testing the level of mechanical properties. The first is sampling. Compared with cement and sand, because of the different structures, the sampling methods of reinforcement are also different. Usually, before sampling, one end of reinforcement shall be selected in strict accordance with the operation requirements, and it shall be intercepted by 500–1000 mm before sampling. The second is cold-drawn steel bar. In the implementation of cold-drawn steel bar inspection, it is necessary to combine the relevant fixed batch inspection of the country. When the diameter of steel bar materials in the same batch is the same and the grade is the same, the overall quality should be below 30 t. Third, test the welding quality of reinforced materials. Different welding methods of reinforcing steel bars adopt different welding inspection methods. From the current actual situation, the welding methods commonly used are resistance spot welding, flash butt welding and arc welding, etc. If resistance spot welding is used, it is necessary to set the test items in combination with the differences in operation and requirements, such as low carbon steel wire welding spot, the length of the test piece should be controlled between 500 and 650 mm, and the shear test and tensile test are mainly used. If flash welding method is adopted, the length of specimen should be controlled between 500–650 mm during tensile test, and the degree of specimen should be controlled between 250–350 mm during excavation test. If arc welding is used,

the length of the specimen should be controlled between 500 and 650 mm before tensile test.

## **2.4 Testing of wall materials**

In the new period, people's safety awareness is constantly improving, which puts forward more stringent requirements for the safety performance of building walls, mainly focusing on sound insulation performance and pollution indicators. Therefore, it is very important to do a good job in testing wall materials. Wall materials account for a large proportion in construction projects. At present, with the continuous development of the times and the continuous improvement of scientific and technological level, there are more and more kinds of wall materials, such as autoclaved lime-sand bricks and sintered porous bricks. When testing these new materials, it is necessary to be comprehensive and meticulous, not only to test the integrity of the appearance of wall materials, but also to test the strength and grade of wall materials. In order to ensure that the indexes of wall materials are in line with the actual construction requirements, the autoclaved lime-sand brick test is analyzed as an example. The batch of standard units is 100,000 pieces, and the test contents include sample strength grade, size deviation and appearance, etc. Therefore, the specific test should be carried out in groups, one group is 5 pieces, and three groups need to be prepared, one group is used to test the compressive strength of bricks, one group is used to test the bending strength, and one group is needed for emergency.

## **3. Construction engineering materials testing methods**

### **3.1 Ensure the quality of building materials before construction**

Because there are many construction tasks in China and they are spread all over different areas, and each place has a different climate, so there are different requirements for the quality of building materials. Some construction companies repeatedly apply the same method to the testing work when carrying out the testing work of building engineering materials, and some materials have different properties. This method may be used to test the quality of this building material, but it may not be applicable to other building materials. In addition, due to the defects of China's technology in this field, it is

impossible to accurately measure the relevant data, which leads to the failure to guarantee the quality of testing and testing of building engineering materials.

### **3.2 The quality of construction materials testing and testing personnel is low**

When carrying out the test work, it will also affect the authenticity of the test results if the operation is not carried out accurately. At present, the main problem lies in the lack of relevant professionals, so those engaged in this work have no strong professional quality, and can not guarantee the quality of construction materials testing and testing. Moreover, some staff members have weak safety awareness and fail to attach importance to the testing and testing of building engineering materials, which leads to their failure to do their duty in their own posts and work hard, which will have an impact on the testing and testing of building engineering materials.

## **4. The construction engineering materials testing test problem response methods**

### **4.1 Establish and improve relevant systems**

Before carrying out the testing and testing work of building engineering materials, it is necessary to establish and improve relevant systems, so as to ensure that the testing and testing work has rules to follow and can be carried out smoothly. When formulating relevant systems, it is necessary to adjust the testing methods according to different conditions in different regions, to have a different method for different conditions, and to formulate solutions after problems arise. In addition, it is necessary to implement the reward and punishment system, reward those who work according to the workflow, and severely punish those who do not work seriously, so as to stimulate the working enthusiasm of the staff and enable them to better complete relevant tasks. After formulating the system, it is necessary to strengthen the implementation and establish the authority of the system, so that all the staff can work strictly under this uniform, which can effectively improve the work efficiency and make the test of building engineering materials run smoothly.

### **4.2 Update relevant testing and testing equipment**

In order to ensure the quality of testing work, it is necessary to increase the investment of testing equipment. Investigate the original equipment, deal with the equipment that cannot meet the test requirements, keep up with the trend of the times, and introduce newer equipment to replace it. The introduction of more advanced testing equipment can greatly improve the accuracy of testing data, and the new testing equipment can also make up for the shortcomings of the original machine. In order to give full play to the role of the new equipment, the relevant professionals can be invited to teach the staff who carry out the test, so that they can master the related operation of these equipment more skillfully.

### **4.3 Improve the comprehensive quality of construction materials testing and testing staff**

It must be ensured that there will be no problems in the operation process in the testing of building engineering materials. Therefore, it is necessary to train the relevant staff in professional skills, so that they can constantly understand and master the skills needed in this work process, and carry out repeated training in peacetime, so that the staff can master the specific operation process and avoid problems in related work. In addition, it is necessary to assess the staff, regularly check whether the staff has made progress during this period and whether they can perform related operations more skillfully. Finally, it is necessary to strengthen the cultivation of staff's consciousness, carry out ideological education and enhance their professional ethics, so that they can

work conscientiously and complete their tasks with quality and quantity.

## **5. Conclusion**

To sum up, material safety will have a very significant impact on the construction quality, and testing and testing building materials is also one of the main guarantees to directly improve the economic benefits and cost structure optimization level of enterprises. Although there are still obvious problems in the testing of building materials in China's construction industry, both R&D personnel and operators are making efforts to improve these problems. For the construction industry, the development of testing technology must keep pace with the times to meet the rapid development needs of the construction industry, which is still the long-term work theme of the construction industry.

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