

Brief Analysis on Sampling and Testing Method of Concrete Specimen of Building Materials

Fuyong Tang

Huanghuai University 463000

Abstract: In recent years, the construction industry in China has developed very rapidly. The demand for concrete for building materials has also increased. Concrete as a basic construction material for construction projects, its application performance also has a very big impact on the overall construction quality of the construction project, which also requires that all construction companies can do a good job in the detection of concrete specimens, only in this way that we can fully guarantee the application performance of concrete, to lay a good foundation for the smooth construction of the construction project. This article mainly studies the sampling and detection methods of concrete samples of building materials.

1 Introduction

Concrete as an important part of the construction, the pouring quality often directly affects the construction quality of the entire construction project, which requires all construction companies to do a good job of testing concrete specimens. However, there are still some problems of the concrete sampling and detection process at the current stage, and the accuracy and rationality of the test results cannot be effectively guaranteed. Therefore, all inspection departments need to continuously strengthen the sampling research of building materials concrete specimens, and need to optimize and improve the existing detection method continuously, so as to fully guarantee the application performance of concrete, to obtain a good effect at construction project.

2 Field Mixing Concrete

During the sampling and processing of concrete, the sampling personnel is required to combine the requirements of the "Construction Quality Acceptance Specification for Concrete Structure Engineering" and the "Concrete Strength Inspection and Evaluation Standards" to make a reasonable selection of the structural member concrete strength test specimens. During the concrete sampling process, random sampling shall be performed at the pouring site. Specific sampling and indwelling of the test piece also need to fully meet the following requirements: In the process of associating each concrete with 100 plates but not exceeding 100 cubic meters, the require the number of sampling shall not be less than once. When the working time is less than 100 sets of concrete with the same mix ratio, the

number of samples shall be kept at least once. For parts of concrete that has been cast continuously in 1000 cubic meters at a time, at least one sampling process is required. In addition, for the concrete with the same mix ratio on the same floor, at least one sampling process needs to be performed. After completion of each sampling work, the inspector is required to be able to carry out the detention of at least one set of standard maintenance test specimens, and a reasonable selection of the number of retention sets of the same-condition maintenance test specimens should be performed on the basis of the actual requirements [1].

3 Structural Entity Test with the same Condition Curing Specimen

In the process of determining the retention method and sample quantity of the same-condition maintenance specimen for structural entity inspection, it is necessary to meet the following regulations based on the relevant concrete quality acceptance criteria to obtain a good concrete test results: ① The structural entity test is required for the important parts involved in the safety of the concrete structure. The specific inspection contents also include the strength of the concrete, the thickness of the protective layer of the steel reinforcement, and the various items in the relevant construction contract, etc. ② For the same condition curing specimens also need to be witnessed and sampled by the parties at the concrete pouring place. ③ For the same-condition maintenance specimens with the same strength level, the specific retention quantity needs to be controlled in more than three groups to ensure the rationality of the test results. ④ For some concrete specimens that have reached the equivalent curing age, the strength test of the curing specimen under the same conditions is carried out to

effectively detect the strength of the concrete. Under normal circumstances, the equivalent curing age mainly refers to the daily curing temperature reached 600 °C, its age also needs to be controlled within the range of 14d ~ 60d, in addition to the concrete structure inspection process, mostly they take the average temperature of the day as the sampling temperature [2].

4 Ready-mixed Concrete

In the process of sampling and processing of ready-mixed concrete, in addition to the need to carry out test block retention work in accordance with the relevant provisions in the ready-mixed concrete plant, after the concrete is transported to the construction site, it is necessary to combine the "ready-mixed concrete". The relevant regulations are used to carry out sampling work. The following three indicators should be followed in the specific sampling process.

① Concrete specimens used for delivery inspections need to be taken at the place of delivery and require that at least one sample which is was sampled for every 100 cubic meter of concrete with the same mixture . For the concrete with the same mix ratio that is produced by the same working group , even if the amount of concrete associated with it is less than 100 cubic meters , a sampling process is required . If the amount of concrete with the same mix ratio exceeds 1000 cubic meters in a sub-project , it is necessary to maintain at least one sampling treatment for every 200 cubic meter of concrete to ensure the rationality of sampling and concrete . The representative performance of the sample .

② During the sample processing of the factory inspection of concrete samples, it is also necessary to properly take the concrete at the mixing site, and the samples shall be sampled according to the standard that the sampling ratio of concrete shall be no less than one per 100 discs. In the case that the concrete with the same mix ratio is less than 100 plates in a work class, at least one sampling process is also required [3].

③ For the quality of ready-mixed concrete mix, we also need to give each vehicle a visual inspection to make a preliminary and effective judgment on the quality of concrete sampling. Every 100 cubic meters of concrete with the same mix ratio need to be sampled at least once, but when the concrete capacity of the same workshop is less than 100 cubic meters, at least one sampling process is also required.

5 Concrete Impervious Test Block

In the process of selecting concrete impermeability test blocks , it is necessary to combine the relevant standards of " Technical Specifications for Waterproofing of Underground Works " and require 12 blocks of resistance to continuous pouring of concrete below 500 cubic meters . The infiltration treatment of the osmosis test blocks is required and the impervious test blocks are divided into two groups for inspection and treatment . In the subsequent construction process of concrete pouring ,

every additional 250 to 500 cubic meters of concrete , it is necessary to add two more impermeabilities test blocks . In addition , after the use of materials , mix ratios , and construction methods have changed , it is also necessary to combine the other requirements with a reasonable retention of concrete impervious blocks . During the sampling process of the impermeability test block , it is required to be made at the pouring site , and then all the impervious test blocks are grouped into two groups of indwelling treatment . One group (6 blocks) needs to be maintained in a standard curing room . Treatment , while the other group (6 blocks) needs to be treated as the same conditions as the construction site . The specific maintenance period needs to be controlled for more than 28 days , . So it can play a good comparative analysis results [4] .

In addition , in the process of sampling concrete impermeability test blocks , it is also required to be able to fully meet the relevant requirements in the " Construction Quality Acceptance Specification for Concrete Structure Engineering " . For concrete structures of high impermeability requirements , it is necessary to directly pour place for random sample extraction , and in the specific sampling process , for the same project with the same mix ratio of concrete , requiring its sampling times to be kept at least once , in the process of carrying out concrete impervious test block retention process also need the actual situation to do the targeted selection of the number of retention groups .

6 Fly Ash Concrete

For the construction engineering, during the inspection of the quality of fly ash concrete, the slump and compressive strength must also be processed as two important detection indicators. In the process of testing the fly ash concrete slump on site, it must be carried out in strict accordance with the corresponding inspection standards, and requires that each work class should conduct at least two more measurements, and the measured value must also be measured. The error is controlled at $\pm 20\text{mm}$ to obtain a good fly-ash concrete slump test effect. For some non-bulky fly ash concrete, it is required to form at least one set of test blocks for each 100 cubic meters of it, for large volume of fly ash concrete with a proportion of more than 500 cubic meters. In the sampling and inspection process, it is also necessary to form at least one set of test blocks. With regard to the number of affiliated systems being less than the above-mentioned stipulated quantity, it is also required that each working group be capable of performing at least one set of test block forming process [5].

7 Making Test Pieces and Curing

In the production of specimens and maintenance, the relevant inspectors are required to strictly follow the relevant provisions and requirements in the "Standards for Test Methods for Mechanical Performance of

Ordinary Concrete" in order to do well in the maintenance and processing of each specimen.

7.1 Production of Concrete Specimens

In the concrete test specimen production process , It is necessary to fully satisfy the following requirements : ① Before the concrete specimen are formed , the size of the trial muse carefully inspected at first , and the relevant provisions of the inspection standard for the mechanical properties of concrete must be met . Once again , basically we need to apply a thin layer of mineral oil or other type of mold releases agent on the inner surface of the trial mold . This can effectively avoid the reaction which is caused by the contact of the concrete sample with other concrete , thus ensuring the validity of the test of the sample . ② In the process of adjoining concrete in the laboratory , It is necessary to rigorously weigh the amount of all kinds of companion materials . The main content includes cement , admixtures , water and external additives and so on , We need to control the volume of aggregates in the aggregate to about 1% . ③ In the concrete sampling or for the concrete in the laboratory also need to be molded in the shortest time after the formation , generally need to control the molding time for 15min . ④ In the process of making concrete specimens , It is necessary to determine the concrete forming method on the basis of the consistency of concrete mixing materials . For some concrete with a slump within 70 mms , It is necessary to adopt a vibration-tight treatment mode . For concrete larger than 70mm , It is necessary to apply a tampers bar of artificial tamping treatment . In addition , In the process of manufacturing cast-in-place concrete and precast concrete , It is also necessary to combine the actual slump of the concrete for reasonable selection of molding methods . ⑤ In the process of making cylindrical specimens , It is also necessary to strictly follow the corresponding concrete regulations . Under normal circumstances , in the process of concrete production , the concrete mixing material that has been accompanied by the system needs to be mixed with the shovel at least three times , and requires a reasonable selection of the molding method based on the actual requirements of the accompanying system . This is to achieve a good effect of concrete components . In the process of manufacturing concrete specimens by vibratory tampering , it is necessary to first load the concrete mixes into the test molds at one time , and it is also necessary to apply a spatula to each test mold wall of the loading process . The transplanting process requires the height of the concrete mixture exceeds the trial module mouth . After the above operation is completed , the trial module needs to be fixed on the relevant vibration table , and the specific vibration vibration treatment process needs to be maintained . It must not have any beating , and then continue to vibrate until the surface of the concrete component has a slurry . When using the artificial vibrating mode for processing , the concrete mixture needs to be divided into two layers and loaded into the mold , and the concrete filling thickness of each layer is

required to be basically consistent . In the process of transplanting the bottom concrete , It is also required that the boring bar can directly reach the bottom of the test mold , and the verticality of the boring bar to the transplanting process needs to be maintained . After the transplanting is completed , an applicator hammer needs to be used to gently tap around the trial mold to instruct the emptying hole left by the plugging rod to completely disappear . When using the artificial vibrating mode for processing , the concrete mixture needs to be divided into two layers and loaded into the mold , and the concrete filling thickness of each layer is required to be basically consistent . In the process of transplanting the bottom concrete , It is also required that the boring bar can directly reach the bottom of the test mold , and the verticality of the boring bar to the transplanting process needs to be maintained . After the transplanting is completed , an applicator hammer needs to be used to gently tap around the trial mold to instruct the emptying hole left by the plugging rod to completely disappear .

7.2 Test Specimen Maintenance

After the formation of the test piece , it is necessary to apply a water-impermeable film immediately to cover the surface . For some test pieces that use the standard maintenance mode , they need to be left standing for a day and night in an environment around 20° C , and then numbered and demoted . The specific mold removal processes to require that the temperature can be controlled between 18 ~ 22 ° Cs , and its relative humidity also needs to be maintained at about 95% , so as to be able to obtain good conservation effect . If the above conditions do not permit , the concrete specimens can also be placed in 20±2° C non-flowing saturated calcium hydroxide solution to curing . In addition , in the process of placing the test pieces in the curing room , it is also required to place all of them on the support , and the interval between each test piece can be controlled to 10 to 20 mm . During the curing process , the wet performance of the surface of the test piece needs to be maintained , but the concrete test piece cannot be directly treated with water . After completing the remolding of the specimen , it is also required to perform the curing treatment of the specimen under the same conditions . Under normal circumstances , the standard curing period needs to be controlled at about 28 days .

7.3 Experiment Record

After the completion of the concrete specimen preparation and maintenance treatment, it is necessary to perform experimental analysis on the various properties of the component, and it is necessary to make a reasonable record of all experimental contents of its production and maintenance for subsequent follow-up work. Develop a good foundation for development.

8 Conclusion

In recent years, the construction industry in China has developed rapidly, and the number of construction projects has also been greatly improved. However, because the quality of commercial concrete in the construction market is uneven, it also requires relevant construction companies to be able to do concrete well. Test specimens are maintained and tested. This article mainly examines and elaborates the method of curing and making concrete specimens, and hopes to give some theoretical help to the relevant testing departments.

References:

1. Fu Difeng. Performance testing of concrete materials and its influencing factors [J]. Urban Construction Theory Research (Electronic Version), 2016, (11): 4631-4631.
2. Zhang Zhixian. Discussion on the detection of concrete strength of railway box girder using ultrasonic rebound method[J]. Science and Technology Vision, 2015,(22):121-122.
3. Han Dajun. Analysis of problems prone to occur in concrete strength testing and relevant treatment measures[J]. Building Materials, Decoration, 2017, (17): 107,117.
4. Yan Tingting. On-site Inspection of Concrete Strength [J]. Science and Wealth, 2015, (12): 238-239.
5. Kong Shuxian. A concrete sampling test method and its mold: CN201710546548.X[P].2017-08-18.