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Tests Discussions on Testing Method of Concrete Compressive Strength of Prefabricated Components

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Abstract: The rapid development of the construction industry, assembly-type buildings slowly rise, at this time the quality requirements for building components are still very strict, the quality of building components related to the safety of the entire building, the strength of prefabricated concrete components is also an important factor affecting the final quality and safety, Therefore, the appropriate and reliable detection method for detecting the strength of prefabricated components is of great importance.

Keywords: Prefabricated components, strength, detection.

1. Introduction

With the large-scale development of assembly building, prefabricated components have been widely used in construction projects, and the quality requirements of their structural components are also standardized. Prefabricated concrete components as an important building components in our country, the quality of which directly affects the safety and use of the whole construction project. Therefore, the quality inspection of prefabricated concrete components and increase production supervision and certain necessity, as the most important material in construction, concrete materials at this stage and for a long time to come, its economy and application are many materials incomparable. However, at present, there are a lot of concrete is often second-best, its strength can not be satisfactory, especially some national key construction projects, the strength of the concrete standard requirements are very high, so the requirements of the concrete standard is very high, so the concrete strength testing is necessary and necessary. At this time, we need to explore a series or a set of feasible prefabricated concrete component quality testing methods for production or quality inspection personnel to produce the components of concrete strength testing.

2. Organization of the Text

The methods of concrete strength detection of prefabricated components can be divided into two kinds: "non-breakage detection method" and "semi-breakage detection method". Non-breakage detection method is to determine a physical quantity related to concrete strength without damaging the structure or components, according to the relationship between it and concrete strength, indirectly obtain concrete strength, china's current commonly used mainly rebound method, ultrasonic method, ultrasonic rebound comprehensive method, etc. , this kind of method is characterized by convenient testing, low cost The reliability of the test structure is widely used, but the reliability of the test structure depends mainly on the correlation between the amount of physics and the intensity under test, so the relationship between the two must be established after a large number of statistical experiments before testing, and a strict correlation formula or calibration curve must be established before testing.

Semi-breakage detection method is to sample directly from the structure to carry out pressure strength test or other methods to finalize the concrete strength, the current commonly used methods are mainly drill core method, rear anchoring method, pull-out method and so on. Although there is a certain gap between the test results and the strength of the cube test block, the correlation between the two is good, and the dispersion is small and has great reliability. Because of its intuitive and accurate characteristics, it plays an indispensable role in real engineering. However, this kind of method will generally cause a certain degree of damage to the structure or component concrete, especially when the concrete strength is far below the design value, the negative effectof of this kind of damage will be further increased, not suitable for use in large areas of engineering testing. Therefore, the use of such testing methods should be careful, after the end of the test to use a high level of strength of concrete or materials in a timely manner, so as not to increase damage to the structure or components.

3. Common concrete pressure strength detection method

3.1 Rebound method

The rebound method to detect the anti-pressure strength of concrete is one of the most commonly used non-breakage detection methods. The hardness of the concrete surface is detected by the rebound instrument, the rebound value is obtained, and then the depth of carbonization is carried out, and the value of concrete anti-pressure strength is presumed by mathematical relationship and related specifications. The industry specifications currently being implemented are JGJ/T23-2011 "Technical specification for inspection of concrete compressive strength by rebound method" Its

application is the pressure strength of ordinary concrete, and it is not suitable for the detection of concrete strength with potholes on the surface of concrete and defects in the interior.

For concrete that changes in raw materials or construction process, a special local standard curve or special standard curve should be established to determine the strength of concrete pressure. The rebound method detects the concrete pressure strength is a non-destructive test, and it can be quickly presumed that the concrete pressure strength is. However, because the rebound method is an indirect presumption method, there are many influencing factors, such as the difference between the concrete surface and the interior, the angle deviation when the rebound is present, the detection of the depth of carbonization is not cleared, etc. Therefore, the rebound method is a widely used method, but its accuracy is general, only suitable for large-scale spot check detection, not suitable for accurate quantitative detection.

3.2 Ultrasound-rebound method

Ultrasonic-rebound method combines rebound method and ultrasonic detection technology with more accurate detection of concrete anti-pressure strength detection, using the standard CECS02:2005 Technical specification for inspection of concrete compressive strength by ultrasonic-rebound combined method, the method in the same detection area through the rebound method and ultrasonic method respectively to detect concrete, It is a supplement to detect the anti-pressure strength method of concrete by means of mathematical formula and related specifications to presume the corresponding pressure strength value of concrete components. Similar to the anti-pressure strength of concrete detected by rebound method, the application range of ultrasonic-rebound method to detect concrete pressure strength is also ordinary concrete, not suitable for concrete which has caused surface loosening and peeling due to frost damage, chemical attack, fire, high temperature, etc.

Although the ultrasonic-rebound method complements and perfects the rebound method, because of the existence of the concrete component distribution rebar, it is necessary to locate the position of the rebar before the physical component detection process, so as to avoid the influence of the rebar on the ultrasonic value, which causes the data distortion, which affects the test results. It is easy to avoid rebar when using ultrasonic testing method, but the deviation of the test results increases when the angular or oblique side is used.

3.3 Core Drilling Method

Drill core method is the use of drill core machine in the concrete components to drill the core sample, after processing in the laboratory pressure machine for pressure

strength detection, belongs to the direct acquisition of concrete pressure strength detection method, is also a semi-break detection method. The current industry standard sits JGJ/T384-2016 Technical specification for inspection of concrete compressive strength by core drilling method, which is used to determine the presumptive value of concrete anti-pressure strength or to correct indirect strength detection methods. Core samples should be used with a diameter of 100 mm, the diameter should not be less than 3 times the maximum particle size of the aggregate, because the drill core method belongs to the semi-breakage detection method to detect the concrete pressure strength, the number of core samples drilled on the concrete components should not be too much, and should avoid the concentrated force of the component. The drill core method easily truncates the steel bars inside the concrete components, which causes the structural mechanical properties to decrease. The core sample height ratio should be within the 0.95 to 1.05 range, the core sample end needs to be leveled, otherwise it will have a greater impact on the test results. At present, the drill core method is mainly used to detect the concrete pressure strength of other indirect methods.

3.4 Pull-off method

Pulling method is to drill and pull the core sample on the concrete component, with a special pull-off instrument for testing, the measured fracture value according to the specification and the use of mathematical relationship to calculate the value of the concrete component's anti-pressure strength, the current common industry standard of concrete is JGJ/T 378-2016 "Technical specification for inspection of concrete compressive strength by pulled off method" The pull method is also a semi-breakable method to detect the strength of concrete, so it is not recommended to carry out a large number of tests on the finished components, as a direct method to obtain the detection strength, should choose the appropriate location for the test. Clean up in time after the test and repair with fine stone concrete of the same strength or height.

4. Concluding remarks

Based on the methods mentioned above, this method is tried in the test of prefabricated concrete members. According to the actual working conditions and the requirements of components and testing, the main factors affecting concrete are judged, and the appropriate testing methods are selected. In the later stage of the test, we should select or find a reliable and easy-to-use method to test the compressive strength of precast concrete members, improve the accuracy of concrete strength detection, and provide a strong guarantee for ensuring the authenticity of the data of civil engineering construction quality.

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