Research Subcommittee on Quality and Performance Evaluation of Concrete Using Fine Powder from Blast Furnace Slag (360 Committee)

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1. Purpose and outline of the establishment of the subcommittee

There are calls for reducing the environmental impact to build a sustainable society. It is well known that cement manufacturing emits a large amount of carbon dioxide, and the industry is taking steps to reduce it. One practical step that can be taken immediately is to reduce the amount of clinker used. Ground granulated blast furnace slag has long been used in Japan as an alternative to clinker; the main types of cement in Japan are Ordinary Portland Cement and blast-furnace slag cement type B. Blast-furnace slag cement is widely used because it not only reduces the environmental impact of the cement but also improves durability. Using a binder mixed with additional ground granulated blast furnace slag reduces the environmental impact while best using its characteristics. In recent years, much research has been done by construction companies and others, and their utilization has been promoted. In response to this movement, the JSCE established two committees in 2016. In 2018, the JSCE published concrete library 151 'Guidelines for designing and constructing concrete using ground granulated blast furnace slag' and concrete library 152 'Design and Construction Guidelines (Draft) for Concrete Structures Using a Large Amount of Supplementary Cementing Materials (SCMs)'.

In response to this report, this committee was established to promote its use further. While firmly understanding the characteristics of ground granulated blast furnace slag, think about how to use it, what is lacking, and provide technical data that can be used with peace of mind and how. The purpose of the committee was to investigate whether the usage would expand or the necessity of legislation.

2. Main activities

The committee established two working groups and held discussions to expand the use of concrete containing blast furnace slag fine powder. The fact-finding working group traced the history of sales expansion of blast-furnace slag cement to date, determined the kinds of problems that have occurred in each phase, such as manufacturing, sales, and construction from the past to the present, and investigated how to deal with the problems to increase sales. In addition, the working group explored ways to promote the utilization of new materials and construction methods. The committee requested

lectures from owners and material suppliers, and held ten lectures, and summarized each of them. During lectures, the committee WG actively discussed what to focus on and what to do in the future.

The experimental test working group clarified the special performance of the concrete containing ground granulated blast furnace slag and confirmed the precautions to take when using it. In addition, standard test and new test were conducted at about ten universities. In the standard tests, the subcommittee conducted a JSCE round-robin water-permeation rate coefficient test and investigated the fluctuation in the test results for locally produced and consumed materials in various places. In addition, the subcommittee asked young researchers to conduct tests in multiple locations and took measures to encourage young researchers in ground granulated blast furnace slag. The Steel Slag Association supported these measures. The results of the tests, we cleared the characteristics of the concrete and identified the factors that influence to obtain the characteristics. Moreover, the committee discussed the kinds of tests that should be considered indoors and outdoors to develop new materials.

3. Results of surveys and research and prospects

The report was published as Concrete Technology Series 129. However, to reduce the environmental impact and PDF publications are digital, not printed.. As for making new materials available, the committee did not arrive at a solution.

Ground granulated blast furnace slag and new materials and construction methods are indispensable for environmental conservation and the realization of a carbon-neutral society, which are expected to become even more critical in the future. Therefore, we hope that the discussions of this committee will help promote the development of Japanese technology.