

Study on Slowly Cooled Blast Furnace Slag Powder as the Cement Additive

M. Morioka¹, K. Yamamoto¹, T. Higuchi¹ and E. Sakai²

¹*Denki Kagaku Kogyo Kabushiki Kaisha, Itoigawa, Japan*

²*Tokyo Institute of Technology, Tokyo, Japan*

It was found that the self-compacting concrete added with the slowly cooled blast furnace slag powder has a better property of fluidity retention than the self-compacting concrete added with the granulated blast furnace slag powder or the lime stone powder. As for the mortar added with slowly cooled blast furnace slag powder, the greater the Blaine specific surface is, the better the fluidity retention is obtained. The fluidity retention mechanism of the ordinary portland cement - slowly cooled blast furnace slag powder system was shown to be resulted from that the initial hydration of C_3A is suppressed by the thio-sulphate ion released from the slowly cooled blast furnace slag powder.

It was clarified that hardened cement added with slowly cooled blast furnace slag powder (CFS) showed the same degree strength of as that of hardened cement added with lime stone powder (LSP) and that it was hard to carbonation. The hardened cement added with CFS showed a greater increase in strength during the carbonation process as compared with the hardened cement added with LSP and, as a result, pore volume decreased as well to become rigid and dense. We assumed that carbonation after that was suppressed thereafter. It was also found that, as a result of carbonation, melilite and α -CS, which were main components of the CFS, reacted as well.