A Study for Zeolite Mixing Ratio and Strength Property of Cement Solidified Product Mixed with Zeolite

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In Japan, on March 11, 2011, The Fukushima Daiichi nuclear disaster occurred due to the Pacific coast of Tohoku Earthquake. Currently, the disposal of radioactive waste is an issue for the decommissioning of the Fukushima Daiichi Nuclear Power Station. Cesium adsorbed zeolite is a secondary waste generated in the process of treatment of radioactively contaminated water. Therefore, the establishment of a disposal method of the cesium adsorbed zeolite is urgently needed. In this study, in order to examine the feasibility of cement solidification technology, Strength property and fresh property of the cement solidified product mixed with zeolite was evaluated.

In this study, first, it was examined whether cement solidification of cesium adsorbed zeolite has feasibility in terms of strength property. Next, the zeolite mixing ratio and chemical admixtures were examined. In this study, the zeolite mixing ratio was defined as the volume of zeolite relative to the volume of cement paste. The used chemical admixtures ware MasterX-Seed120JP (hereinafter called "MXS") as hardening accelerator and two kinds of super plasticizer. The used super plasticizers ware MasterGleniumSP8SV (hereinafter called "MG") and MasterEase3030 (hereinafter called "ME"). Conducted tests ware the flow test and the compressive strength test.

The present study confirmed that the compressive strength decreased with the increase of the zeolite mixing ratio. In the case of sealed curing, a decrease in strength occurred at a long-term material age. On the other hand, mixing of fly-ash improved the strength property. From this, even in the case of solidifying zeolite, the effectiveness of using fly-ash was confirmed. In any case, the cement solidified products had sufficient strength. From the examination of fluidity, the zeolite mixing ratio was decided to be 200%. Examination of chemical admixture have shown that the flow value is better when using ME than MG. The flow values also tended to decrease with use of fly-ash and MXS. In addition, the compressive strength of sealed curing with the addition of MXS was reduced compared to water curing. From this result, it is presumed that a certain amount of water is required to promote strength development by the effect of MXS.