

# **Experimental study on development of concrete and concrete materials to reduce environmental burdens**

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In this study, the development of concrete and concrete materials in order to reduce environmental burdens was experimentally carried out. The paper has five chapters as following.

Chapter 1 is "Introduction." This research can take a part of the plans established in the world, in Japan, especially in Shiga prefecture, to achieve environmental preservation. Also, the study on development of concrete and concrete materials for reduction of environmental burdens can help to build a resource-recycling society for further economic development.

Chapter 2 is "Application of porous concrete to creation of reed colonies." Porous concrete is experimentally examined as one of the useful materials for reproducing reed colonies along Biwa lakeshore. First of all, the mix proportion of the porous concrete suitable for the growth of reeds is determined and the porous concrete in a container is planted with reeds to observe the favorable growth of reeds. Finally, the five years' observation of the porous concrete and the coconut fiber base in general use planted with reeds along Biwa lakeshore is carried out. Comparison between these two kinds of bases clearly leads the effectiveness of porous concrete.

Chapter 3 is "Utilization of melt-solidified slag derived from sewage sludge for concrete." The concrete including melt-solidified slag derived from sewage sludge as fine or coarse aggregates is experimentally investigated. First, the property of the molten slag itself is examined. Next, the condition of fresh concrete, strength, deflection, resistance to freeze-thaw and fatigue behavior under compression of mortar and concrete with molten slag are discussed. It is indicated that the concrete inclusive of molten slag can be used as same as the general concrete if recognizing a few differences from normal aggregates.

Chapter 4 is "Case study on calculation of environmental burdens as an experiment." Two types of calculations of environmental burdens as an experiment are made in case of (1) applying a porous concrete to creation of reed colonies along Biwa lakeshore and (2) using melt-solidified slag derived from sewage sludge for concrete. The reduction of environmental burdens in future is quantitatively evaluated.

Chapter 5 is "Conclusions" obtained by this study.