

Effects of fine content on mechanical properties of recycled concrete aggregates for unbound road base materials in Vietnam

*Thai Hong Nam¹, Akira Kato¹, Takeshi Saito¹, Ken Kawamoto¹

1. Graduate School of Science and Engineering, Saitama University

Unbound aggregates crushed from natural rock such as limestone, granite are the most popular materials used to construct the base of the pavements. However, nowadays the resources of natural materials have been increasingly exhausted while the demand for using aggregates in road construction has been increasing due to economic growth and rapid urbanization. Currently, construction and demolition waste (CDW) generated in urban areas in Vietnam is not fully recycled and is used on- and/or off-site for landfilling and ground leveling without the quality control of materials. Besides, some of CDW has been being dumped along a road or river, or in a pond for landing illegally. Therefore, the utilization of CDW for recycling is a crucial issue to reduce the generation amount of CDW and consumption of natural resources.

There were many studies on various factors that affect the mechanical properties of recycled concrete aggregates (RCA). Among of the factors, the fine content influences significantly on the mechanical properties of unbound aggregate road base and subbase. However, the effect of fine content (F in wt.%; typically, with particle size less than 0.075 mm) has not been fully evaluated quantitatively. This study focused on the effect of F on the compaction properties and California Bearing Ratio (CBR) of the RCA base. The samples with the maximum particle size of 25mm, and four different F values, i.e. 0, 5, 10, and 20 %, were prepared and their test results were compared to the current Vietnamese standard. The experimental results showed that the maximum dry density reached highest value with F of 5-10%. Except for the tested sample with F of 20%, the measured CBR values with F of 0, 5, and 10% satisfied the technical requirements of Vietnamese standards, i.e. CBR over 100.

Keywords: Base, Recycled Concrete Aggregate (RCA), fine content, compaction, California Bearing Ratio (CBR)