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再生混凝土冻融后基本力学性能试验研究(PDF)

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Title: Experimental study on basic mechanical properties of recycled concrete after freeze-thaw cycles

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摘要: 为了研究再生混凝土的抗冻融性能,进行了不同再生粗骨料和不同再生细骨料取代率的54个立方体试块和27个棱柱体试件的抗冻融性能试验。基于试验,分析了分别经25次、50次、75次和100次冻融循环后,各阶段棱柱体试件的表现特征、质量损失率、相对动弹性模量改变量以及立方体试块的抗压强度损失率;研究了"试件质量损失率-冻融循环次数"、"试件相对动弹性模量改变量-冻融循环次数"的变化规律;提出了适于寒冷地区建造房屋结构的再生混凝土骨料及其取代率。研究表明,再生粗骨料取代率为50%、细骨料为普通砂的试件,经100次冻融循环后,其表现特征、质量损失率、相对动弹性模量改变量均与普通混凝土相差不多,经合理设计,仅掺入不高于50%的再生粗骨料的再生混凝土可用于寒冷地区混凝土房屋结构。

Abstract: In order to study the freeze-thaw durability of the recycled concrete, the fast freeze-thaw cycle tests were carried out on fifty-four cube specimens and twenty-seven prism specimens with different replacement ratios of recycled coarse or fine aggregate. Based on the experiment, appearance features, mass loss rates, changes of relative dynamic elastic modulus of prism specimens, and loss rates of compression strength of the cube specimens for 25, 50, 75, and 100 freeze-thaw cycles respectively were analyzed. The relationships of the mass loss rate and the relative dynamic elastic modulus of specimens with the increase of freeze-thaw cycles were analyzed as well. The recycled aggregate and its replacement ratio, which are suitable for building structures in cold area, were proposed. Research shows that after 100 freeze-thaw cycles, the specimens with

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50% replacement ratio of recycled coarse aggregate and natural sand fine aggregate do not make much difference compared with ordinary concrete in appearance features, mass loss rate and the relationship of relative dynamic elastic modulus, So through reasonable design, the recycled concrete with no more than 50% replacement rate of recycled coarse aggregate can be used for building structures in cold areas.

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