

Effect of mortar reduction in recycled aggregates used in concrete

Letelier V.

Tarela E.

Muñoz P.

Background: Following a global environmental concern, concrete manufactured with recycled materials has been widely studied. The reuse of concrete as raw material can reduce the amount of debris and the amount of natural resources needed minimizing the environmental impact. Objective: One of the fundamental issues when using recycled aggregates is the mortar that remains adhered to their surfaces. The effect of this adhered mortar on aggregates, obtained from pavement demolition debris, used in recycled concrete is studied. Method: A mechanical abrasion process is used to reduce the amount of mortar in different degrees from the recycled aggregates that will be used to replace a 40 % of natural coarse aggregates in structural concrete. The mechanical behavior is studied through the compressive and flexural strength of the material and compared with the values obtained for a control concrete, with no recycled aggregates. Results: The abrasion process is proven to be effective eliminating the adhered mortar to the aggregates and the results show that a medium abrasion level, around 200rev, improves significantly the mechanical properties of the recycled concrete, increasing its compressive strength. Conclusion: The percentage of recycled aggregates used in structural concrete can be increased if these are treated with simple mechanical abrasion. The residuals of the eliminated mortar can be also reused as cement replacement, maximizing the material reuse. © 2017 Letelier et al.

Compressive strength

Mechanical properties of concrete

Recycled aggregates

Recycled concrete