

MPA Cement Fact Sheet 6

Use of recycled aggregates in concrete

Introduction

There is a public will to reduce the use of primary aggregates in construction, including concrete. Inert, construction and demolition waste (and especially crushed concrete) forms a possible source for recycled aggregates when produced in accordance with a WRAP Quality Protocol. Over 60% of this type of material is used as aggregate, general fill or for land reclamation. British Standards permit the use of recycled aggregates in some forms of new construction. Around 17% of UK aggregate needs are already met from recycled material.

What is recycled aggregate?

Recycled aggregate is derived from crushing inert construction and demolition waste. It may be classified as crushed concrete aggregate (CCA) when consisting primarily of crushed concrete or more general recycled aggregate (RA) when it contains substantial quantities of materials other than crushed concrete. Currently, only the use of coarse aggregate derived from construction or demolition waste is recommended for use in new concrete construction.

CCA is not the same as reclaimed or recovered aggregate, where these materials are obtained from either the fresh or hardened ready-mixed concrete returned to the concrete producer.

How are recycled aggregates covered by existing standards?

The British/European harmonised product standard, BS EN 12620, Aggregates for concrete, makes no distinction, in terms of properties covered, between: natural, manufactured or recycled materials and mixtures of these aggregates. The British Standard for Concrete, BS 8500 (the complementary UK Standard to the European standard BS EN 206) and, in effect a 'national Code of Practice' for concrete, applies product-specific, and specification-specific, conditions on the use of recycled aggregates in new concrete construction.

CCA conforming to the requirements of BS 8500-2 can be used in both Designated and Designed concretes. In Designated concretes RC20/25 to RC40/50, a maximum of 20% of the natural coarse aggregate can automatically be replaced by coarse CCA and more may be permitted by the specification. For Designated GEN concrete or Designed concrete there are no general restrictions in the standard on the proportion of coarse CCA, as long as any aggregate durability criteria (e.g. frost resistance) are satisfied. CCA can be used in concretes of strength classes up to C40/50 and in most exposure classes, except exposure to salt (XS, XD), severe freeze-thaw (XF2 - XF4) or aggressive ground more severe than design chemical class DC-1.

As the potential composition of RA is so wide the additional specification requirements should be assessed on a case-by-case basis taking into account the specific composition of the RA.

Where can I find out more?

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Further reading

WRAP, Quality Protocol - Aggregates from inert waste, October 2013. Introduction

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