

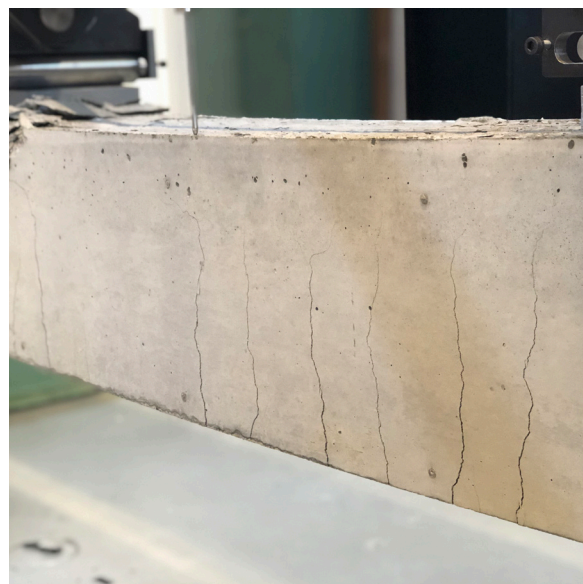
Recycled concrete in structural applications

Concrete is known to be the most employed building material in construction. Circularity in the construction sector supports the responsible use of concrete as a building material. It is to say that residual concrete or demolition concrete waste can be crushed and recycled as aggregates and applied in new concrete or as filler materials; the result of this being denoted as Recycled Concrete Aggregates (RCA). It is however projected that the application can also be extended to structural applications.

In this project, RCA was processed from reinforced concrete edge beams sourced from a demolished bridge in Gullspång, Sweden. Three recycled aggregate concrete (RAC) mixes and a benchmark mix with only crushed aggregate were developed.

The aggregate replacement ratios investigated were 20%, 50%, and 100% of the crushed aggregate by RCA. Samples of the mother concrete from the demolished bridge were also recovered for comparison purposes with the developed mixes. The mechanical behaviour, in terms of compression and tension properties, was characterized at the material level for the mixes, while the flexural capacity was investigated at the so-called component level (reinforced edge beams).

It was found that if the concrete used to produce RCA is of high quality and from one source, the resulting RAC will have adequate mechanical properties with minimal variation despite the aggregate



replacement ratio. The outcome of this project also indicates the potential of using RCA in a recycled concrete product in structures, which is a responsible use of resources and an innovative product development compared to the current use of RCA as a “reused material”.

The results presented here were generated within a project entitled “Återvunnen betongkross i klimatneutrala konstruktioner inom transportinfrastruktur” financed by Infracweden 2030: a strategic innovation program and ÅForsk.

Contact:

Natalie Williams Portal
natalie.williamsportal@ri.se

