

Crushed return concrete as aggregates for new concretes

Parmenowa L.A., Kleschonok L.
Belarusian National Technical University

Every year students take part in the annual scientific conference held at the BNTU. They choose urgent issues and represent the results of their research. This paper is about crushed returned concrete as aggregates for new concrete.

The geographical situation of Belarus has predetermined its role of a transit state and the road pavement must be of an adequate rigidity, uniformity and resistance to wear. Cement concrete surfacing has a very considerable, inherent strength and temperature stability. European countries have generally been more advanced in terms of sustainable development, particularly related to the use of recycled concrete aggregate in concrete. Every year 2% to 10% of ready mixed concrete can be returned to the concrete plant. The returned concrete can be used in the following manner:

1. If it is a small quantity of returned concrete, fresh material can be batched on top. Hydration stabilizing admixtures might be involved in this process;

2. Returned concrete can be processed through a reclaimer system to reuse or dispose the separated ingredients, including the process water with a hydration stabilizing admixture as needed;

3. Returned concrete can be used for production of other products, such as concrete blocks either for resale or disposal;

4. Returned concrete can be discharged at a location in the concrete plant for processing. The hardened discharged concrete can be subsequently crushed for reuse as a base for pavements or fill for other construction. The separation of the crushed material can produce different products for use. In general, the finer crushed product is difficult to manage and dispose. This could be material finer than 2 inches.

Three different mixtures with CCA (crushed concrete aggregate) were produced at the ready, mixed concrete plant. They were tested for slump, air concrete, temperature, density and compressive strengths.

The compressive strength cylinders were subjected to two curing conditions: lab moist curing; field curing near the location where the concrete had been discharged.

Based on the results of the tests it is recommended that CCA stockpiles should be sprinkled prior to batching to avoid significant slump loss, especially if larger quantities are used. Even with maintaining CCA in a moist condition, significant slump loss was observed due to the increased quantity of fines.

We can conclude, that if we use recycled concrete aggregates in road construction in Belarus, the cost of cement concrete surfacing will be lower.