



The high quality recycled concrete secondary materials

Katarzyna Kalinowska-Wichrowska

Białystok University of Technology, Poland

Abstract:

Recycling is currently one of the main ways of managing concrete debris. The huge consumption of concrete in the world and the fact that its production consumes huge amounts of non-renewable resources induce a responsible approach in searching for methods and possibilities of its effective recycling. The mechanical methods of recycling concrete debris that are most commonly used on an industrial scale rely on its single or even multiple crushing. They are focused mainly on obtaining secondary aggregate. This is mainly due to the high absorbability of these aggregates, caused by the presence in their composition of a porous cement mortar, which adversely affects both the characteristics of the aggregate itself and the concrete. The purpose of other known methods is to remove cement mortar from the surface of recycled aggregate grains by: mechanical abrasion in screw mills or eccentrically rotating cylinders, by introducing additional heating of debris or gravitational classification of aggregates due to their density. Emerging advanced recycling methods are mainly based on improving the properties of secondary coarse aggregates. In recent years, a lot of attention has also been paid to the fine fraction obtained in the recycling process next to coarse aggregates (representing 60% of the waste volume). Comprehensive methods that allow complete processing of rubble concrete waste are welcome. It was considered necessary to conduct analyzes in the scope of improving concrete recycling technology with a focus on obtaining aggregates and recycling mortar with high parameters, which can be successfully re-included in the construction production cycle. This became the object of many years of research team work,



which resulted in obtaining a patent for the method and device for comprehensive recycling of concrete debris PAT.229887PL. The proposed method of comprehensive recycling is based on the use of thermal and mechanical treatment of concrete debris. As a result of the developed processing technology, high-quality recycled aggregate was obtained, which improves the strength parameters of concrete, without causing significant deterioration of other parameters (water absorption, water permeability, frost resistance). A fine material with binding properties was also obtained, which can be successfully used as an active additive for cement composites and lime-sand products.

Biography:

Katarzyna KALINOWSKA-WICHROWSKA works at Department of Building Engineering and Environment Engineering in the Białystok University of Technology, Poland

Recent Publications:

1. Kalinowska-Wichrowska, K, et al; Materials (Basel). 2019
2. Kalinowska-Wichrowska, K, et al; Materials (Basel). 2019

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