

Abstract

In many countries around the world, and even more so in developing countries, the problem of the use of end-of-life tires (NFU) is very much present, mainly because they lack selective collection and an adequate management system.

The retreading method is the alternative process in NFU management, which consists of replacing the worn tread of a used tire, performing the reconstruction of its original structure. The scraping of the surface is the stage where all the waste that is obtained in the form of tire fibers (FN) and particles is generated. This type of waste can be valued as raw material to obtain pre-fabricated non-conventional building elements and low economic and environmental costs.

In this work, tire residues have been used in the preparation of cement / pozzolan matrices and alkaline activation matrices. For this purpose different residues have been used: In the case of cementitious matrices, a residue of the petroleum industry has been used as pozzolan; The fluid catalytic cracking (FCC) as a 15% substitution of cement for this residue.

In the case of geopolymeric mortars, two types of waste have been used as the precursor agent: FCC, and blast furnace slag (SC). On the other hand, and for the preparation of the activator solution, a mixture of sodium hydroxide and rice husk ash (CCA) has been used as the source of silica. In parallel, and for mortars with slag, sodium carbonate activator has been used as activator.

In all previous systems, part or all of the aggregate has been replaced by FN, as an ecological option for the reuse of this material.

The objective of this study is to evaluate the NFU from its application as FN in ultra-light binder mixtures based on portland cement and alkaline activated cement, so that many of its physical, mechanical, thermal and thermographic properties have been analyzed, To develop applications in civil engineering and building as is the case of microconcrete tiles.

The use of FN decreases the density of the hardened mixtures and reaches the minimum values of compressive strength, collected by the standard for masonry pieces. On the other hand, the analysis of thermography and thermal conductivity show that the increase of FN in the dosage of mortars decreases the values of heat transmitted in the studied material, reaching lower values than in conventional concretes and similar to that of light concrete with clay expanded.