

The main objective of this work is the development of a new sand concrete whose aggregates consist only of river (0/4 mm) or dune (0/63 mm) sand and recycled plastic aggregates (0/3.15 mm). The work has both ecological and economical interest, without forgetting the technological interest which certain materials provide. Indeed, what is new in our case is the addition of plastic aggregates to sand concrete as well as the study of the acoustic properties of this material.

Different compositions have been studied by replacing (in volume) the mineral sand with plastic aggregates. The envisaged proportions are: 0%, 25%, 50% and 75%. The work focused mainly on the study of the effect of the addition of plastic aggregates on the properties of the river sand concrete and dune sand concrete, such as the thermo-mechanical properties and microstructure, with particular emphasis on studying the acoustic properties. The results obtained showed that, although the compressive strength of the studied composites is slightly reduced, their qualities in thermal insulation and acoustics absorption are significantly improved. For substitutions of up to 75%, the sound absorption coefficient and the noise reduction coefficient (NRCs) ranged between 0.15 and 0.6 and between 0.28 and 0.39 respectively. Based on the obtained results, the final product is a lightweight concrete which can be classified, according to ISO 11654, into the sound absorption classes D and E. It is able to integrate among the new building materials and to contribute to sustainable development, particularly in local construction (arid regions). In conclusion, the recycled plastic waste and the dune sand can be a suitable alternative to the classic building materials