

The Mechanical Properties of Rammed Earth with Plastic Fibers

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Abstract : In recent years, the world has begun to adopt more sustainable practices in response to today's environmental and climate challenges. The construction sector is one of the most resource-intensive among others, so researchers are testing different types of materials with different processes and methodologies to achieve more environmentally and sustainably friendly buildings. Plastic is one of the most harmful materials for the environment. The global production of plastics has increased dramatically in recent decades, and it is one of the most widely used materials. However, plastic waste is not biodegradable and has a chemical composition that is stable for many years in the environment, both on land and in water bodies. Recycled plastics have been tested to be used in construction in many ways to reduce the amount of plastic in the environment and the use of raw materials in construction. In this context, the main objective of this research is to test the use of plastic fibers with one of the most promising materials to replace cement, which is rammed earth. In fact, rammed earth is considered one of the most environmentally friendly materials due to its use of local raw materials, recyclability, and low embodied energy. In this research, three different types of plastic fibers were used. Then, the blends were evaluated by considering their mechanical properties, including compressive strength and tensile strength. In addition, the non-destructive ultrasonic wave velocity was measured. The result shows excellent potential for the use of plastic fibers in rammed earth, especially in terms of compressive strength.

Keywords : mechanical characterization, plastic fibers reinforcement, rammed earth, sustainable material

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