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Data Article

Data on the physical and mechanical properties of soilcrete materials modified with metakaolin

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ABSTRACT

During the last decades eco-friendly, low-cost, sustainable construction materials for utilization in civil engineering projects have attracted much attention. To this end, soilcretes are non-conventional construction materials produced by mixing natural soil such as natural clay or limestone sand with a hydraulic binder and are recently under detailed and in-depth investigation by many researchers. In this paper the results of the physical and mechanical characteristics of a large set of cylindrical specimens under uniaxial compression, are presented. Specifically, two types of soils such as sand and clay with metakaolin as a mineral additive have been used. This database can be extremely valuable for better understanding of the behavior of soilcrete materials. Furthermore, the results presented herein expected to be of great interest for researchers who deal with the prediction of mechanical properties of materials using soft computing techniques such as artificial intelligence (AI) techniques.

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Specifications Table

Subject area	*Materials Science and Engineering*
More specific subject area	*Construction and Building materials*
Type of data	*Tables, figure*
How the data were acquired	*Macroscopical and experimental tests*
Data format	*Raw, analyzed*
Experimental factors	*Pretreatment of samples included drying of natural clay ground soil at 105 °C for 5 days and crushed quarry sand at 105 °C for 24 h in an electrical laboratory oven and then sieved in order to pass a 2 and 4.75 mm sieve correspondingly. Mixing of binder batches was conducted in a laboratory swing mill for 1 h without further grinding of solid constituents until homogeneity of the blends was reached.*
Experimental features	*Testing the shrinkage, bulk density after 1 day of curing and compressive strength, modulus of elasticity and strain at maximum stress after 28 days of curing of 2 type soilcrete materials samples that contained different contents of natural clay ground soil or crushed quarry sand of a limestone origin and different content of a variable-in-synthesis ordinary Portland cement-metakaolin binder at different water/binder ratio values in laboratory situation*
Data source location	*Laboratory of Concrete & Aseismic Constructions, Department of Civil Engineering, School of Pedagogical & Technological Education, Athens, Greece*
Data accessibility	*Data within this article*

Value of the data

- The research data are important for researchers who deal with eco-friendly, low-cost, new, sustainable construction materials with improved mechanical properties for utilization in civil engineering projects.
- The experimental data can be extremely valuable for the development of a mix design process focused on soilcrete materials and to elucidate the relation between physical and mechanical properties through the comparison of macroscopical observations with experimentally measured mechanical characteristics.
- The experimental data presented herein expected to be of great interest for researchers who deal with the prediction of mechanical properties of materials using soft computing techniques such as artificial intelligence (AI) techniques and provide an initial dataset point to generate and validate numerical and/or analytical models.

1. Data

Data on the synthesis and physicomechanical characteristics of 2 types of environment-friendly soilcrete materials are presented. Soilcrete samples contained different contents of natural clay ground soil or crushed quarry sand of a limestone origin as replacement of the aggregate phase. Metakaolin has been added at variable contents as a mineral additive to the ordinary Portland cement-based binder mix, at different water/binder ratio values (W/B). Specifically, the Research Database presents measured physical and mechanical properties such as the 28 days compressive strength (f_c), the modulus of elasticity (E_c) and the strain at maximum strength (ε_0) (Fig. 1) of a large