

Mineralogical Study of the Triassic Clay of Maaziz and the Miocene Marl of Akrach in Morocco: Analysis and Evaluating of the Two Geomaterials for the Construction of Ceramic Bricks

Authors : Sahar El Kasmi, Ayoub Aziz, Saadia Lharti, Mohammed El Janati, Boubker Boukili, Nacer El Motawakil, Mayom Chol Luka Awan

Abstract : Two types of geomaterials (Red Triassic clay from the Maaziz region and Yellow Pliocene clay from the Akrach region) were used to create different mixtures for the fabrication of ceramic bricks. This study investigated the influence of the Pliocene clay on the overall composition and mechanical properties of the Triassic clay. The red Triassic clay, sourced from Maaziz, underwent various mechanical processes and treatments to facilitate its transformation into ceramic bricks for construction. The triassic clay was subjected to a drying chamber and a heating chamber at 100°C to remove moisture. Subsequently, the dried clay samples were processed using a Planetary Babs II Mill to reduce particle size and improve homogeneity. The resulting clay material was sieved, and the fine particles below 100 mm were collected for further analysis. In parallel, the Miocene marl obtained from the Akrach region was fragmented into finer particles and subjected to similar drying, grinding, and sieving procedures as the triassic clay. The two clay samples are then amalgamated and homogenized in different proportions. Precise measurements were taken using a weighing balance, and mixtures of 90%, 80%, and 70% Triassic clay with 10%, 20%, and 30% yellow clay were prepared, respectively. To evaluate the impact of Pliocene marl on the composition, the prepared clay mixtures were spread evenly and treated with a water modifier to enhance plasticity. The clay was then molded using a brick-making machine, and the initial manipulation process was observed. Additional batches were prepared with incremental amounts of Pliocene marl to further investigate its effect on the fracture behavior of the clay, specifically their resistance. The molded clay bricks were subjected to compression tests to measure their strength and resistance to deformation. Additional tests, such as water absorption tests, were also conducted to assess the overall performance of the ceramic bricks fabricated from the different clay mixtures. The results were analyzed to determine the influence of the Pliocene marl on the strength and durability of the Triassic clay bricks. The results indicated that the incorporation of Pliocene clay reduced the fracture of the triassic clay, with a noticeable reduction observed at 10% addition. No fractures were observed when 20% and 30% of yellow clay are added. These findings suggested that yellow clay can enhance the mechanical properties and structural integrity of red clay-based products.

Keywords : triassic clay, pliocene clay, mineralogical composition, geo-materials, ceramics, akach region, maaziz region, morocco.

Conference Title : ICACM 2023 : International Conference on Advances in Clay Mineralogy

Conference Location : Paris, France

Conference Dates : September 18-19, 2023