Influence of Sulfate and Chloride on The Mechanical Properties of Fired Clay Masonry Wall

Abstract

This paper presents the influence of aggressive environment on the mechanical properties of masonry systems. The investigation involved the measurement of strength and modulus of elasticity of single leaf brick masonry wall which were built from fired clay bricks in conjunction with designation (iii) mortar with proportions of 1: 1: 6 (OPC: lime: sand). After being constructed, the specimens were cured under polythene sheet for 14 days in a controlled environment room with 80 ± 5% relative humidity and temperature of 25 ± 2ºC. The specimens were then exposed to the solution containing sodium sulfate and sodium chloride. The strength and modulus of elasticity of the brickworks were determined at the ages of 28, 56 and 180 days. The strength and modulus of elasticity of the brickworks, unbonded bricks, and mortar prisms were determined at the ages of 28, 56 and 180 days to quantify the contribution of bricks and mortar on the deformation of the masonry walls. As a result, fired clay brickwork is not durable and deteriorate in the environment containing sodium sulfate but durable in sodium chloride. The deterioration of the brickwork clearly influenced by the deterioration of mortar joint. The present of sodium chloride also retarding the attack of sodium sulphate.