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G.S. Pavan, S.N. Ullas, K.S. Nanjunda Rao

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SHEAR BEHAVIOR OF CEMENT STABILIZED RAMMED EARTH ASSEMBLAGES

G S Pavan[1], S N Ullas[2] and K S Nanjunda Rao[3]

ABSTRACT

Adoption of rammed earth technology in building construction has witnessed a surge during the recent times and hence it is essential to understand the mechanical behavior of rammed earth under various loading conditions. In this study, in-plane shear behavior of cement stabilized rammed earth (CSRE) is assessed by conducting two types of tests namely (i) Direct shear test of CSRE causing shearing along two adjacent rammed earth layers similar to triplet shear test of masonry bed joints which is henceforth called as triplet test and (ii) Diagonal tension (shear) test of CSRE panels according to the procedure recommended in ASTM-E519 (2015). Three types of bonding techniques between the rammed layers of CSRE are explored in this study, namely, (i) making conical dents which act as shear connectors between rammed earth layers, (ii) applying a coat of fresh cement slurry along the interfaces of rammed layers and (iii) combination of dents and fresh cement slurry and their influence in enhancing the interface shear strength of CSRE is assessed. The bonding techniques are adopted for both, triplet specimens and diagonal panels. Further, the effect of compressive stress normal to the rammed earth layers on the interface shear behavior of triplet specimens is examined. The different levels of normal pre-compression considered are 0.05 MPa, 0.3 MPa and 0.9 MPa. The triplet and diagonal tension (shear) tests on CSRE assemblages are conducted under both, dry and wet conditions. Shear behavior is assessed in terms of shear strength, shear modulus, strain at peak stress, post-peak behavior and failure patterns.

[1]Assistant Professor, Department of Civil Engineering, Shiv Nadar University, India 201314

[2]Senior Project Scientist, Centre for Sustainable Technologies, Indian Institute of Science, Bangalore, India 560012

[3]Chief Research Scientist, Department of Civil Engineering, Indian Institute of Science, Bangalore, India 560012