

FE Analysis of Complex Discontinuous and Jointed Structural Systems (Part 2: Application of the Method – Development of a 3D Model for the Analysis of Unreinforced Masonry Walls)

A.D. Tzamtzis and P.G. Asteris

*Department of Civil Works Technology,
Technological Educational Institute of Athens, Greece.*

ABSTRACT

In this part, a non-linear 3D finite element model for the analysis of unreinforced masonry walls subjected to static and seismic loads is presented, in order to demonstrate the applicability and potential of the method proposed in Part 1. The work reported here could also stand “on-its-own”, due to the detailed investigation made on this particular subject. The model developed considers masonry as a two-phase material, treating bricks and mortar joints separately, thus allowing for nonlinear deformation characteristics and progressive local failure of both bricks and mortar joints. The influence of the mortar joints is taken into account by using ‘interface’ elements to simulate the time-dependent sliding and separation along the interfaces. Analytical and experimental solutions available in the literature have been employed to verify the results obtained from the present finite element model, showing that it is capable of a high degree of accuracy.

KEYWORDS

Discontinuous structures, Interface element, Masonry Wall, Non-linear behaviour.
