

Structural Repair of single layer masonry dome in Brihuega (Spain)

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Abstract Brihuega is a small ancient town in Central Spain, whose activity in the past was linked to fabric manufacturing, and in the XV-XVIth centuries was provided with several churches and convents uninhabited nowadays. One of these is the church of Madres Jerónimas, a single nave covered by a single span barrel vault. It has a single layer masonry dome above the altar, that had partially collapsed. The church was decided to rebuild and restore. A multiphase postensioning strategy was designed to make ancient and new parts of the construction work properly. It was analysed the set of stiffness interactions between the dome itself, its boundary flat diaphragm and its surrounding walls. Fluage and creep of both ancient and new masonry were considered. All analysis procedures were ruled by 3D FEM (Finite Element Method) model. Linear, non-linear and time-dependent analysis were necessary to get accurate information for new structure and construction procedure.

Keywords Single layer domes, masonry, postensioning, structural repair