

ABSTRACT

The façades of brick enclosures are one of the most widely used in current residential architecture in Spain. It is a type of facade with centuries of history, but that still stands due to the tradition of the ceramics industry and its ease of implementation and maintenance.

This type of enclosure is built traditionally in Spain supporting its outer sheet in the floors of the building, which leads to stability problems of this sheet problems of thermal insulation and sealing against water. Lots of buildings have been found with these damages. Damages are classified according to their origin. To meet these disadvantages arises self supporting facade, heir to the cavity wall, which is separated from the floors leaving a continuous air chamber. This facade transmits vertical loads, due to the weight directly to foundations, and transmits horizontal loads, due to wind, the building structure by metal anchors.

The objective of this thesis is to study the mechanical behavior of brick enclosures to propose improvements to avoid the problems of stability and strength. To this end, the current legislation, behavior patterns and trials have been analyzed.

The finite element method have been used, after analyzing the behavior patterns of the masonry. The behavior of the enclosure and the traditional enclosure and self supporting enclosure have been studied. The investigation into his behavior towards horizontal actions is performed noting the influence of the size of the holes, the geometry of the anchors, the effect of vertical loads and possible collaboration of the inner leaf. This method can predict the appearance of cracks in order to avoid them by reinforcing the masonry and checking the effectiveness of the reinforcements.

Following the study, constructive solutions are proposed to construct the enclosures solving Stability and strength requirements, avoiding the appearance of cracks, and considering other aspects such as insulation and waterproofing.