

Analysis of the cross section of Palma de Mallorca Cathedral

The columns of Palma de Mallorca Cathedral, which are the slenderest in the Gothic world, showed curvatures in the cross section plan as well as other damage (vertical cracks amongst others). This study was needed in order to establish the Management Program of the Cathedral. Likewise, disorders in the thrusts were also detected.

In order to find an answer to this problem, an analytical study of the cross sections structural behavior was fulfilled. The mechanical behavior of the masonry had to be characterized, as without recognizing the masonries and their resistant capacity, the degree of the columns' stability could not have been determined.

From this point of view it has been very useful to observe how the knowledge developed for concrete structures, especially regarding the second order effects analysis, has allowed the study of a masonry structure such as this, to be dealt with.

In short, it is a fine example of the manner in which the solution of one structural material can be applied to other materials, permitting the solution to which, are otherwise, rather frequent problems.

The structural analysis allowed an estimation of the safety level of the columns expressed in terms of relation between failure and acting stress eccentricities. The safety level determined was deemed to be adequate. In this study, the importance of the consideration of the construction process has been shown. With regard to the thrusts, whose analysis required fairly simple tools, (stability and tensional verification with non-tension materials) the study concluded that the stability of these elements would not be compromised whilst there were no movements in the abutments.

In any case, the need to develop an intelligent monitoring plan was observed in order to follow through and control the evolution of the most significant parameters.



Spain /14th Cent.
Project data

Structural type:
Gothic Cathedral. Limestone Masonry
Location:
Palma de Mallorca
Opening Date:
14th century
Proprietor:
Chapter of the Cathedral of
Palma de Mallorca
Scope of Works:
Structural Diagnosis