

Neomudejar Architecture and Analysis of Local Behaviour of Masonry Structures. The Escuelas Aguirre Case Study.

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ABSTRACT

At the end of the 19th century, an architectural style called Neomudéjar became quite popular in some areas of Spain. Very much like other historicist european styles in the same years, the Neomudéjar sought to recreate the local medieval architecture [1]. The use of faced brick façades with complicated bonds -formed by stretchers and headers in and out the main wall plane- lead in term to a wide variety of results that resembled arabic architecture.

The brick façades of the Neomudéjar buildings are ideal case studies for the analysis of the local behaviour of masonry structures, especially regarding problems of stress concentration. There are several methods for studying the global behaviour of masonry structures –from the classic thrust line to the limit analysis tools- but, as the average stresses taken over by structural masonry elements are usually well below the compression strength of the constituent material, the classical methods of analysis are designed to verify only the global stability. Local behaviour, on the other hand, is quite elusive, especially when the properties of the material are uncertain. In such cases stress concentrations might appear, resulting on stress currents and low stress islets [2].

A particular case of these phenomena occurs in the bonding of Neomudéjar façades. Local concentration of stresses is especially likely in these bonds, given the peculiar relative position of some bricks with respect to others. The paper proposed will use one of these buildings, the Aguirre Schools (Rodríguez Ayuso, Madrid, 1886), as a case study to evaluate local behaviour. Starting from a geometrical hypothesis of the internal distribution of the material based on recent photogrammetric surveys, and using a conventional software of parametric design, the paper will describe a numerical model based on a non-deterministic random algorithm, although limited in its number of solutions, to discuss later the validity and scope of them. The limitations of the standard hardware in which these design tools are usually handled will also be considered in the discussion.

REFERENCES

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