

OPTIMAL DESIGN OF CURTAIN-WALL SYSTEMS

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ABSTRACT

Glass curtain-wall systems are nowadays extensively used in modern construction due to the fact that they can be manufactured as building façades to possess all those high efficiency properties prescribed by the designer; among these properties predominant role play the high strength-to-self-weight ratio, the serviceability requirements, the recyclability of the constituting parts, as well as transparency and the overall aesthetics characteristics. From a structural engineering standpoint, although usually curtain-wall systems are considered as secondary structural systems, their structural performance has to be meticulously analyzed and designed to fulfill modern Structural Codes requirements because they are in most cases subjected to strong environmental actions. The structural response of standard curtain-wall systems subjected to normative load combinations is numerically investigated within the Eurocodes framework. In addition, an optimal structural design of the glass curtain-wall system is carried out by applying advanced finite element analysis schemes and taking into account structural design principal criteria. The proposed optimal structural design approach leads to useful conclusive remarks for the selection of the basic structural members as well as the anchor details and the glass panels with reference to the dominating actions being the wind and the earthquake action. The proposed methodology is illustrated by means of a numerical application on a typical building façade case study.

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