

Performance Assessment of Aluminium Alloy-Glass Curtain Wall Systems under Wind and Seismic Actions

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Abstract. Aluminium curtain walls are non-structural cladding systems that can be applied into multi-storeys buildings. As the curtain wall is a building non structural component, it carries only its own dead load. This system is designed to resist infiltrations of air and water, as well as to transfer the applied lateral wind and earthquake loads to either floor connections or columns of the main structural system. Curtain wall systems are typically designed with extruded aluminium members. These members are arranged to create an aluminium frame with infilled glass panels, which allow for daylighting, providing at the same time a pleasant appearance to the building. The behaviour of composite aluminium-glass curtain walls under lateral loads was not deeply investigated in literature. Nevertheless, the damages deriving from seismic or wind actions give rise to economical losses and represent a potential hazard for people. For this reason, the aim of this work is to perform numerical analyses on a given aluminium-glass curtain wall system, characterised by different extruded aluminium alloy profiles, in order to determine the behaviour under wind and earthquake loads. The displacements of different levels of the curtain wall system under either seismic actions or wind loads are provided by performed analyses. The achieved results are used to find the best profile cross-section as a function of the total inter-story drift of the examined curtain wall, which can be used by designers and manufacturers for applications in seismic and wind prone areas.

Keywords: Curtain walls, Aluminium alloys profiles, Glass panels, Serviceability limit states, Seismic loads, Wind actions.

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