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EXPERIMENTAL STUDY OF SEISMIC RESISTANT STEEL FRAMES IN CASE OF COLUMN LOSS

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Abstract. *Protecting buildings during extreme loading events is an important aim of structural design. For buildings located in non-seismic areas, the usual design situations include gravity and lateral wind loads. Unlike those above, specific design requirements and detailing are required for seismic resistant structures. As a result of these special design conditions, the later structural systems are considered more appropriate to withstand abnormal loads due to their specific redundancy, degree of continuity and ductility. Features like ductility and continuity provide more deformation capacity and redistribution of loads so that the structure can bridge over damaged elements. Special measures should be taken to ensure the connections can withstand the extreme loading and deformation demands in case of local failure. In addition, two-way frames will enhance the progressive collapse resistance over planar systems as the loading demand on each element reduces. The paper presents the results of an experimental test and the numerical validation carried out to evaluate the ultimate capacity of a two-way steel frame system following the loss of a column. The main goal of the study is to evaluate whether seismic design requirements improve resistance to progressive collapse.*

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