

عنوان مقاله:

Performance Assessment of Ductile Detailing Code-Based Reinforced Concrete Special Moment Resisting Frames

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خلاصه مقاله:

Reinforced concrete (RC) buildings make up the majority of Indian building stocks. Structural elements of these buildings are often designed limited to non-ductile detailing. With a very low building replacement rate, many Indian buildings are vulnerable to earthquakes and pose a significant risk to lives, properties and economic activities. This paper examines the effectiveness of ductile-detailing in mitigating the seismic collapse risk by analyzing the behaviour of a four-storey RC Special Moment Resisting Frame (RC SMRF) using the latest codes of ductile detailing. It also aims to quantify the impact of lateral force resisting system detailing on the performance and cost of RC SMRF buildings and its benefits. The present study emphasizes the effect of ductile detailing on three fundamental aspects of the structure – safety, stability and economy. Two four-storeyed building models – one without ductile detailing and the other with ductile detailing are designed and then analyzed using non-linear static analysis. The results of this study represent the behaviour of ductile-detailed and non-ductile-detailed buildings in terms of pushover curves, and hinge behaviour and identify the mode of final failure. In extension to that, a cost-benefit analysis is done to study the benefits of ductile detailing with the increased cost. The marginal increase in initial cost associated with ductile detailing is significantly outweighed by the resulting savings in the repair and downtime costs during the service life of the building.

کلمات کلیدی:

Seismic Performance, ductile detailing, Pushover analysis, Cost-benefit analysis

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