



**ACOUSTIC EMISSION MONITORING ON REINFORCED CONCRETE FRAMES
WITH IMPROVED SEISMIC RESILIENCE**

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ABSTRACT

In modern structural engineering, reinforced concrete (RC) structures are widely adopted due to their strength in resisting compressional and flexural loads. Moreover, RC structures can be precast or cast-in-place and have been used for many applications, such as footings, beams, and columns. However, the performance of RC structures can be limited in terms of resilience when subjected to seismic and wind loads. In this study, to mitigate the damages caused by these loads, two frames with different energy dissipating methods were tested - a buckling restrained braced RC frame and a structure assembly built with Accelerated Bridge Construction (ABC) techniques. While the RC frames were subjected to quasi-static cyclic load, structural damages were evaluated using acoustic emission (AE) to monitor mechanical waves induced by fracture-released energy. The applied AE system performed data acquisition and processing, which potentially supports real-time structural diagnosis, prognosis, and decision making. The results are promising, and for future tests, it is recommended to use AE to perform damage localization and fracture mechanism identification. Lastly, the structural damage quantification and assessment will be beneficial for the maintenance of bridge structures around the U.S. that are approaching the end of their design life.