

Investigate the Performance of SMA-FRP Composite Bars in Seismic Regions under Corrosion Conditions

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Abstract : Steel bars has been used in concrete structures for more than one hundred years but lack of corrosion resistance of steel reinforcement has resulted in many structural failures. Fiber Reinforced Polymer (FRP) bar is an acceptable solution to replace steel to mitigate corrosion problem. Since FRP is a brittle material its use in seismic region has been a concern. FRP RC structures can be made ductile by employing a ductile material such as Shape Memory Alloy (SMA) at the plastic hinge region and FRP at the other regions on the other hand SMA is highly resistant to corrosion. Shape Memory Alloy has the unique ability to undergo large inelastic deformation and regain its initial shape through stress removal therefore utilizing composite SMA-FRP bars not only have good corrosion resistance but also have good performance in seismic region. The result show indicate that such composite SMA-FRP bars can substantially reduce the residual drift with adequate energy dissipation capacity during earthquake.

Keywords : steel bar, shape memory alloy, FRP, corrosion

Conference Title : ICSRD 2020 : International Conference on Scientific Research and Development

Conference Location : Chicago, United States

Conference Dates : December 12-13, 2020