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Analytical study on lateral cyclic responses of RC columns retrofitted with Fe-based SMA

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ABSTRACT

This paper analytically studies the lateral cyclic responses of RC columns actively confined with Iron-based shape memory alloy (Fe-SMA). Based on experimental results on compressive behaviors of concrete cylinders confined with Fe-SMA strips and carbon fiber reinforced polymer (CFRP) sheet, analytical material models of SMA confined and CFRP confined concrete models were developed, respectively, and finite element models of RC columns were further developed in OpenSees. A series of lateral cyclic loading simulation was performed for four RC columns (as-built, CFRP confined, Fe-SMA confined columns). The analytical results showed that the Fe-SMA confined column exhibited greater performance in deformation and energy dissipation capacities, compared with as-built and CFRP confined columns.

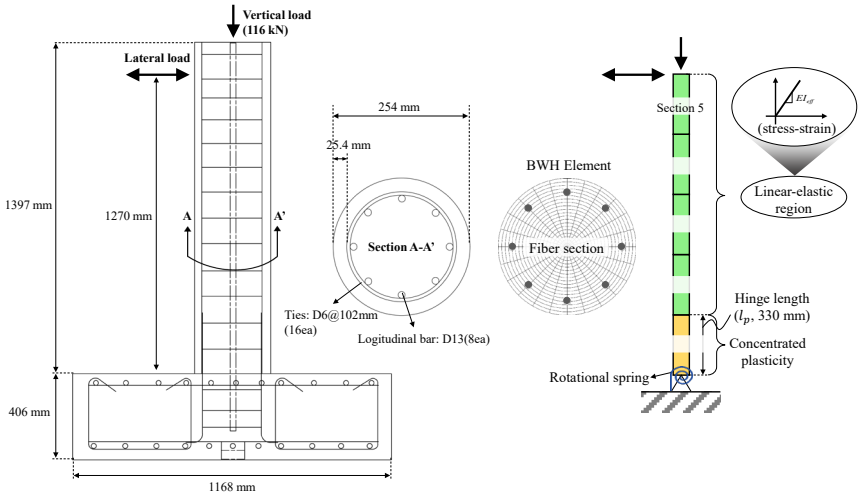

Fig. 1 Drawing of RC Column (Shin and Andraws, 2011) and an analytical model

REFERENCES

[1)] Graduate Student
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Shin, M. and Andrawes, B. (2011), “Lateral cyclic behavior of reinforced concrete columns retrofitted with shape memory spirals and FRP wraps”, *J. Structural Engineering.,* **137**(11), 1282-1290.