

Shear strengthening of concrete columns using self-prestressing iron-based shape memory alloy

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ABSTRACT

This paper experimentally evaluates the seismic performance of RC columns retrofitted with iron-based shape memory alloy (Fe SMA). Four circular RC columns with non-seismic details were provided with different strengthening (external confinement) schemes and subjected to reversed lateral cyclic loading. The test results revealed that both carbon fiber-reinforced polymer (CFRP) and Fe SMA were quite effective in preventing severe shear failure shown from the unretrofitted, control specimen, and inducing the ductile flexural responses up to $\pm 8\%$ drift ratios. Despite the comparable global responses, the visual and nondestructive damage assessment indicated that the Fe SMA confinement with prestressing capability was far more effective in delaying the damage accumulation in concrete, compared to the CFRP confinement.

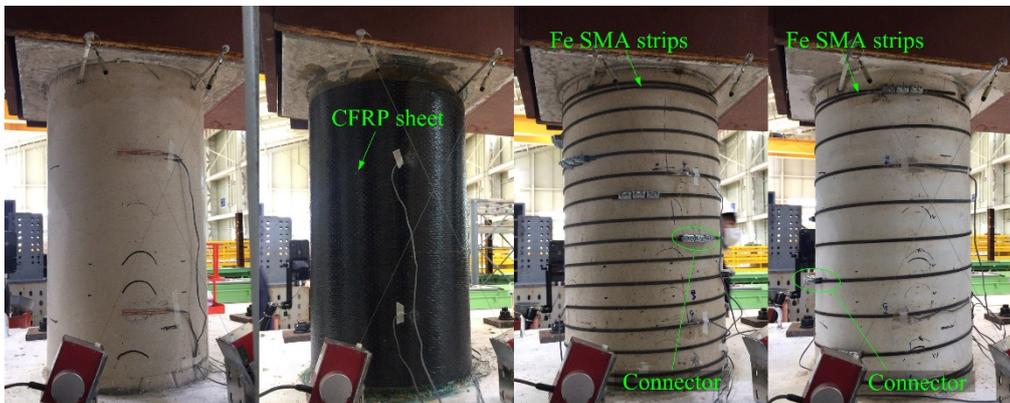


Fig. 1 Computational meshes for Gyeongju station

REFERENCES

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.

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