

Effect of Radial Reinforcement on Delamination Behavior in Curved Post-Tensioned Concrete Structure

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ABSTRACT

This study experimentally confirms the performance of radial tension reinforcement in curved post-tensioned wall structures on delamination behavior. A quarter-circle curved wall, scaled down to 1/10 of the actual nuclear containment wall, was fabricated to test delamination behavior in specimens. The specimens were designed to be affected only by prestressing loads. Monotonically increasing prestressing force was applied until delamination failure (Fig. 1). The design requirements for radial tension reinforcement are specified in **ASME BPVC Section III, Division 2 Code**. In this experimental study, the delamination resistance performance is verified for reinforcement spacing wider than those specified in the code and for a reinforcement ratio lower than that typically applied in actual nuclear containment. As a result, only a portion of the reinforcement strength contributed to tensile resistance because delamination cracks expanded within a very fine width. After the cracks occurred, the crack propagation was faster near the locations of the rebar. Consequently, the contribution of the reinforcement to the delamination failure resistance increased

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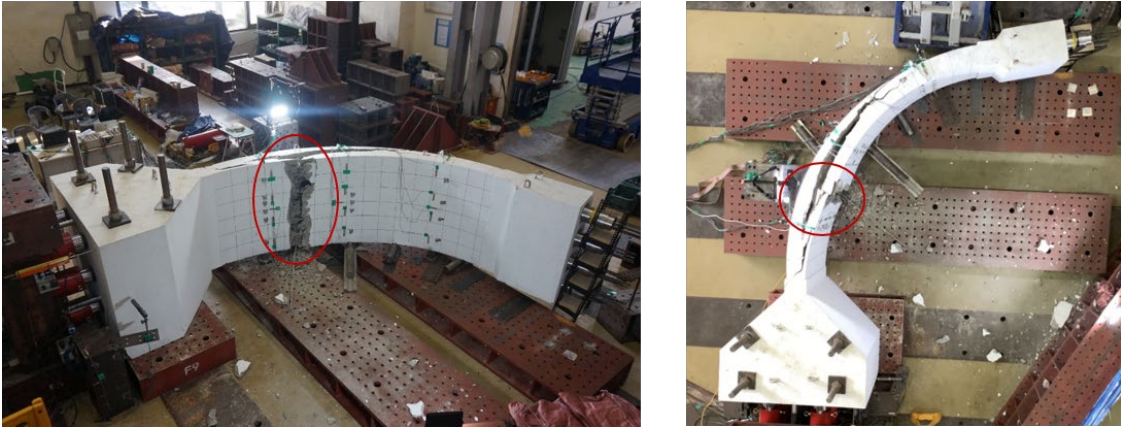


Fig. 1 Delamination failure for Specimen 1

REFERENCES

Joint ACI-ASME Committee 359 (2019), "ASME Boiler and Pressure Vessel Code, Section III. Rules for construction of nuclear facility components, Division 2. Code for concrete containments", *American Society of Mechanical Engineers*, New York, NY.