

# 1. Bond Splitting Tests for High-Performance Fiber-Reinforced Strain-Hardening Cementitious Composite Beams

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Buildings with core walls have recently been constructed. Short span beams connect core walls and brittle bond splitting is likely to cause failure during an earthquake. In order to prevent such failure, short span beams are now being developed that use high-performance fiber-reinforced strain-hardening cementitious composite (SHCC) with polyvinyl alcohol (PVA) fibers mixed with mortar.

In this study, bond splitting tests were conducted using cantilever-type specimens in order to identify the bond characteristics of SHCC beams. The findings are described below.

- (1) The effectiveness of PVA fibers for erecting bridges prevented the spalling of concrete cover and the rapid deterioration of strength after the maximum load was applied, and controlled failure induced by bond splitting.
- (2) With the increase of perpendicular reinforcement ratio ( $p_w$ ), normalized bond strength of main reinforcement ( $\tau_b / \sqrt{\sigma_B}$ ) increased linearly.
- (3) The value of bond strength obtained in the tests was higher than the value obtained by calculation using an existing equation for the bond strength of reinforced concrete beam.
- (4) The bond strength of SHCC beams was accurately evaluated using an existing equation for the bond strength of reinforced concrete beam by modifying the  $p_w$  term while considering the effectiveness of PVA fibers for increasing tensile strength.

**Key words** : high-performance fiber-reinforced strain-hardening cementitious composites, beams, bond splitting tests, bond properties, bond strength