





































- (1) The general FEA approach, through proper boundary and material approximation/assumption, is capable of reproducing the behavior of bonded and unbonded PT concrete members. The FEA approach can contribute to a variety of design problems associated with unbonded PT concrete structures, particularly in cases where internal measurements are not obtainable from experimental studies.
- (2) With the exception of the lateral drift ratio at punching, the FEA approach verifies that the lateral stiffness and strength as well as the shear stress distribution around the slab-column connection are not much impacted by the bond condition of tendons.
- (3) The FEA approach reconfirms that the existing eccentric shear stress model and relevant punching shear design codes are valid.

Next, a finite element contact formulation was developed to model bonded, partially bonded, and unbonded PT members. The interface of PT tendons and sheathings was modeled through a Node-to-Segment contact formulation. The developed finite element formulation was implemented into a nonlinear finite element program developed using MATLAB, and verified by performing several examples. The developed FE formulation can be extended to a variety of computational studies such as the bond stress along the tendon/sheathing interface at different levels of bonding. In this case, advanced constitutive models should be implemented at the contact interface.

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