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Spotlight on *Structures*

Editor's Featured Article

The Featured Article for Volume 74 of *Structures* is now available. Associate Editor, Iman Hajirasouliha, has selected a paper with a novel approach to predicting seismic performance in unbonded post-tensioned concrete structures.

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Novel multi-scale finite element modelling approach to predict the seismic performance of unbonded post-tensioned concrete structures

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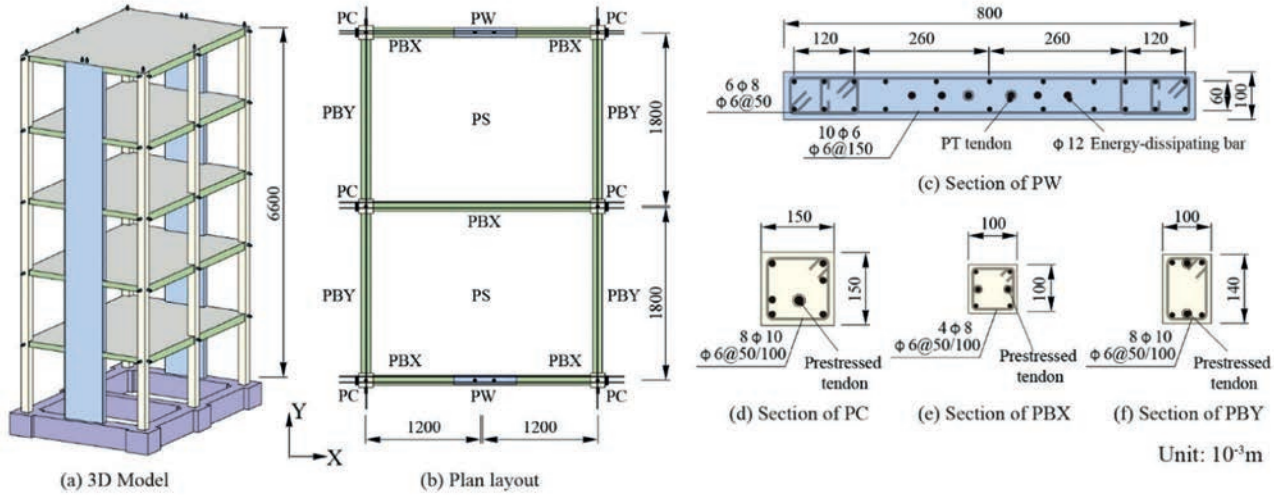
Owing to their significant damage control capacity, unbonded post-tensioned concrete (UPTC) structures have attracted extensive research attention. Current numerical modelling approaches face challenges in efficiently and accurately characterising the damage distribution in components and predicting the structural seismic performance of UPTC structures. Therefore, this paper proposes a novel multi-scale finite element modelling (MSFEM) approach based on the ABAQUS software and its subroutine interface to predict the seismic performance of UPTC structures. Specifically, to ensure the computational efficiency and simulation precision simultaneously, the proposed MSFEM approach takes full advantage of different analysis elements provided by the ABAQUS software to create multi-element scale geometric models of UPTC structures. Meanwhile, a multi-functional connector (MFC) is developed based on the user-defined element (UEL) subroutine provided by the ABAQUS software to connect various scale analysis elements and model the interactive relationship existing in UPTC structures, including the opening and closing process of the contact interface between concrete components, the unbonded property of prestressed tendons, and the mechanical properties of the adopted energy dissipation devices. Finally, the correctness, universality, and effectiveness of the proposed approach are demonstrated via a series of experiments and numerical simulations at the component and structural scales. The results indicate that the proposed MSFEM approach can achieve accurate seismic performance prediction and damage distribution description for UPTC components and structures, thereby providing a practical numerical analysis method for these structures.

→| Read the full paper at **https://doi.org/10.1016/j.istruc.2025.108620**



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