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## Numerical simulation analysis toward the pseudo-dynamic test of a resilient prestressed steel frame with an intermediate column containing friction damper

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The structural system of the resilient prestressed steel frame with intermediate column contain friction damper and the typical details of the intermediate column containing friction dissipating damper was put forward for researching the resilient capacity to large-span prestressed steel structures. An eight-story prototype structure was designed and a pseudo-dynamic test of the first story plane frame containing the intermediate column with friction damper subjected to El-Centro ground motion for PGA= 0.07g, 0.2g, 0.4g, 0.51g, 0.62g, 0.8g, and 1.0g was conducted. In this paper, the numerical simulation toward the pseudo-dynamic test was carried out by adopting finite element analyzing software Abaqus. The hysteretic curves, the cable forces, the self-centering capacity, the gap-opening, the structural stiffness, the strain variation as well as the energy dissipating capacity were compared with those from the test and analyzed. The results show that both the results achieved from the test and the numerical simulation were in coincidence; the intermediate column containing friction damper not only increase the structural stiffness but enhance the energy dissipating capacity of the structure. The main structure still remains elastic except the reinforcing plate of the beam flange and the foot of the column. The story shear force-displacement hysteretic curves of the first story frame was achieved which presented to be in shuttle shape. The loss of the cable force in steel strand is very little after the test which indicates that the anchorage method of the prestressed steel strand is reliable as well as the structure possess an out-standing self-centering mechanism and resilient capacity to resist earthquakes and aftershocks with large magnitudes.

### Biography

Zhang Yanxia has rich achievements in the research and development of fabricated steel structure and high-performance steel structure system. She chaired the National Natural Science Fund and other countries and provincial and ministerial projects more than 10 items, publishing materials 1, monographs 1, the National Invention Patent Authorization 8, published a high level of papers more than 70. Beijing has been selected as the backbone of middle-aged and young cadres and excellent talent. At present, the director of China Steel Structure Association, the executive director of the Housing Steel Structure Branch, the director of the Stability and Fatigue Branch, the director of the Steel structure Design branch, the National High Building earthquake Resistance Professional committee member, the Chinese Survey Design Association structural design Branch Director. EI periodical "Engineering Mechanics" and "vibration and impact" reviewers, the National Natural Science Foundation Project expert reviewers.

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