

## **Prestress Force Identification for Eccentrically Prestressed Concrete Beam Based on Vibration Response**

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### **Summary**

The measurement of residue prestress force is one main issue for condition and performance assessment of prestressed concrete beam bridge. This paper proposes a vibration based parameter estimation technique for this purpose. Under given form external excitation, beam velocity responses at multiple points are collected firstly. The prestress force of the beam is then identified based on the minimization of the least square difference between the measured response and the baseline response. A numerical study on a beam of variant length, subjected to a constant prestress force with variant eccentricity, is conducted to show the effect of prestress force and the effect of bending moment due to eccentricity on fundamental frequency of the beam. The results show that this vibration based method for prestress force identification is both theoretically feasible and practically workable.

