

## SUPPLEMENTARY MATERIAL

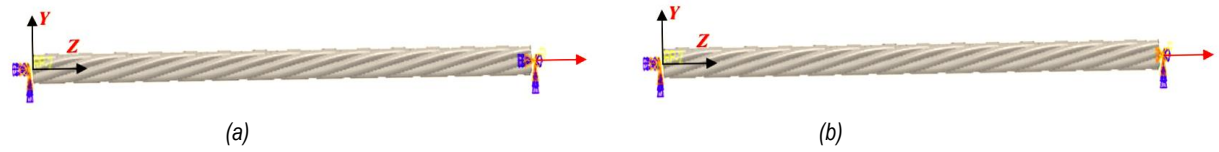


Fig. 4. Two types of model boundary conditions. (a) Left fixed, right no rotation; (b) Left fixed, right free rotation.

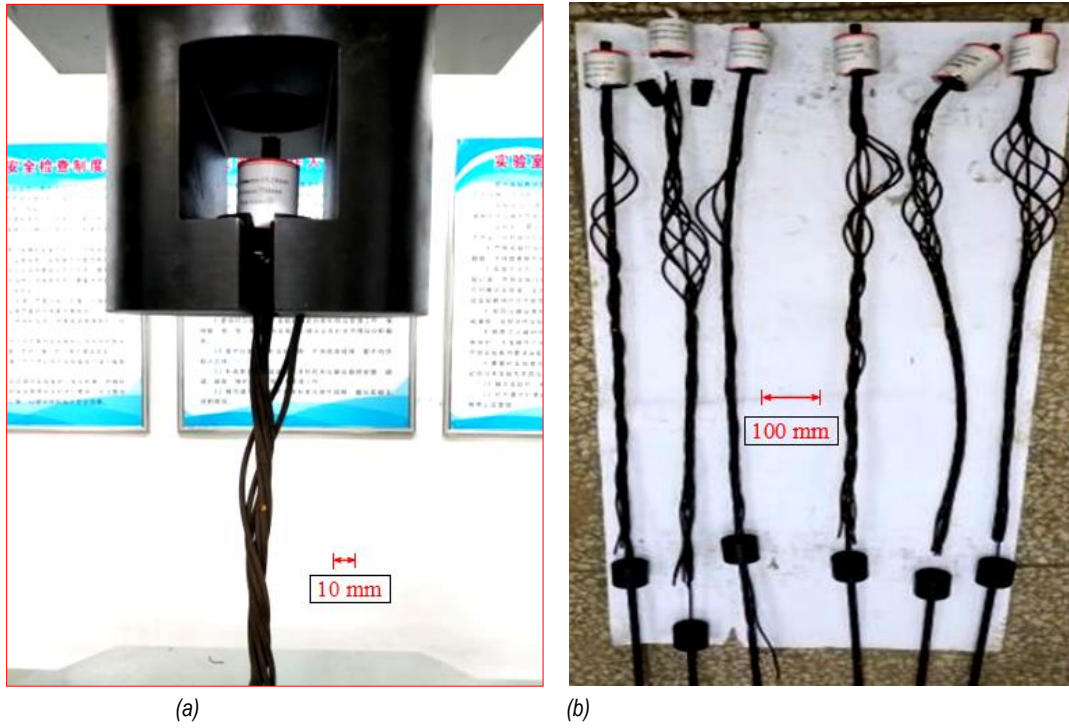


Fig. 5. Failure forms of anchor cable. (a) Single anchor cable; (b) Two groups of anchor cables.

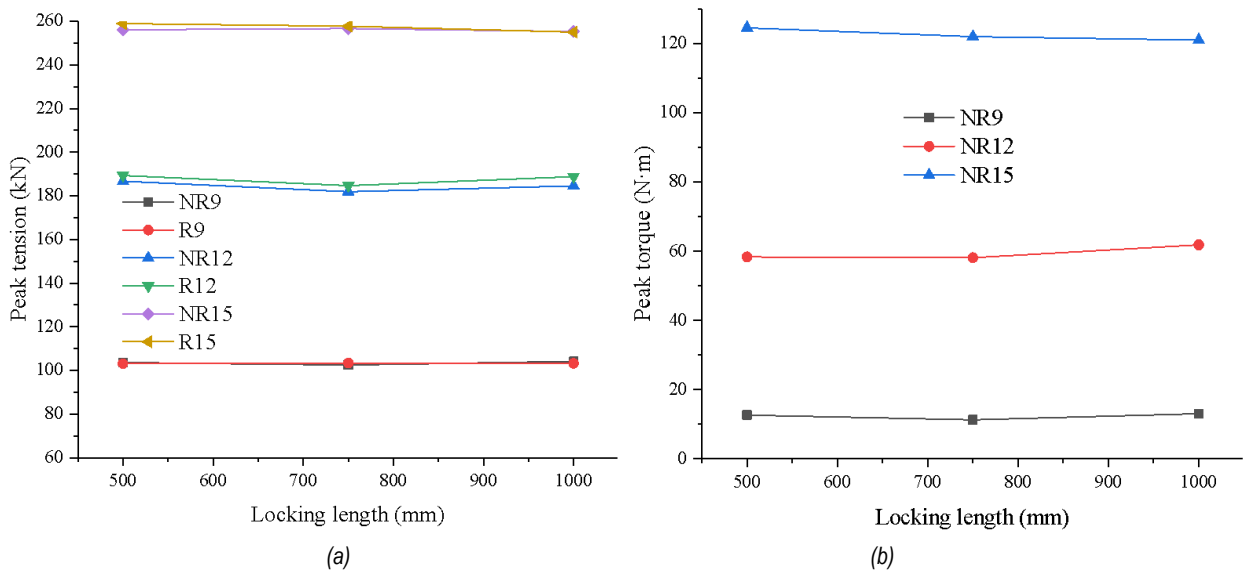


Fig. 6. Curves of peak tension (torque) with locking length under different diameters of anchor cable. (a) Curves of peak tension; (b) Curves of peak torque.

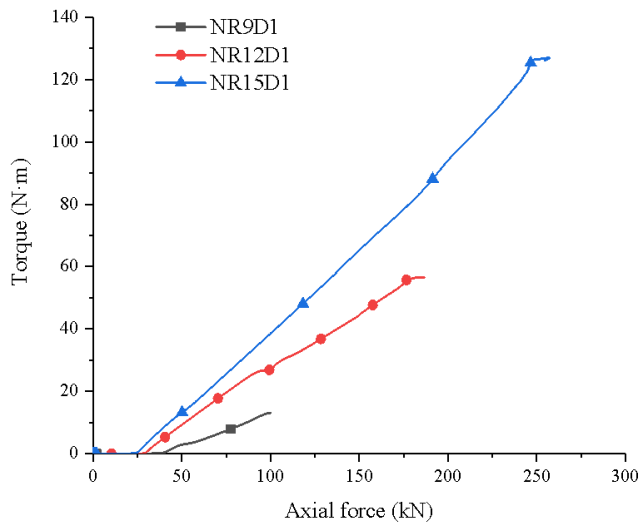


Fig. 8. Axial force-torque curves of different diameter cables.

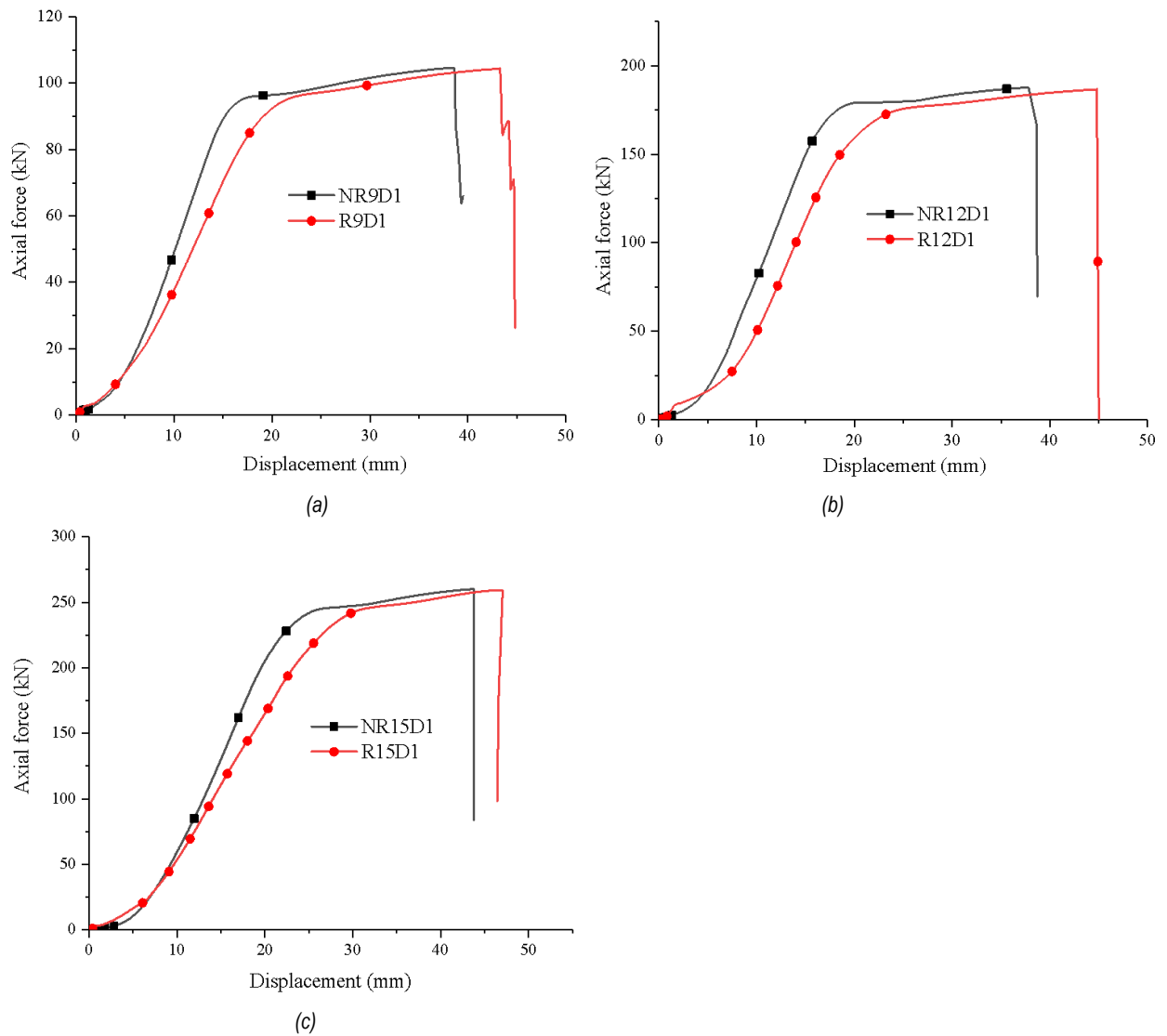


Fig. 9. Axial force-displacement curves with free rotation and without rotation. (a) 9.5 mm anchor cable; (b) 12.7 mm anchor cable; (c) 15.2 mm anchor cable.

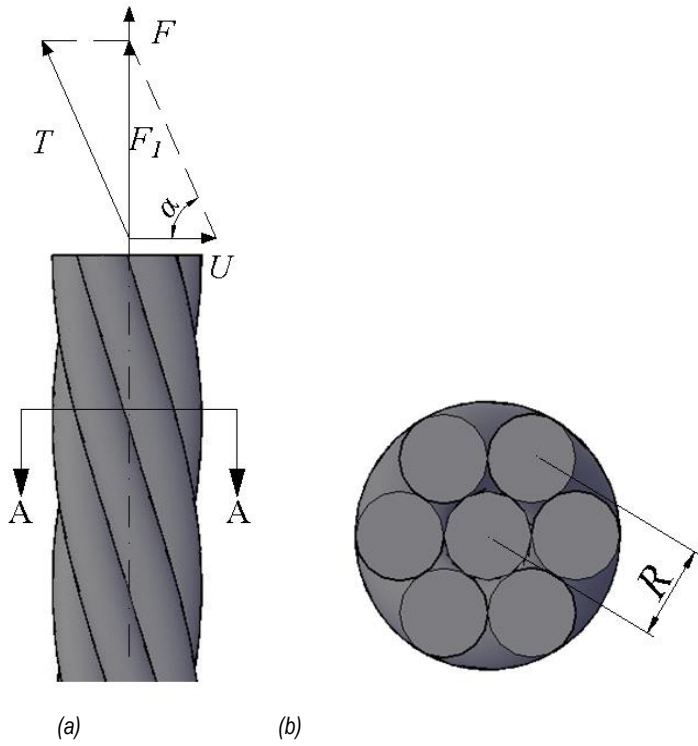


Fig. 11. Simplified mechanical model. (a) Calculating model; (b) Cross-section of A-A.

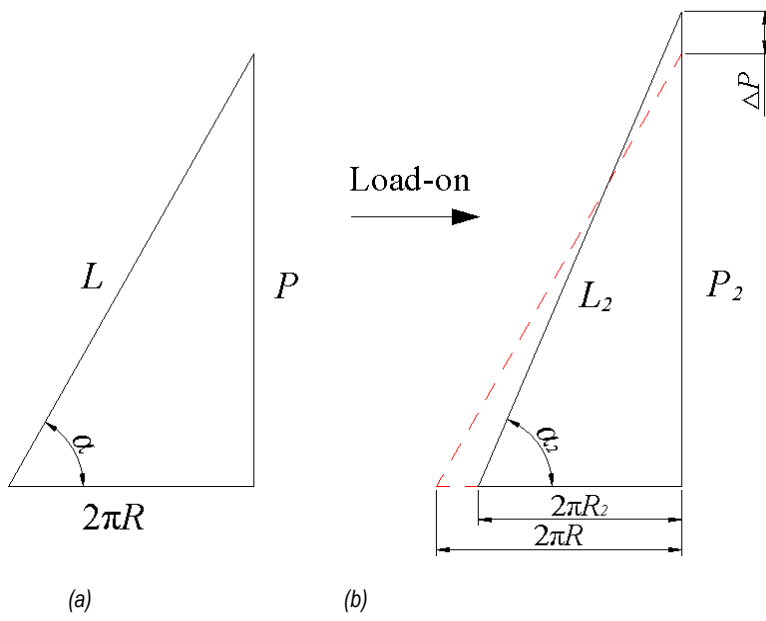


Fig. 12. Loading deformation diagram. (a) Before deformation; (b) After deformation.

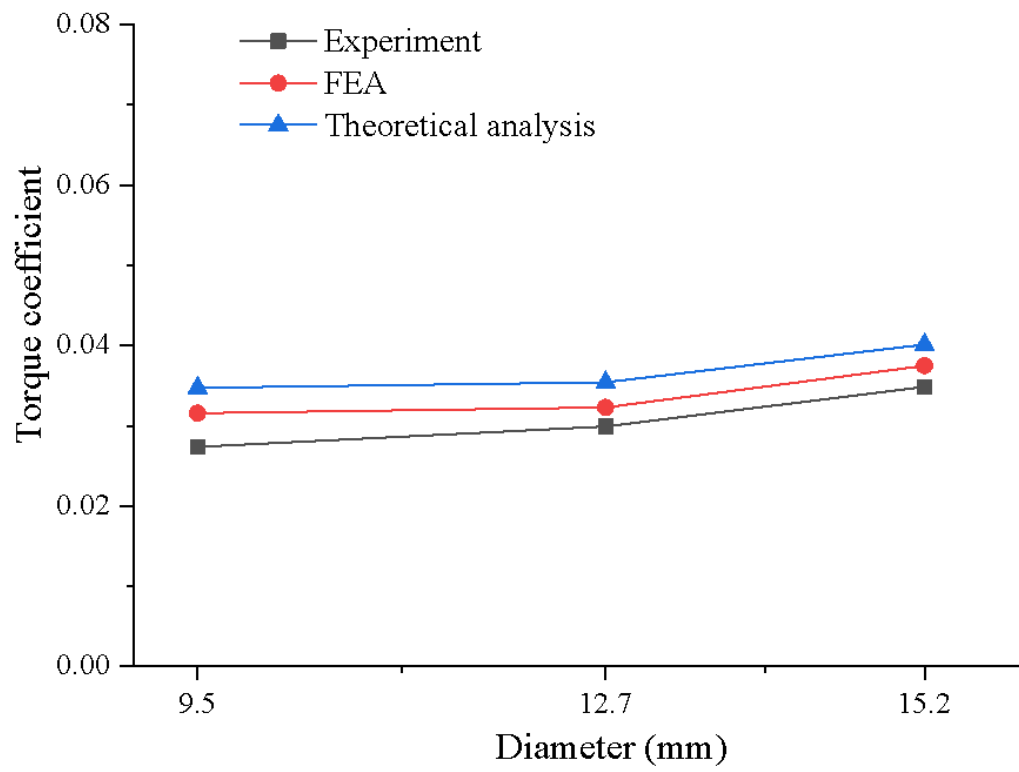


Fig. 13. The FEA, theoretical analysis and experimental results.