Study On The Influence Of Joint Stiffness On The Stiffness Of Overall Steel Space Structure

Cheng YUAN, Wei LU, Jun TENG, Weihua HU

The joints of steel space structures are assumed to be idealized hinged or rigid connection in structure design as well as FE (Finite Element) structure analysis. However, the real states of joints are not completely hinged or rigid connection. The stiffness of joints is not suitable to be ignored. Hence, the hypothesis of idealized hinge or rigid joints in structure analysis would make difference between simulation results and the accurate state of the structure. Ultimately, we could hardly obtain the structure properties through such analysis. This paper studies the influence of joints stiffness on the stiffness on the overall steel space structure. The monitoring data of joints are inverted to obtain the real stiffness of the joints, while the FE model of space steel structure considering joints stiffness characteristics are established in order to study the influence of joint stiffness on the stiffness of overall space steel structure. The influence of joints stiffness on stiffness of overall steel space structure studied before is verified by the monitoring data of structure responses of Shenzhen Gymnasium. The conclusion of this paper would provide theoretical basis for tracking stiffness evolution of steel space structure.