

Study On The Sensitivity Of Structural Responses Caused By The Damaged Members Of Spatial Grid Steel Structure

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The structure will inevitably deteriorate due to environmental corrosion, material aging, fatigue effect and other factors during the long-term service period. There are important structural members such as ring beams and bearings in the spatial grid structure, while the structural performance degradation will be occurred because of such damaged members. Furthermore, the structural responses will change due to the redistribution of internal forces. The mapping pattern between members degradation and structural response is established based on structural members deterioration and sensitivity of structural responses, which provides a mechanical basis for the prediction and monitoring of structural member damage. Thus, it is necessary to study the mechanism of sensitivity of structural responses caused by the damaged members of spatial grid steel structure. The analysis conditions of different damage locations and degrees of structural members are established, where the bar section parameters and the bearing stiffness parameters are set to simulate damaged ring beams and the bearings. The response changes of stress and joint displacement of all members under structural intact state and different damage state are analyzed, while the change rule of sensitivity of structural responses under different damage states and different load can be explored.