

The Structural Force-Bearing System Conversion Monitoring Method In Construction Unloading Phase

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The unloading of temporary support in construction phase will lead to the change of degrees of freedom and redistribution of internal forces, which causes the change of overall stiffness and larger deformation of structure. The redistribution of internal forces will lead the stress state of members in construction phase be different from designed state, the stress and deformation monitoring of members effectively in construction phase can ensure that the completion state of structure satisfies design requirements. The monitoring method for force-bearing system conversion of structure in construction unloading phase is proposed in the paper, which is based on Shenzhen Vanke Center and Nanshan Science & Technology Innovation Center construction monitoring considering crucial construction phases such as cable tensioning, support unloading, etc. The principles of displacement of joints and overall stiffness caused by force-bearing system conversion of structure is studied based on equilibrium equations through simplified force-bearing system of structure, the rules of the accumulation of stresses and deformations of members caused by cable tensioning and support unloading is studied through step-by-step construction simulation and monitoring data analysis, the prediction of the stresses and deformations of structural members is studied by analyzing the association of member responses and utilizing regression method. In addition, the reasonable variable range of the stresses and deformations of members is determined based on the predictive regression outcome by studying the influencing factors of construction errors, which provides a theoretical basis for the construction monitoring of complex force-bearing system conversion of large span and cantilever structure.