

Research and application of key technologies of large religious buildings, based on ecological utilization of deep and large abandoned mining pits

ABSTRACT

This project takes the first large-scale modern religious architecture built in abandoned mining pits in China (Nanjing Niushou Mountain ruins park project) as the research object. A number of technical challenges for the construction of a large-scale religious building based on the ecological utilization of deep & large abandoned pits. Under the support of Ministry of Housing and Urban-Rural Development of the People's Republic of China (MOHURD), China State Construction Engineering Corporation (CSCEC) and self-raised scientific and technological projects, the following innovations have been achieved through the cooperation of industry, university and research.

(1) Treatment and ecological rehabilitation of abandoned pit slope under complex geological conditions. Aiming at a number of technical problems caused by the comprehensive treatment and ecological restoration of the 150m deep ultra-high side slope and 900,000 m³ tailings landslide in the abandoned pit, through the research and development of the anti-sliding system and construction method, and the real-time monitoring and forecasting system of the slope stability, the problem of the control technology of the ultra-high slope in the abandoned pit under complex geological conditions is solved; Through the research and development of "skeleton modeling & plastic stone carving, painting & landscape covering eco-green technology", the technical problems of topography and geomorphology restoration, environmental landscape construction and green covering construction are solved.

(2) Construction key technology of aluminum alloy structure system with large-span and special-shaped surface. According to the characteristics of the difficulty of the structure roof of aluminum alloy with special-shaped surface, the aluminum alloy reticulated surface slip technology and the steel structure supporting the tire frame, the universal bearing connecting piece and the high space structure tower type buckle operating frame were developed, the construction problem of 250m multi-curvature radius aluminum alloy and 140m long-span ellipsoidal aluminum alloy reticulated shell structure were solved. Through the development of the hyperbolic cable-type hollow ceiling aluminum plate structure and construction method, the hoisting connector, the ceiling connecting device and the pipeline mounting bracket structure have been developed to solve the technical problem of the 130m span hyperbolic roof system construction.

(3) Key technology of stage construction of large lotus rotating and lifting religious theater. Aiming at the characteristics of 38m wide lotus rotating lifting stage with complex modeling, high production and installation accuracy and great difficulty, the installation method of large-diameter(38m) stage ring lifting device and automatic lifting stage is developed, which ensures the smooth implementation of stage system device.