Optimized Version of Temporary Electricity Planning for Hongqiao Wastewater Treatment Plant Construction Project

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Abstract

With the continuous development of engineering construction and the widespread adoption of high-power electrical equipment, the importance of electricity at construction sites has become increasingly prominent, making temporary power planning essential to ensure the successful completion of construction tasks. Power planning for different construction stages must comprehensively consider factors such as power consumption requirements of electrical equipment, power supply distance, cable current-carrying capacity, cable voltage drop, and box transformer capacity, with continuous optimization and refinement throughout the actual construction process. This paper draws upon the temporary power design and planning for the new Hongqiao Wastewater Treatment Plant project, focusing on large-capacity electrical equipment during construction. By altering box transformer locations during the early construction phase, optimizing the number of distribution boxes, and optimizing cable length and diameter, this study employs a methodology combining theoretical analysis with practical construction experience to optimize the planning and layout of temporary power for construction equipment in integrated underground wastewater treatment plants. The research yields effective measures including rational allocation of large-capacity mechanical equipment and reduction of material and labor costs, providing valuable references for similar projects.

Full Text

Preamble

Optimization of Temporary Power Supply Planning for the Construction of Hongqiao Wastewater Treatment Plant

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Abstract

With the continuous development of construction projects and the widespread adoption of high-power electrical equipment, electricity has become increasingly critical at construction sites. Temporary power supply planning must ensure the successful completion of construction tasks. Power supply planning for different construction phases requires comprehensive consideration of factors such as power demand, supply distance, cable current-carrying capacity, cable voltage drop, and transformer capacity, with ongoing optimization and refinement throughout the actual construction process.

This paper presents a case study of the temporary power supply design and planning for the new Hongqiao Wastewater Treatment Plant project. Focusing on high-capacity electrical equipment during construction, the study employs a methodology combining theoretical analysis with practical implementation. Optimization strategies implemented during the pre-construction phase include repositioning box-type substations, optimizing the number of distribution boxes, and optimizing cable lengths and cross-sections. Through these measures, the planning and layout of temporary power supply for integrated underground wastewater treatment plant construction equipment were optimized, resulting in effective solutions for rational allocation of high-capacity machinery, reduced material costs, and decreased labor expenses. These findings provide valuable references for similar projects.

Keywords: large-scale integrated; underground wastewater treatment plant; ultra-high capacity; temporary power supply; scheme optimization

Note: Figure translations are in progress. See original paper for figures.