Mawan Cross-Sea Passage Shield Tunnel Section Synchronous Road Construction Technology Postprint

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Abstract

Taking the Mawan Cross-sea Passage Project as an example, this paper introduces the synchronous construction technology for shield tunnel road sections. This technology adopts internal construction control measures, combines prefabrication with cast-in-place methods, achieves synchronous flow construction of structural surfaces, and better conforms to overall construction continuity. In structural construction, the central span lane slab adopts prefabricated rectangular components. On the one hand, this avoids the construction difficulties associated with cast-in-place central span lane slabs; on the other hand, through a novel hoisting and ferrying approach, prefabricated components are transported and installed. The paper elaborates on control measures during the construction process, satisfying construction safety requirements. The curved slab adopts a steel formwork turnover and ferrying process. Compared with conventional timber formwork construction, this further accelerates formwork erection and dismantling speed, thereby effectively improving construction efficiency and saving construction time. The side lane slabs, crash barriers, and pavement slabs all adopt cast-in-place construction. This structural construction mode combining prefabrication and cast-in-place methods can provide reference for subsequent similar projects.

Full Text

Synchronous Road Construction Technology for the Shield Section of the Mawan Cross-Sea Tunnel

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Abstract

This paper presents the synchronous road construction technology employed in the shield-driven section of the Mawan Cross-Sea Tunnel project. The methodology integrates prefabrication with cast-in-place techniques through internal construction control measures, enabling synchronized assembly-line construction of structural surfaces and enhancing overall construction continuity. For the central lane slabs, prefabricated box segments were adopted to circumvent the construction difficulties associated with cast-in-place methods. These prefabricated components were transported and installed using an innovative hoisting and barge transportation system, with comprehensive control measures implemented throughout the process to ensure compliance with safety requirements. Curved slabs were constructed using a steel formwork turning process, which significantly accelerated formwork installation and removal compared to conventional timber formwork, thereby substantially improving construction efficiency and reducing project duration. The side lane slabs, crash walls, and pavement slabs were constructed using cast-in-place methods. This hybrid structural construction approach, combining prefabrication with cast-in-place techniques, offers valuable insights for future similar projects.

Keywords: Shield tunnel method; Synchronous construction; Control measures

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