Mega Project - Upgrading the 4th Ring Transportation Corridor in Zhengzhou, Henan, China

Gernot Komar

Sun Engineering & Technology International, Inc., San Diego, USA

Dr. Junling Sun, Yong Ping He, Wenbin Lei

Sun Engineering Consultants International, Inc., Guangzhou, China

Contact: gernot.komar@sunengtech.com

Abstract

The City of Zhengzhou is a major transportation hub in the heart of China. The fast-growing city was in need of an additional elevated expressway to increase the traffic capacity from 10 lanes to 18 lanes on the 4th Ring Transportation Corridor. The additional elevated expressway has a total length of 93 km without traffic lights and faced complex boundary conditions. The focus of this project was to increase the capacity, by reducing the impact to the current traffic flow in a very short time frame and to meet the government requirements to implement green construction technology, which called for an innovative solution. The ABC with the precast segmental bridge technology using the short-line match casting method deemed to be the only answer to fulfill the requirements from the owner and the government. Eight completely new PC yards with over 400 PC stations were designed and were ready for production within 5 months. With over 50,000 segments, this is the largest precast segmental bridge construction project in the world.

Keywords: Zhengzhou, elevated expressway, precast segmental bridge technology, precast yards, short-line match casting, green construction technology, geometry control, ABC.

1 Introduction

The city of Zhengzhou, with a history of over 5,000 years, is the capital of the Henan Province and a major transportation hub. Zhengzhou has a population of 10.1 million. Due to the poverty-alleviation relocation project, within the next 10 years roughly 5 million more people will move into the city, making large infrastructure projects imperative. To satisfy the needs of the fast-growing city, the 4th Ring Transportation Corridor was developed. This expansion is currently considered one of the largest transportation projects in China. The 4th Ring Transportation Corridor in Zhengzhou is an elevated viaduct expressway above the existing 4th Ring around the city center. It increased the traffic capacity from 10 lanes to 18 lanes, and improved the connection of the inner city with its suburban areas. The industrialization technology of bridge design, fabrication, erection, and construction has been fully implemented to the greatest extent in this project.

The necessity of reducing the impact of the current traffic flow during construction and meeting the requirements of the city and government to implement green construction technology called for an innovative solution. Accelerated Bridge Construction with the precast segmental bridge technology, using the short-line match casting method and continuous rigid bridge frame systems