

Design of Industrial Ring Road Project, Bangkok, Thailand

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Summary

The Industrial Ring Road Project includes two crossings of the Chao Phraya River, Bangkok with cable-stayed bridges of navigation spans of 398m and 326m. The Project has three approach structures, with a central peninsula interchange which connects the west approach to the main north-south route. The interchange is located between the two main bridge structures imposing tight geometrical constraints upon both the cable-stay back spans and the interchange itself. All foundations were 1.5m diameter bored piles extending to 60m depth. The main navigation spans are of steel composite construction whereas the back spans are constructed in pre-stressed concrete. The main bridges feature slender towers with a diamond configuration.

Keywords: Bangkok river crossing; Truck route; Composite cable-stay bridges; Pre-stressed concrete viaducts; Deep piled foundations; Sustainable development

Introduction

The Industrial Ring Road (IRR) is a Royal Initiated Project providing a dual three-lane highway between the industrial areas of Samut Prakarn Province and the Port of Bangkok. The river crossing is located three kilometres downstream from the existing Rama IX Bridge where a looping meander of the Chao Phraya River leaves a neck of land only 600m wide, whereas the distance by river is some 10km. The IRR route crosses both the southern and northern legs of the river and replaces the original ferry across the southern leg. Ferry vehicles landing on the central peninsula passed through the residential district of Phra Pradaeng and then to the main highway network, causing severe pollution and damage to the locality. The cost of traffic delays caused by queuing at the ferry was significant. The construction of this scheme was therefore both carbon efficient and gave an exceptional economic rate of return.

The river is navigable by shipping at both crossing locations and therefore no supports were permitted within the river. The navigation spans provide 220m wide shipping channels with clearances of 54m and 45m beneath the southern and the northern bridges respectively. These spans were constructed with steel composite decks. The decks for the cable stay back spans were continuous pre-stressed concrete structures.

The three approach structures were designed to be constructed span by span with a maximum span of 67.5m.

The Thai Cabinet assigned the Public Works Department (PWD), later to become the Department of Rural Roads (DORR), to implement the project and the