



# Widening and Upgrading of the 77-years old Y-Bridge in Ho-Chi-Minh City

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## Abstract

Built in 1941 and strengthened for the first time in 1992, the Y-Bridge in Ho Chi Minh City (Vietnam) is set to be widened and upgraded in 2018, doubling its capacity from 2 to 4 lanes and making it in compliance with current Vietnamese Design Specifications and loading. The complex deck structure, made of concrete T- or I-shaped girders, with drop-in steel I-girder spans required various and adaptable strengthening solutions (external post-stressing, shotcrete, FRP) depending on the type and configuration of the deck. Substructure is strengthened and upgraded using reinforced shotcrete, while new piles and micropiles are cast and connected to the substructure using transverse jacking beams and external post-tensioning bars. The challenge for this project is technical, since the bridge capacity is increased for the second time, and logistical, since only a reduction of traffic during works is allowed.

**Keywords:** Strengthening; upgrading; deck widening; shotcrete; external post-tensioning; FRP

## 1 Introduction

Y-bridge is one of the major bridges located in the centre of Ho Chi Minh City (Vietnam). It crosses 2 canals and connects Districts 5 and 8. As a strategic axis, its closure needs to be reduced to a minimum.

Open to traffic since 1941, the Y-Bridge in Ho Chi Minh City is constituted of 3 branches, named branch A, B and C, connected by a central platform (Figure 1). The bridge is mainly built of reinforced concrete, multiple tee or I beam girders. Spans 6A-7A and 7B-8B are drop-in spans made of composite steel-concrete multi-girders.

In 1992, the bridge underwent a first renovation and strengthening operation led by Freyssinet. The works, mainly included the installation of external post-tensioning. Shotcrete and rebar were also added to one of the spans.

A second renovation operation took place in 2008 where spans going from 1A to 7A were demolished and a new structure with greater clearance was built. The new branch A is a multi-cell, prestressed concrete box with a new drop-in span between piers 5P and 7A. The concrete structure between piers 7A and 8A remained in place and was not additionally strengthened in 2008.