

The design of pre-stressed concrete continuous curved beam bridge with extra-small radius and large curvature in New Wuhan Railway Station

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Summary

This paper introduced the layout span of viaduct in front of new Wuhan railway station, stress characteristics, calculation method, and the special design which is different from the straight girder bridge because of the stress characteristics of small radius and large curvature. It mainly contains the box girder structure, prestressed tendons arrangement, piers eccentric setting, and reasonable selection of supporting pattern. Besides, the layout of the two kinds of reinforcement has been studied. One is used against collapsing of prestressed tendon on the radial direction, and the other is the stirrup bar for resisting against the torque effect. As a result, this research could provide reference for the related bridge design in the future.

Keywords: extra-small radius and large curvature, pre-stressed concrete continuous curved beam bridge, structure design Introduction

1. program summary and the overall arrangement

Among the viaducts in front of new Wuhan railway station, there are four curved bridges locating at the east and west path in and out station to suit to the line shape and construct limitation. See the Fig. 1. The radians of curved are $84^{\circ}\sim 105.5^{\circ}$, the spans are 25~40m, 4~5 spans a unite, the radius of both unite East I and unite West I are 25m, unite East X is 40m, unite West X is 55m. The East I and the West I are the pre-stress concret curved box girders with the smallest radius having been built and applied in China currently. The amount of prestressed steel strand of whole unites is 0.043t per cubic metre and ordinary steel reinforcement is 0.33t per cubic metre. This paper take unite East I with spans of $(30 + 29.5 + 30.5 + 27.5)$ for example to do some introductions.

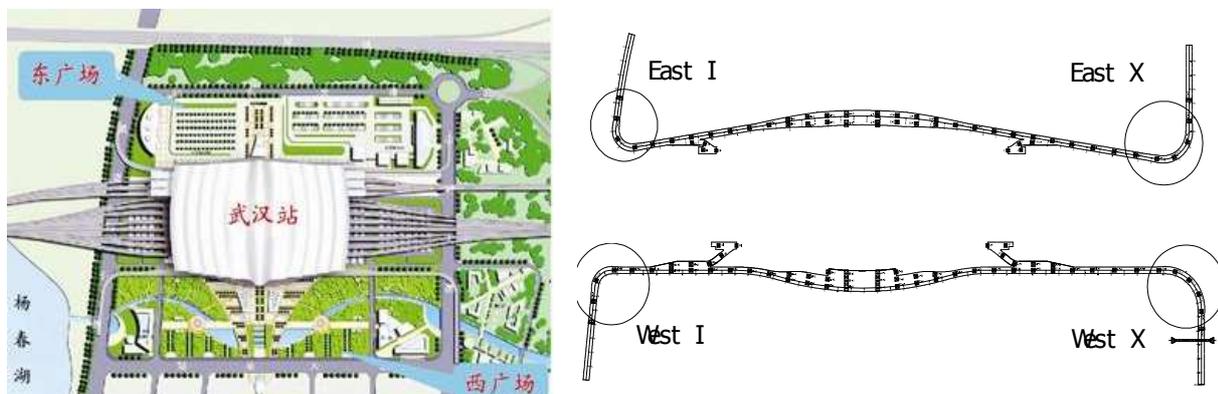


Fig. 1 The arrangement of viaducts in front of new Wuhan railway station