Comparison Study on Model Selection of Small Radius Curved Bridge

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Summary

Based on the new Wuhan railway station western No. 10# viaduct, a (5 × 25)m prestressed concrete continuous curved beam bridge (R=55m), this paper give a brief introduction of three models which are commonly used in bridge analysis: single beam model, shell element model and the spine-like beam model.

By thorough comparison of the accuracy, validity, dynamic performance and time-history analysis of above three models, it is demonstrated that the spine-like beam model is the most reasonable model to simulate the small radius curved bridges, with the outstanding accuracy, convenience as well as applicability.

Keywords: Small-radius curved bridge; Seismic response; Time-history method; Model selection; Seismic response.

1. Project Introduction

Owing to limited terrain, heavy traffic and high demand on urban landscape of modern transportation network, curved bridges are increasingly used in modern road and urban overpasses, particularly in the design of ramps of interchange projects.

The western No. 10 viaduct of the new Wuhan railway station, a 5×25m prestressed concrete continuous curved beam bridge, is located at a combined circular curve(R=55m) and straight line. 2m diameter round piers are adopted in this bridge, with the height vary from 4.3m to 9.4m. Under each pier, 4 piles with 1.2m diameter are set. The arrangement of the span distribution and restraint conditions can be seen in below Fig.1, and the standard section is shown in Fig.2.

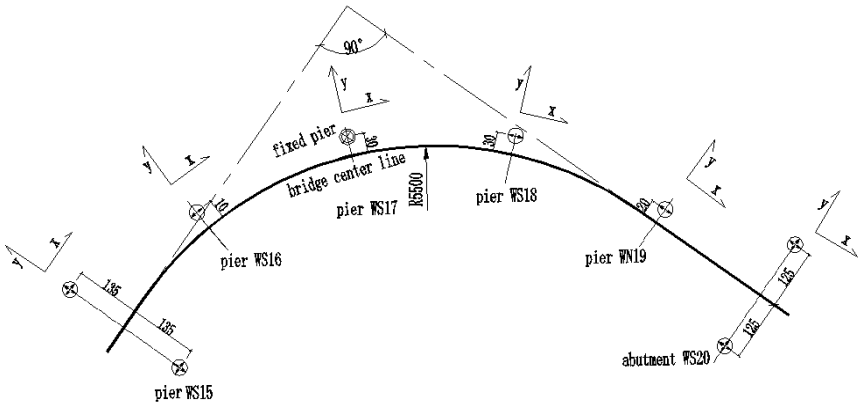

Fig.1: Layout of span distribution and restraint conditions (cm)

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