

# Construction of the New Tenkenji Bridge

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## Construction of the New Tenkenji Bridge

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Yasumitsu Watanabe, born 1948, received his civil engineering degree from Waseda Univ. engaged in many bridge Project both in design and construction.

**Koichi OKINO**

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Koichi Okino, born 1958 received his civil engineering degree from Univ. of Hokkaido.

### Summary

The New Tenkenji Bridge is a cable stayed bridge with segmental method.

The construction site of this new one is located in the northern area of Kyushyu Island in Japan and across Chikugo River. In adjacent to the construction site, previous Tenkenji Bridge located and has been used for around 40 years. Now a day this bridge is too narrow to pass comfortably through and traffic load are limited to under the 4 tons vehicles only.

The New Tenkenji Bridge is planned to construct in order to improve such traffic conditions.

**Keywords:** cable stayed bridge; segmental method.

### 1. Outline of the Project

The construction site of this new Tenkenji Bridge is located in the northern area of Kyushyu Island and across Chikugo River.

In adjacent to this new bridge, previous old bridge has located and been opened to traffic around 40 years. Consequently, it has become too narrow to pass comfortably through and also traffic load are limited to under the 4 tons vehicles only.

The New Tenkenji Bridge is planned and to be constructed to improve such traffic conditions.

The super structure of the New Tenkenji Bridge is 3 spans continuous prestressed concrete cable stayed bridge, and has been constructed by segmental method.

The bridge is 426m long, 14.6m to 17.6m widths. The center span is 219 and both side spans are 102.7m long. This bridge has triple box-section prestressed concrete girder and H-shaped concrete tower. The girder height is constantly 2.3m and deck slab is 0.27m, lower slab is 0.165m, webs are 0.2m thick. In order to achieve such a slender cross section, 60N/mm<sup>2</sup> strength concrete is used for the girder as well as external tendons are used for continuity tendons. Pre-cast are produced at the casting yard. 4 casting machines and 100ton gantry crane are equipped and maximum 80 segments can be stocked in this area. The segments are hoisted with the gantry crane and lifting frame are placed on the transport car, then transported underneath erection trusses. The erection trusses are placed just above the entire bridge before erection works. The segments are lifted with lifting frames and erection start from pier head segments simultaneously. The construction of caissons were started on April 1996. The super structure has been completed by the end of 1998.

## **2. Results and Conclusion**

Prior to beginning the construction, both a landscape study committee and a technical investigation committee were organized and from the point of landscaping as well as designing and in-situ construction view point, so much study and investigation has been conducted.

As a result, the 3 spans continuous prestressed concrete cable stayed super structure has been selected and recommended expecting that this super structure would become a landmark at this area. Also, those new technique or technical skill such as a using of 60N/mm<sup>2</sup> strength concrete, segmental construction method were adopted.

All of these new trials has been successfully accomplished.