Framed structure enhanced PSC girder design of Seohae viaduct

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Summary

Seohae viaduct is a part of the second Ring Expressway from Inchon to Gimpo. The width of viaduct was 19.64m in accordance with regulations Urban Expressway Standards. However, it was insufficient for high speed expressway to satisfy the standard width of expressway for consistency of other expressway segments. Therefore, it is required for the width to be extended to 24.64m.

There are some important changes in the new design. The first point is that the highly efficient hybrid girder system is introduced to save the cost caused by the extension of the road width.

Superstructures of the viaduct are designed EPC(Enhanced Prestressed Concrete) girder and Hybrid EPC girder of 3-span continuous structures. EPC girder with bulb-T type section can reduce the girder height and improve the efficiency more than ordinary prestressed concrete girders do. In addition, new continuation method of precast girder enhances the performance of the girder. 3 span-hybrid EPC girder system has a steel composite girder at the main span and has a EPC girder at the side span. This hybrid EPC girder system can make main span long, so it is applied at a crossroad.

Keywords: Seohae Viaduct; Enhanced PSC; EPC girder; Hybrid EPC girder; Frame Structure

1. Outline

1.1 Route

The second outer circular highway was designed to distribute the traffic volume of Seoul outer circular highway that is about to reach the limit capacity and to strengthen the intercity connectivity.

Fig. 1: The second outer circular highway (Incheon-Gimpo) Highway Section Route

It was an urgent issue to build the network of arterial roads because the large scaled land developments for Incheon free economic zone and Gimpo new town are in progress between Incheon and Gimpo where Seohae viaduct is planned to be constructed. Therefore, the Incheon-Gimpo section of the second outer circular highway was completed as private investment project in December, 2008.

The owner of this project is Incheon-Gimpo Expressway corp., there are 7 main companies that participate in the project including Posco E&C, Kumho E&C and Doosan E&C. Built-Transfer-Operation (BTO) method is applied and the duration of the project is 30 years.

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