

Technical Award

Implementation of Rapid All-Precast Slab Replacement Technology for PC Composite Girder Bridge



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The Ueda River Bridge on the Chuo Expressway is a quadruple precast (PC) simple composite girder bridge with a length of $L=125$ m on each of the inbound and outbound sides. Replacement of the reinforced concrete (RC) slab on such a bridge would conventionally have been by the cast-in-place method. However, this method presents issues of social impact, such as traffic jams caused by long-term traffic restrictions required while removing the existing slab and constructing a new RC slab on site. In order to save labor and shorten the construction period, a new precast PC slab replacement method was used for the first time in Japan on the Ueda River Bridge. Known as "cap slab", the method was developed exclusively for PC composite girders.

In removal of the existing slab, the steel bars were cut and the slab removed in one unit to save on-site labor. A new cap-shaped precast PCa slab was then erected over the upper flange of the existing girder, and girder and slab were integrated with each other using anti-displacement reinforcement bars and mortar filling to ensure structural safety. Further, a link slab structure by using cap slab for jointless fulcrum and full precast wall railing were adopted to achieve all precast at the fulcrum and wall railing. Through these innovations, labor was saved in slab renewal and slab replacement was completed about three times faster than by the conventional method.

This work has been highly evaluated as a major contribution to civil engineering technology and infrastructure improvement. It is expected to be widely adopted in the increasing number of slab renewal projects required in the future. As such, it is deserving of the Technical Award.