

Improvement of Tendon Layout for PSC Girders with Long Span

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Summary

This study was conducted to develop 60 m span PSC girders with shallow depth considering their economic efficiency and constructability. A cross section of bulb-tee type with a half deck was applied to the PSC girders. Especially this paper looks carefully at effective ways to arrange the tendon for long span girders and also explains the decision making process. First, it was preferentially considered that tendons be arranged in a straight line for as long as possible. Second, the division of the tendon layout was considered with two sections using the intermediate anchorage zone. With this tendon layout, a PSC girder with span length of 60 m was developed in this study. The full scale PSC girder was made for a four point bending test by static load. The test results showed the effect of the tendon layout on long span PSC girders and the good structural performance of the girder.

Keywords: long span PSC girder; bulb-tee; half deck; straight tendon layout; division of tendon layout; full scale test

1. Introduction

PSC girders have been widely used for bridge construction because of their good structural performance and relatively cheap construction cost compared to those factors of other types of girders. PSC girders have usually been used to construct short span bridges ($L=25\text{ m}\sim 35\text{ m}$). It was difficult to use PSC girders for construction of long span bridges because of their poor constructability due to the heavy girder weight and the large girder depth. However, there have recently been many studies on increasing the applicable span length of PSC girders in several countries. Some research achievements have made it possible to develop long span PSC girders by using high strength concrete, improving girder cross section, or using segmental girders, etc. In South Korea, studies to develop long span PSC girders have been actively conducted since the 1990s. As a result, some types of girder with long spans of more than 50 m were developed, and they are in general use in the constructing of bridges.