



The Recent Cable and Deck Erection Methods Applied in Various Types of Suspension Bridges in Korea

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Abstract

As the designs for the modern structures are given attention to both function and aesthetics, various types of suspension bridges have begun to emerge recently in the world. Although the fundamental concept of cable and deck erection of suspension bridges have not gone through noticeable changes since the 1800s, sustainable developments for detailed erection methods were witnessed throughout the last century such as improved wire tension adjustment scheme, pre-fabricated PWS(PPWS) method, site-fabricated PWS method, high strength wire and high capacity equipment with improved functions.

As a part of this global trend, almost all types of suspension bridges were built simultaneously in Korea for the past decade. Consequently, the corresponding erection methods have been developed in terms of the theories, materials and related equipment. This paper focuses on the introduction of the main features of the erection methods for five types of suspension bridges in Korea: ①self-anchored(by PPWS) with mono cable, ②conventional type with long span(by Air-Spinning, AS), ③long single-span(by AS), ④three-dimensional cables with single pylon(by AS), and ⑤multi-span with three pylons(by PPWS). The cost-effective solutions to overcome the technical challenges are established and most of the projects have finally come to a successful completion. These cable and deck erection cases described here are expected to be helpful information to find the optimal construction methods, and more generally, to plan the new types of suspension bridges such as causeway or strait crossing projects.

Keywords: cable; deck; suspension bridge; Air-Spinning; PPWS.

1 Introduction

Since the first modern suspension bridge was built in the early 19th century, the relevant technologies have been developed consistently for the past 200 years. In Korea, in spite of little experience in the past, various types of suspension bridges are constructed intensively within these past ten years. Each bridge has unique features according

to its surroundings and appropriate erection plans are established for each given condition. This paper introduces the various erection methods of the cable and deck applied in five suspension bridges (Table 1), ① Sorok, ② Yi Sun-sin, ③ Jeokgeum, ④ Dandeung and ⑤ Saecheonnyeon located in the southwest coast of the Korean Peninsula as shown in Figure 1.