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Autor: Mino, S.
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8. Komyoike Pedestrian Bridge, Osaka

Owner: Housing and Urban Development Corporation

Designer: Oriental Consultants Corporation, Limited

Contractor: Sumitomo Construction Co., Ltd.

Dimensions:

- Overall bridge length: 157.6 m
- Arch span length: 98.0 m
- Full deck width: 4.0 m–6.0 m
- Arch rise: 21.25 m
- Span of deck: 2.05 m + 27.75 m + 98.0 m + 27.75 m + 2.05 m

Quantities of material used:

- 2650 m³ concrete (40N/mm²)
- 290 t steel (SD30) for reinforcement
- 33 t steel for prestressing
- 282 t steel for arch centre
- 230 t steel for scaffold and falsework

Construction Period: from June, 1983 to September, 1984

Introduction

The Komyoike Pedestrian bridge crosses a pond called Komyoike in the residential area in the Senpoku hills approximately 27 km south of Osaka, which have been developed by the Housing and Urban Development Corporation, Kansai branch office. In order to harmonize with the environment and also to provide a landmark to the developed areas, thoughtful consideration was given in the design of the bridge. Selected was a unique reinforced concrete balanced arch construction with post-tensioned half through deck.

Design

Considering the nature of the soil which consists of alternate clay and sand layers, the most important factor was to minimize the dead weight of the superstructure. To meet this requirement, the concrete deck was designed to be prestressed and continuous over the columns. The arch base was founded on 28 or 30 steel pipe piles, 800 mm in diameter and 21 m in length. Analytical calculation of the whole structure was carried out by space frame analysis.

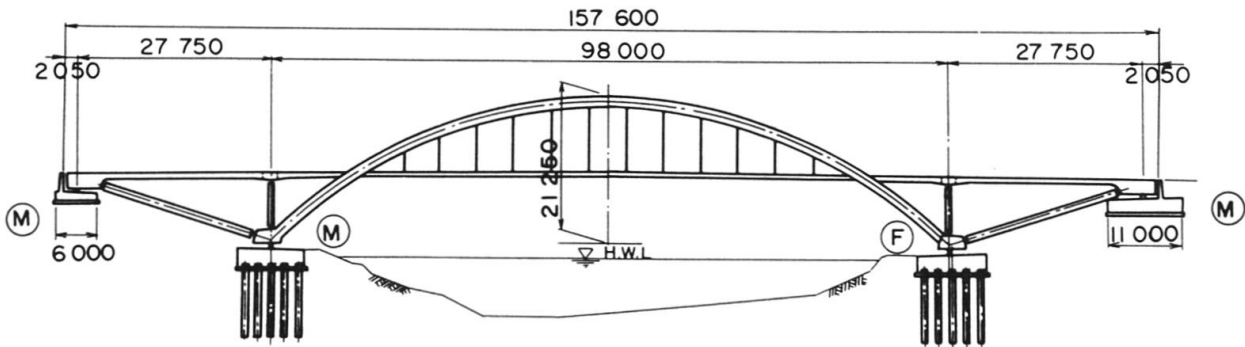


Fig. 1 General view

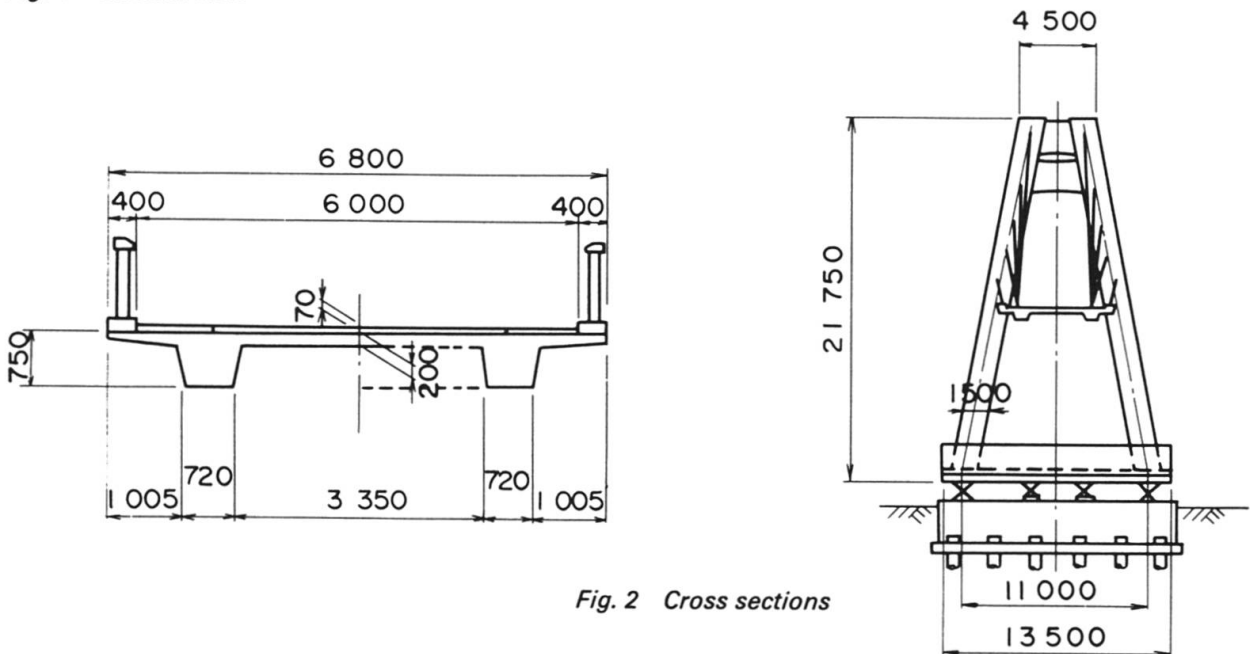


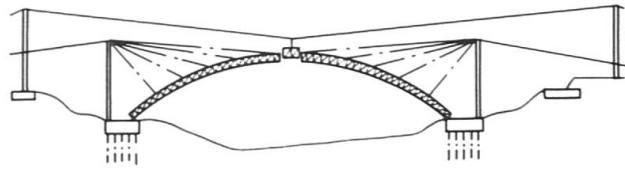
Fig. 2 Cross sections

Construction

Procedure of construction is shown in stage 1 to 4

Stage 1

1. arch foundation completed
2. cable crane and steel pylons installed
3. arch centre for falsework erected with temporary stay cables



Stage 1

Stage 2

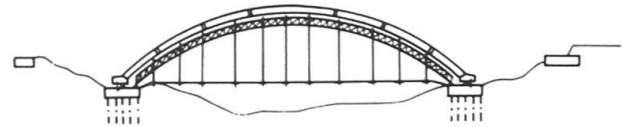
1. temporary stay cables and steel pylons removed
2. hanger PC steel bars set and scaffold for tie cable constructed
3. tie cable set and introduced prestressing



Stage 2

Stage 3

1. cast-in-situ concrete constructed
2. arch rings completed



Stage 3

Stage 4

1. falsework for side span erected
2. slab completed and introduced prestressing
3. falsework removed and tie cable released
4. after surfacing, this bridge completed



(S. Mino) Stage 4

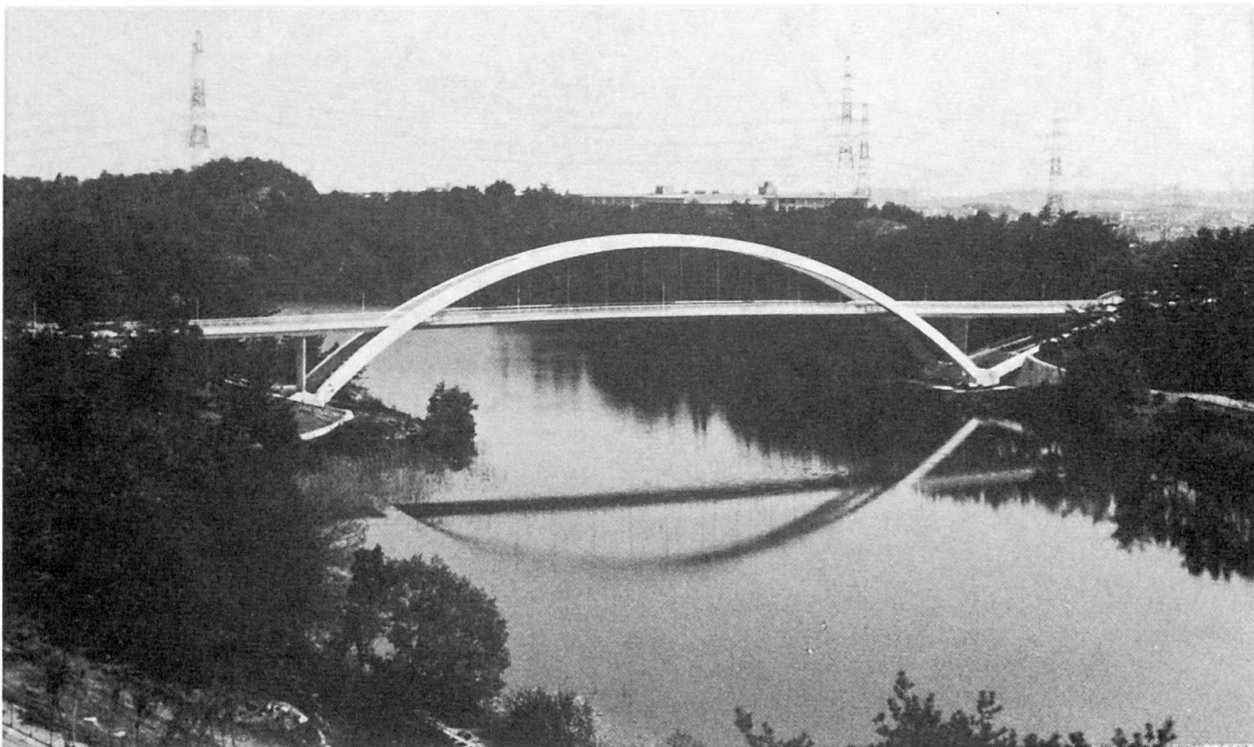


Fig. 3 View of the bridge completed