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## Large Mobile Scaffolding System for Tsukiyogawa Bridge

Echafaudage mobile de grande dimension pour le pont de Tsukiyogawa

Bau der Tsukiyogawa-Brücke mit grosser Vorbaurüstung

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#### 1. Introduction

TSUKIYOGAWA Bridge locates between Sekizawa I.C. and Yamagata-Zaoh I.C. on Sakata Line of Tohoku-Ohdan Motorway. This bridge was constructed along the western ridge (approximately 600m above sea level) of Ohu Mountains, and then down towards Yamagata Basin (approximately 200m above sea level). The total bridge length was approximately 1km long with 5% gradient and the S-Shape plane view with minimum radius of 540m (see Photo-1).

The economical feasibility study had been made comparing steel bridges with concrete bridges. Consequently, Prestressed Concrete (PSC) bridge was chosen. The bridge span vary from 35.3m to 38.0m. The Bridges consist of two separate lanes because of the adjacent tunnel. Because of the geographical feature, the pier heights vary from 13.5m to 37.9m. Consequently, the large moving scaffold system was chosen considering geographical feature, constructability, construction management, economy, and so on even though that system was not common in the mountainous area.

Scaffold of TSUKIYOGAWA Bridge with the maximum gradient and the minimum plane radius in Japan are presented.

#### 2. Design and Construction

Basic matters for design and construction are as follows.

- 1) Three span continuous PC box frame type bridge (37.05m + 38.00m + 37.05m) as the basic structure was adopted considering reduction of the bearings, and the structure of main girder cross section is box type with 2-cell as shown in Figure-1.
- 2) Because of the divided construction system, the cantilever length from each piers was selected 7.5m (0.2 x L, L: Span Length) in consideration of inflection point for bending moment.
- 3) As prestressing tendon, tendons made of twelve 12.4mm-diameter prestressing steel strands (SBPR 7A) were used, and prestress was introduced in the main girder every construction spans.
- 4) The adopted moving scaffold is shown in Figure-2, and this bridge was erected by the construction procedure as shown in Figure-3.



Photo-1 General view

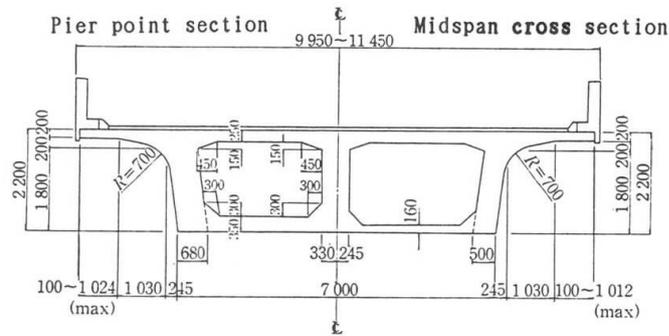


Figure-1 Typical box girder cross section

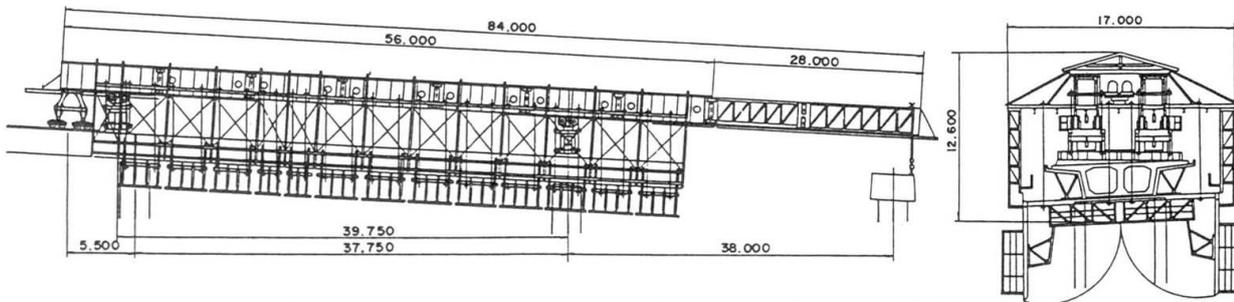


Figure-2 General view of large moving scaffold

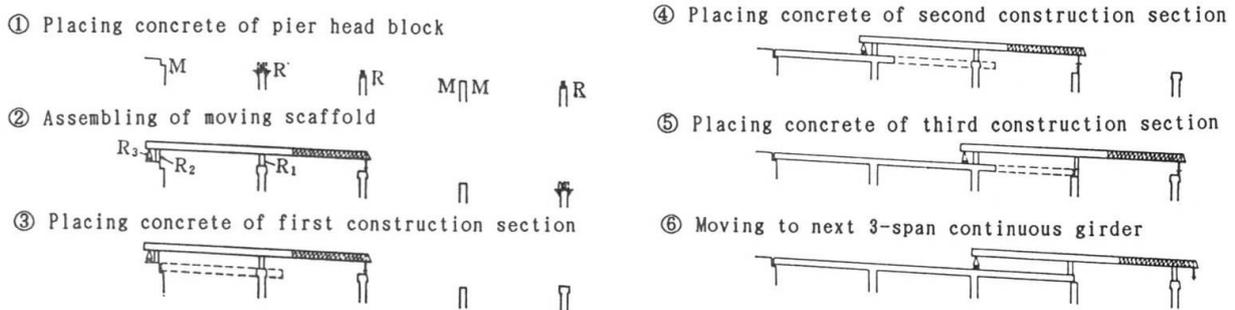


Figure-3 Construction procedure by moving scaffold