Composite constructions using deformed flange H-sections

Autor(en): **Sato, Masakatsu / Tanaka, Sachito**

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Composite Constructions using Deformed Flange H-Sections

Structures mixtes utilisant des profilés en membrure déformée

Verbundkonstruktionen aus H-Trägern mit verformten Flanschen

Masakatsu SATO
Dr. of Eng.
Kawasaki Steel Corp.
Chiba, Japan

Sachito TANAKA
Senior Researcher
Kawasaki Steel Corp.
Chiba, Japan

1. INTRODUCTION

It is of primary importance that a steel and concrete composite structure be provided with an effective stress transmission mechanism in its steel-concrete interface. In 1977, Kawasaki Steel Corp. developed a new form of rolled H-shape for composite constructions. This H-shape has a lateral projection on the outer surface of both flanges in order to increase the bond strength between steel and concrete, as with deformed bars, so it might be called the "deformed flange H-shape". The lateral projections plays the role of deformed bars in the steel framed reinforced concrete(SRC) girder and mechanical shear connectors in composite bridge as shown in Fig.1.

2. DEFORMED FLANGE H-SHAPES

Deformed flange H-shapes of up to 900mm height in the narrow flange series and 400mm height in the wide flange series can be furnished. 2.5mm and 19mm are adopted as lateral projection height and space on surface of deformed H-shapes, respectively.

The bond strength on the outside surface to concrete is more strongly than the large-diameter deformed bar D51. This type of H-shape also keeps the cracking to a minimum, and is strongly resistant to corrosion.

3. SRC GIRDERS

Prefabricated members were manufactured beforehand in which the lower portions of deformed flange H-shapes were covered with expansive concrete, as shown in

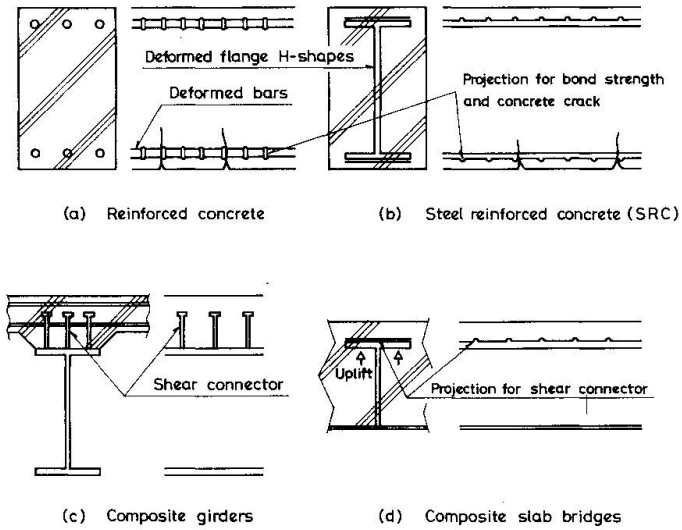

Fig.1 Composite structures using deformed flange H-shape

Fig.2. Then these prefabricated members were elected on the pier. After distributive deformed bars were laid, slab concrete was carefully placed. The steel frame and concrete were considered to bonded into a single unit by projections on the surface of H-shape. This type of composite construction has been applied in gay construction in Japan since 1978.

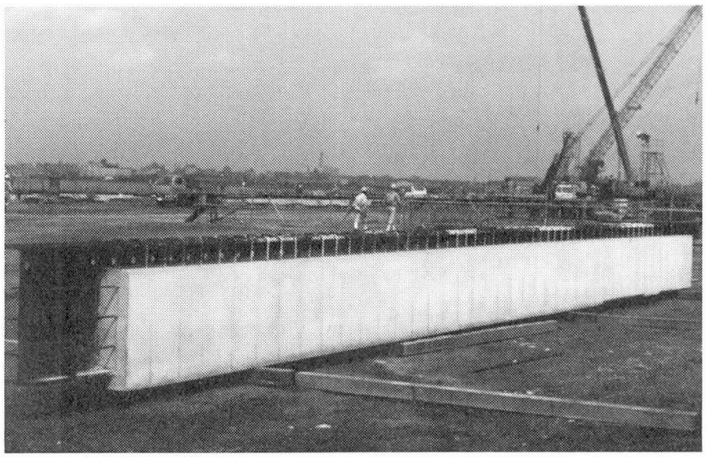

Fig.2 Prefabricated member of SRC girder

4. COMPOSITE SLAB BRIDGES [1]

A New-type composite slab bridges made by filling up the CT-shapes (cutting in half the new H-shapes) with expansive concrete, as shown in Fig.3, has been used for road bridge. The depth of this bridge can be made lower than that of composite girder and prestressed concrete girder. Since the commencement of sales for this slab bridge in 1982, more than fifty bridges have been completed as a result of river improvement and hollow type composite slab bridge has been developed for longer span.

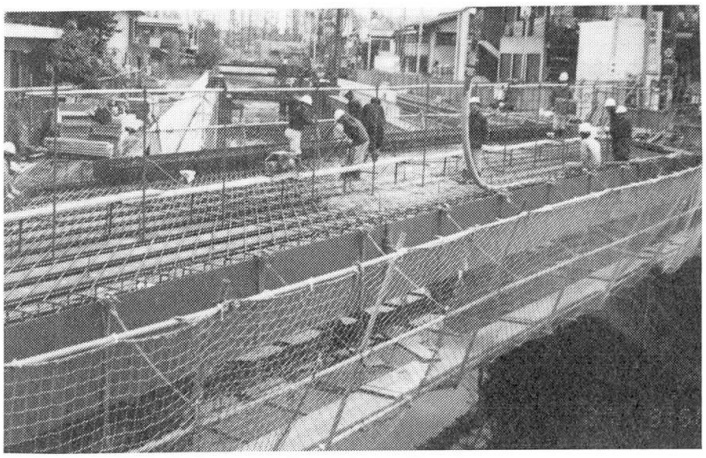

Fig.3 Placing expansive concrete on composite slab bridge

5. SRC BRIDGE PIERS

SRC high bridge piers using deformed flange H-shapes have been in practical use. Fig.4 is a shot of piers under construction in highway bridge and their height are about 40m. In this case, deformed H-shapes were also used as supports for the metal panels for concrete forms.

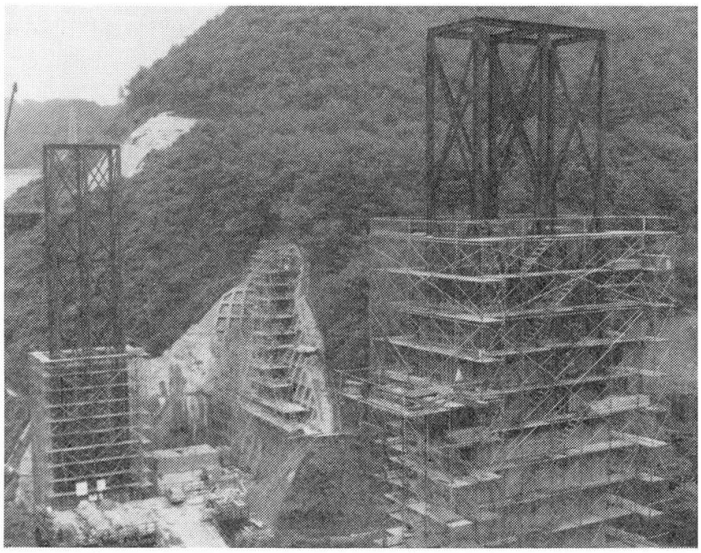

Fig.4 Under construction on SRC bridge pier

REFERENCE

1. YAMASAKI T. et al, Composite Slab Bridge using Deformed Flange T-shapes. IABSE 12th Cong., p:385~392, August 1984.