

Tanaka Award: Bridge Design and Construction Category

New Kelani River Bridge



Contractee: Road Development Authority (RDA), Ministry of Highways, Sri Lanka

Designer: Oriental Consultants Global Co., Ltd., Katahira & Engineers International Co., Ltd., Consulting Engineer and Architects Associated Pvt. Ltd., and Project Management Associate International Pvt. Ltd.

Constructor (Package 1): JFE Engineering Corporation Co., Ltd., Mitsui E&S, and Toda Corporation Co., Ltd. JV

Constructor (Package 2): Sumitomo Mitsui Construction Co., Ltd., and Sanken Construction Pvt. Ltd. JV

As part of Package 1 (steel bridge sections), a comprehensive review of production capacity, delivery performance and cost was carried out, leading to division of the manufacturing process among five factories in four countries (Japan, Myanmar, Vietnam and Thailand). The required quality of welds for the pier corners was assured by checking welding posture, weld state and the sequence of welding in advance using a mock-up model and by implementing witnessed on-site inspections by engineers. Cambers were set individually for each side web considering the torsional effect. The scaffolding requirement was reduced through the use of “River Decks” for the composite

slabs and onside high-strength bolts.

In Package 2 (PC bridge section), a number of measures were taken in casting the mass concrete: (1) the temperature of the fresh concrete was held below 25°C by adding ice to the mixing water; (2) fly ash cement (25% replacement) was used; (3) thermal analysis was carried out based on the results of adiabatic temperature rise tests; (4) a full-size casting test was carried out to verify the analytical results; (5) heat-retention curing was achieved by applying aluminum-coated sheeting to the outer side of formwork and plastic sheets; (6) the pile caps, which involved high-volume casting (2,000 m³), were divided into five placement layers; and (7) a pipe cooling system was installed in the basement of the main towers and near the supports of the transverse girders to reduce the internal temperature differential. For the cables of this extradosed bridge, PE coated WAX grouted ECF strands and four-layer anti-corrosion outer tubes were adopted, while anchorages are fully non-grouted to enable future replacement. The cantilever erection method was adopted, employing a super-size construction machine with four 1,000 tm main trusses.

The various new technologies used for quality enhancement of this steel and PC bridge system are expected to contribute to bridge construction in the future. For this reason the work is recognized as being a worthy recipient of the Tanaka Award in the Bridge Design and Construction Category.