

Prestressed reinforced cable-stayed bridge with stiffening slab

Autor(en): **Krishman, Boris I.**

Objekttyp: **Article**

Zeitschrift: **IABSE reports = Rapports AIPC = IVBH Berichte**

Band (Jahr): **64 (1991)**

PDF erstellt am: **29.04.2024**

Persistenter Link: <https://doi.org/10.5169/seals-49325>

Nutzungsbedingungen

Die ETH-Bibliothek ist Anbieterin der digitalisierten Zeitschriften. Sie besitzt keine Urheberrechte an den Inhalten der Zeitschriften. Die Rechte liegen in der Regel bei den Herausgebern.

Die auf der Plattform e-periodica veröffentlichten Dokumente stehen für nicht-kommerzielle Zwecke in Lehre und Forschung sowie für die private Nutzung frei zur Verfügung. Einzelne Dateien oder Ausdrucke aus diesem Angebot können zusammen mit diesen Nutzungsbedingungen und den korrekten Herkunftsbezeichnungen weitergegeben werden.

Das Veröffentlichen von Bildern in Print- und Online-Publikationen ist nur mit vorheriger Genehmigung der Rechteinhaber erlaubt. Die systematische Speicherung von Teilen des elektronischen Angebots auf anderen Servern bedarf ebenfalls des schriftlichen Einverständnisses der Rechteinhaber.

Haftungsausschluss

Alle Angaben erfolgen ohne Gewähr für Vollständigkeit oder Richtigkeit. Es wird keine Haftung übernommen für Schäden durch die Verwendung von Informationen aus diesem Online-Angebot oder durch das Fehlen von Informationen. Dies gilt auch für Inhalte Dritter, die über dieses Angebot zugänglich sind.



Prestressed Reinforced Cable-Stayed Bridge with Stiffening Slab

Pont à haubans avec dalle en béton armé

Stahlbeton-Schrägseilbrücke mit massiver Fahrbahnplatte

Boris I. KRISHMAN

Cand. Sc. (Eng)

Central Res. Inst. of Transp. Constr.

Moscow, USSR

A bridge connecting the new public and cultural centre with an island park was erected in Krasnojarsk, Eastern Siberia. In the context of the increased requirements toward the architectural expressiveness a version with a cable-stayed superstructure has been adopted. The bridge has the total length of 600 m and consists of a cable-stayed superstructure with 76.55+157.1+76.55 m spans (Fig.1) and viaducts with 25.6 m spans.

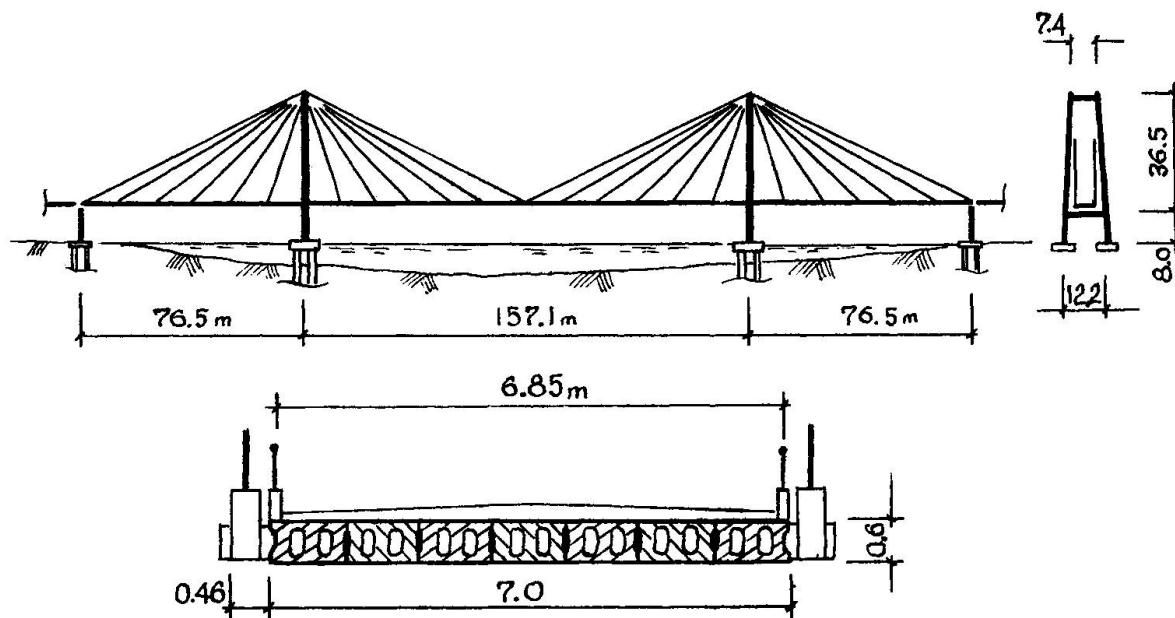


Fig. 1 General view and cross section of cable-stayed bridge

Two features differ the presented design from other examples of cable-stayed bridges. First of all, the cable-stayed bridge used the simplest design of the form of cross section of the stiffening slab - the plate form. That is why the "stiffening slab" term is being used below. Application of the cross section plate form made it possible to obtain the record for the reinforced concrete cable-stayed bridges construction elevation to span length 1/260 ratio. Secondly, for the main and viaduct spans use was made of a single-type precast element which is, essentially, a hollow plate block of 12 m length and 0.6 m thickness, series manufactured for the small-size motor-road bridges. The total dimensions of blocks were retained, with alterations connected with certain

particulars of operation under load of cable-stayed bridge stiffening slab and viaduct continuous plate, introduced in the reinforcement design.

The blocks were combined into the stiffening slab in the transverse direction by concreted key joints, and in the longitudinal direction - by the cast-in-situ cross 1.0 m wide beams.

The stays consist of one or two spiral ropes of enclosed type dia. 71.5 mm with 4.5 MN breaking load. Prior to erection, the stay ropes are subject to stretching until stabilization of the elasticity modulus. On pylons the

stays are fixed in the saddle-type bearing supports. To fix stays to the stiffening slab cross beams, a new design of the unit (Fig. 2) having the basic advantage of full unification within the superstructure limits independent of the stays inclination angles, has been developed.

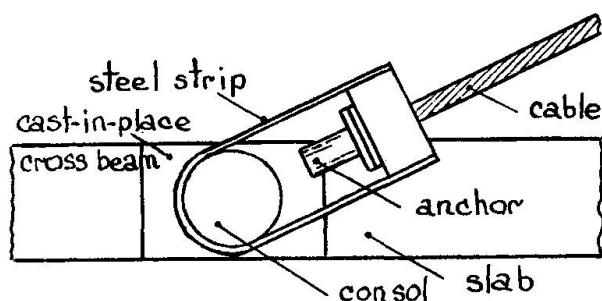


Fig. 2 Stay-to-stiffening slab attachment unit

The bridge pylons having the form of plane double cross-bar frames with inclined rectangular struts were concreted in situ in travelling forms. The foundations of all bridge piers were made on drilled cast-in-place piles of 1500 mm in diameter, with 8 posts concreted under each pylon. The stiffening slab was erected using temporary supports installed under stay attachment units.

To optimize the internal force distribution in the stiffening slab, regulation of the stay forces by method of additional tensioning was performed. For the three-dimensional and non-linear calculations of the cable-stayed superstructure, the computer programs making it possible to plot diagrams of efforts in the stiffening slab were produced. The stressed-deformed condition of the stiffening slab and stay-to-slab attachment units were studied on acrylic plastic models, reinforced gypsum and reinforced concrete models. The aerodynamic parameters of the cable-stayed superstructure were investigated in the wind tunnel using a model of the slab section.

Leere Seite
Blank page
Page vide