The Huangpu Great Bridge - Unique Suspension and Cable-Stayed Bridge Complex

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http://koti.kontu.la/jvirola/cv-jv.rtf

In China, the Huangpu Great Bridge was built across the Zhujiang River near Guangzhou City [1-3]. Huangpu-1 is a suspension bridge with a span of 1108 m, one of the longest built in the 2000's [4]. Huangpu-2 has a span of 383 m, 2nd longest among 1-tower cable-stayed bridges wordwide.

The Zhujiang River is about 2200 km long, third longest in China after the Yangtze and Yellow rivers, and it discharges to the South China Sea between Hong Kong and Macao. Guangzhou, capital of the Guangdong province, is situated along the Zhujiang River, about 150 km north-west of Hong Kong.

At the south shore of the river, the Huangpu-1 Bridge is an ordinary 2-tower suspension bridge. Only the 1108 m long main span is suspended by hangers from the two main cables, while the both side spans are supported by underneath columns. The main cables are anchored to block anchorages at side span ends. The spacing of the hangers is 16 m along the bridge.

At the north shore of the river, the Huangpu-2 Bridge is a 1-tower cable-stayed bridge with a main span of 383 m, 2nd longest in the world. The opposite side span near the suspension bridge is 197 m long.

The towers of the both bridges are made of concrete. The single tower of the cable-stayed bridge is 201 m tall, while the 2 towers of the suspension bridge are 189 m tall. The deck structure of the both bridges consists of a streamlined steel box girder, structural height 3, 5 m, total width 41,7 m. The vertical clearance at the cable-stayed bridge is 55 m, at the suspension bridge 60 m.

The client is the Chinese Ministry of Communications, the consultant being the First Prospecting & Design Research Institute of Highways at Xi'an. The bridge was completed in 2008.

As appears in the attached Table [4], there are in China more long-span suspension bridges (9 of 20) than in any other country.

References:

[1] Juhani VIROLA: "Huangpu Bridge – great suspension and cable-stayed bridge in China" (in Finnish). Tierakennusmestari 2008:3, p. 28-29.

[2] Information and material kindly given by the Nanjing Institute of Technology (NIT), and by the Tongji University Shanghai.

[3] LIU Shilin, FENG Yuncheng & DING Dajun: "Demanding double". Bridge Design & Engineering 2004:3, p. 35.

[4] Bridge Tables of the Helsinki University of Technology (TKK), www.tkk.fi/Units/Bridge/longspan.htm

Fig.1: General view of the Huangpu Great Bridge. Photo: Chinese Ministry of Communications
[NOTE: temporary picture name huan-001D, to be replaced in the article proper.]

The leading 20 long-span suspension bridges, [4]

No.	Bridge	Span	Location	Year
1	Akashi-Kaikyo	1991 m	Kobe-Naruto, Japan	1998
2	Xihoumen	1650 m	Zhoushan, China	2008
3	Great Belt East	1624 m	Korsor, Denmark	1998
4	Gwangyang	1545 m	Myodo-Gwangyang, Korea	2012
5	Runyang South	1490 m	Zhejiang, China	2005
6	Nanjing-4	1418 m	Nanjing, China	2013
7	Humber	1410 m	Kingston-upon-Hull, Britain	1981
8	Jiangyin	1385 m	Jiangsu, China	1999
9	Tsing Ma	1377 m	Hong Kong, China	1997
10	Hardanger	1310 m	Vallavik-Bu, Norway	2013
11	Verrazano-Narrows	1298 m	New York, NY, USA	1964
12	Golden Gate	1280 m	San Francisco, CA, USA	1937
13	Yangluo	1280 m	Wuhan, China	2007
14	Höga Kusten	1210 m	Kramfors, Sweden	1997
15	Mackinac	1158 m	Mackinaw City, MI, USA	1957
16	Aizhai	1146 m	Hunan, China	2011
17	**Huangpu-1**	**1108 m**	**Guangzhou, China**	**2008**
18	Minami Bisan-seto	1100 m	Kojima-Sakaide, Japan	1988
19	Fatih Sultan Mehmet	1090 m	Istanbul, Turkey	1988
20	Balinghe	1088 m	Guanling, China	2010

The leading 10 long-span 1-tower cable-stayed bridges

No.	Bridge	Span	Location	Year
1	Surgut	408 m	Khanty-Mansi, Russia	2000
2	**Huangpu-2**	**383 m**	**Guangzhou, China**	**2008**
3	Flehebrücke	368 m	Düsseldorf, Germany	1979
4	Kao Ping Shi	330 m	Dapingding, Taiwan	2000
5	Karnali	325 m	Chisapani, Nepal	1993
6	Kniebrücke	320 m	Düsseldorf, Germany	1969
7	Daugava	312 m	Riga, Latvia	1981
8	Grenland	305 m	Frierfjord, Norge	1996
9	Dubrovacka Most	304 m	Dubrovnik, Croatia	2002
10	Novy Most	303 m	Bratislava, Slovakia	1972

Fig.4: Bridge tower under construction.
Photo: Chinese Ministry of Communications
[NOTE: temporary picture name huan-004D, to be replaced in the article proper.]

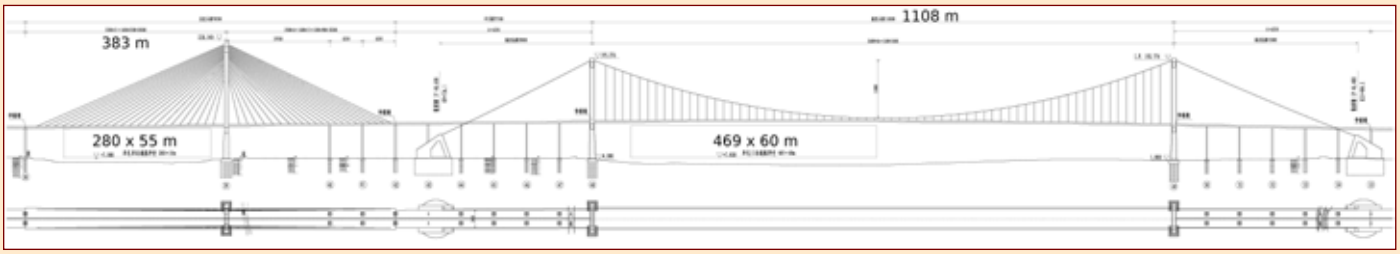

Fig.2: Longitudinal profile and plane of the bridge.
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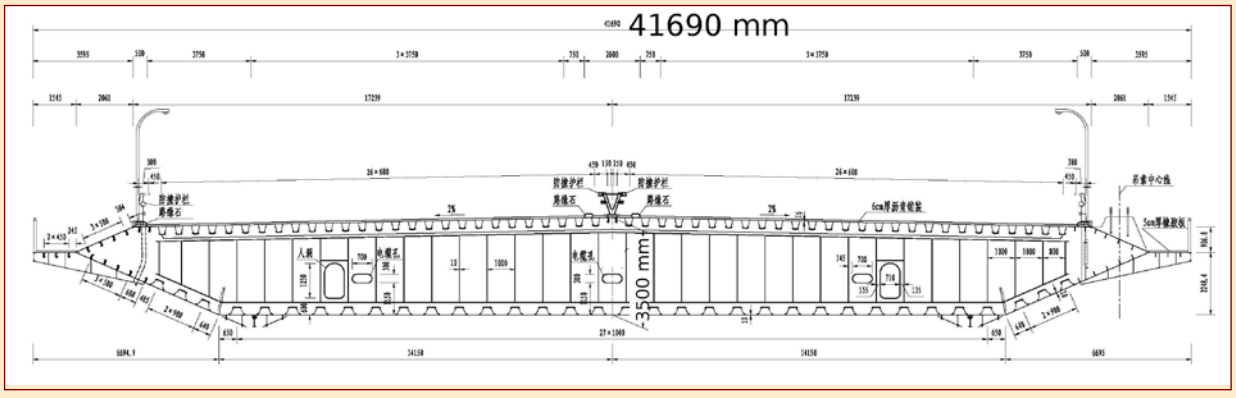

Fig.3: Cross-section of the deck.
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