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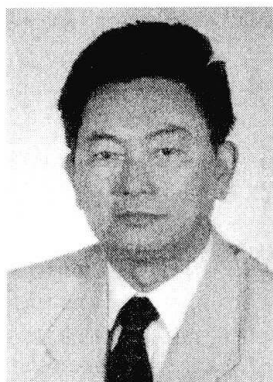
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Retrospect & Prospect of Cable-Stayed Bridges in China

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Abstract

The construction of modern cable-stayed bridges in China initiated in 1972, relatively later compared with other developed countries, but in last two decades of this century, a number of cable-stayed bridges have been built, the span length from 54m of the first bridge has been increased beyond 600m, about 9 cable-stayed bridges with spans over 400m have been opened to traffic, and 3 with spans over 600 m are now under construction. Table 1 shows the main cable-stayed bridges in China with spans over 400m.

| | Bridge Name | Location | Main Span | Year of Completion | Deck Type |
|----|------------------------------------|---------------|-----------|--------------------|-----------|
| 1 | Nanpu Bridge | Shanghai | 423 m | 1991 | composite |
| 2 | Yangpu Bridge | Shanghai | 602 m | 1994 | composite |
| 3 | Yunxian Bridge / Han River | Hubei | 414 m | 1994 | P.C. |
| 4 | 2nd Wuhan Bridge / Yangtse River | Hubei | 400 m | 1995 | P.C. |
| 5 | Tongling Bridge / Yangtse River | Anhui | 436 m | 1995 | P.C. |
| 6 | 2nd Chongqing Bridge / Yangtse R. | Chongqing | 444 m | 1995 | P.C. |
| 7 | Xupu Bridge | Shanghai | 590 m | 1996 | composite |
| 8 | Kap Shui Mun Bridge | Hong Kong | 430 m | 1997 | steel |
| 9 | Ting Kau Bridge | Hong Kong | 475 m | 1998 | composite |
| 10 | 2nd Santou Bay Bridge | Guangdong | 518 m | u.c. (1999) | mixed |
| 11 | 2nd Nanjing Bridge / Yangtse River | Jiangsu Prov. | 628 m | u.c. (2001) | steel |
| 12 | 3rd Wuhan Bridge / Yangtse River | Hubei Prov. | 618 m | u.c.(2002) | mixed |
| 13 | Jingsha Bridge / Yangtse River | Hubei Prov. | 500 m | u.c. (2002) | P.C. |
| 14 | Qingzhoulu Bridge | Fujian Prov. | 605 m | u.c. | composite |
| 15 | Zhanjiang Bay Bridge | Guangdong | 480 m | u.c. | P. C. |
| 16 | Lingdingyang West Channel | Guangdong | 950 m | u.p. | steel |
| 17 | Chongming Bridge | Shanghai | 1200 m | u.p. | steel |
| 18 | Zhenyang Bridge | Jiangsu | 625 m | u.p. | steel |

Table 1. Major Cable-stayed Bridges in China ($L > 400$ m)



During the progress of building these large cable-stayed bridges, the Chinese bridge engineers and researchers obtained experiences in the design and construction techniques and furthermore gathered more scientific results related to the topics of structural details, earthquake-resistant and wind-resistant design as well as construction control. In this paper, the state of art including some innovative points, for example, general structural systems, stay cable technology and the construction control technique considering creep effects for P. C. cable-stayed bridges will be introduced.

Most of large cable-stayed bridges have been or will be built along the pacific coast of China, the most economic developed region in China. As the coastal line is often hit by typhoons, the wind-induced problems play an important role in designing these large bridges. The State Key Laboratory for Disaster Reduction in Civil Engineering(SKLDCE) at Tongji University has been charged with their wind-resistant studies, where there are three boundary wind tunnels, in which the largest one has a testing dimension of 15m wide, 2 m high and 14 m long. In this paper some of the activities of the group of bridge aerodynamics especially related to cable-stayed bridges will also be introduced.

As the requirement of several strait crossings in China, the span length of cable-stayed bridges will increase to a new record. A traditional cable-stayed bridge with a span length of 950 m has been proposed by the Bridge Design Institute of Tongji University, which has been selected in the design competition for further optimization. In this paper some of the main conceptual considerations for this bridge will be presented for discussion.

In the first two decades of next century, China will be one of the world's hot places in building cable-stayed bridges. Although Chinese bridge engineers have now confidence to build cable-stayed bridges with longer spans, international colleagues are welcome for co-operation.