

# The Overall Design and Application of M280 Cable System of the Mingyuexia Yangtze River Bridge of Chongqing Donghuan Railway

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## Abstract

Mingyuexia Yangtze River Bridge is a (62.5+125+425+175+75) m double-deck four-line railway steel truss girder cable-stayed bridge with high and low towers. In view of characteristics of the bridge heavy design load and prominent fatigue problems, the pressure area adopts steel-concrete combination with closed box chamber structure between the lower beam. Steel truss beam adopts regional and different internal force types of fatigue loading coefficient to improve the economy. The cable adopts the 280MPa high fatigue stress amplitude cable system to extend cable change cycle. Fatigue and safety durability of the cables are comprehensively improved by a variety of means, including improvement of the stress of cable base metal, reduction of bending stress of the transition section, improvement of clip structure, more than 70% of life span is increased compared with the M250 cable.

**Keywords:** double-deck four-line railway; steel truss girder; cable-stayed bridge; fatigue loading coefficient; M280 cable.

## 1 Project Profiles

Mingyuexia Yangtze River Bridge is a key control project of Chongqing Hub Donghuan Railway, located in Chongqing. It adopts a main span of 425m double-deck four-line high and low tower steel truss beam cable-stayed bridge, crossing the Yangtze River from south to north. It locates in the perennial return water area of the Three Gorges Reservoir. The navigation level of the river section is national level I.

## 2 General Design

The total length of the Mingyuexia Yangtze River Bridge is 877.5m, and the span is arranged as (62.5+125+425+175+75)m. The lower deck is the 160km per hour double-line passenger and freight common line East Ring Railway and the upper deck

is a double-track intercity railway with speed of 250km per hour.

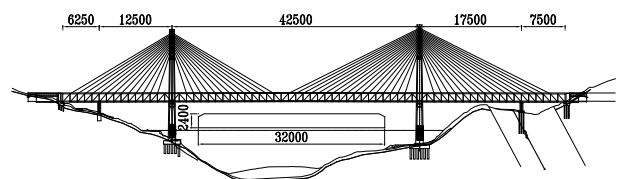


Figure 1. General Layout of Mingyuexia Yangtze River Bridge

The main girder adopts N-type parallel truss, with truss width of 17m, truss height of 14m. The upper and lower decks are all orthogonal dense beam integral deck system. Each vertical member is equipped with a horizontal connection which adopts a fully welded design. Meanwhile, the steel beam adopts high-strength bolts with dehydrogenation process.