Large span HSR bridges across the Yangtze River and the Yellow River

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Wuhan Tianxingzhou Yangtze River Bridge

Cable-stayed bridge
Main span: 504 m (1,653 ft)
Highway: 6 lane
Railway: 4 tracks
Opened: 2009
Speed: 200 km/h
Steel Truss

Main Span: 2@336 m
(2@1,102 ft)

Railway: 4 lane

Light Rail: 2 tracks

Opened: 2011

Speed: 300km/h
Cable-stayed Bridge

Mian Span: 5@168 m
   (5@551 ft)
Railway: 2 Tracks
Highway: 6 lane
Opened: 2012
Speed: 350km/h
Cable-Stayed Bridge

Main Span: 630 m (2,067 ft)
Railway: 4 tracks
Highway: 6 lane
Under Construction
Design Speed: 250km/h
Cable-stayed Bridge

Mian Span: 1092 m (3,583 ft)
Railway: 4 tracks
Highway: 6 lane
Under Designing
Design Speed: 200km/h
Technical Challenges to Design of HSR Long Span Bridges

Technical features: Long span, High speed, Heavy load

Technical Challenges:

- Vibration control
  Train-track-structure dynamic interaction analysis, wind tunnel test, install damper
- Stiffness criteria and deformation control
  Control the angle of rotation at beam end strictly, stiffness is judged by dynamic analysis results.
  Live load and temperature deformation added as additional track irregularity for dynamic analysis.
- CWR-bridge interactions
  Install rail temperature regulator, release CWR longitudinal force.
New Technologies

- New structures
  - Triple main truss
New Technologies

- New structures
  - Triple main truss
  - Integral orthotropic plate
New Technologies

- New structures
  - Triple main truss
  - Integral orthotropic plate
  - Composite truss girder
New Technologies

- New construction technologies
- Full block erection
New Technologies

- New construction technologies
  - Full block erection
  - Cantilever erection
New Technologies

- New construction technologies
  - Full block erection
  - Cantilever erection
  - Incremental launching erection
New construction technologies

- Full block erection
- Cantilever erection
- Incremental launching erection
- Truss block erection
New Technologies

- New equipments
  - Large displacement expansion joint and rail temperature regulator
  - Large tonnage spherical bearing
    Design carrying capacity 180MN
  - Large tonnage damper
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