

Project

Jiangxi River Bridge

Location

Chengdu, China

Date

2019 / 2023

Client

Chengdu International Aerotropolis Group Construction and Development

Status

Built

Size

13,860m²



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The first in a series of bridges on Chengdu's West Line Road, the new 295-metre Chengdu West First Bridge crosses the Jiangxi River, a tributary of the Tuojiang River in China's Sichuan province.

With its 185-metre central span and 55-metre secondary spans reaching to the riverbanks, the Chengdu West First Bridge is a road, cycle and pedestrian bridge over the meandering Jiangxi River; enabling the West Line Road to become the western section of the Airport New Town ring-road and cycle route.

As arches provide the most efficient bridge structure for spans between 120-250 metres, this symmetrical bridge is composed of two primary steel arches that rise from either side of the road deck. As they rise, the arches lean together to touch tangentially at their crown, stabilising the structure from lateral wind forces.

The dynamic curvature of the bridge's supporting piers and abutments taper into its primary arches and road deck, defining a sculptural landmark within Chengdu's transport infrastructure.



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01 Photograph by Arch Exist

02 Photograph by Arch Exist

03 Photograph by Liang Xue

04 Photograph by Liang Xue

05 Photograph by Arch Exist

Architect

Zaha Hadid Architects
(ZHA)

Design

Patrik Schumacher

ZHA Project Directors

Charles Walker, Lei
Zheng, Ed Gaskin

ZHA Project Architect

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ZHA Site Team

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Executive Architect

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Architectural Design &
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Local Architect

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Structural Engineers

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Quantity Surveyor

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Shenzhen Pengdaxin
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Transport Consultant

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Fire Engineer

China Southwest
Architectural Design &
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Landscape Consultant

Zaha Hadid Architects

Lighting Design

Zaha Hadid Architects

Site Supervision

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Design and Construction

Total Bridge Length

295m

Central Span

185m

Secondary Spans

55m

Height of Arches

30m

Commissioned to build the bridge following the 2019 design competition, Zaha Hadid Architects (ZHA) used structural analysis software on the design's digital model. Examining all material self-weight, superimposed dead load and traffic live loading, as well as environmental considerations of wind and temperature, this analysis ensured the structure and foundations have been designed to exceed the standards required for once-in-200-year weather events.

With a height to span ratio of approximately 1:6, the bridge's arches rise to 30 metres and are tied together at their base by longitudinal box girders that run along the edge of the road deck. These ties resist the outward horizontal thrust of each arch and significantly reduce the horizontal loads on the bridge's foundations.

Concrete abutments at either end of the bridge incorporate connectors linking the road deck to the West Line Road's surface. With no foundations positioned in the Jiangxi River, intermediate piers are located beneath the springing points of the arches on each riverbank.

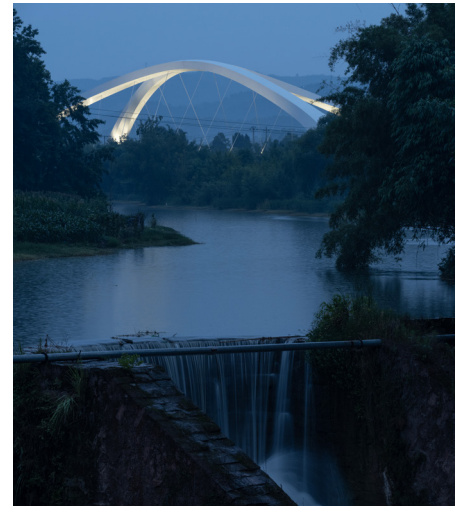
The bridge's bored piles and abutments were constructed using conventional in-situ reinforced concrete techniques. The steel box sections of each arch were prefabricated in optimal dimensions for transportation and assembly on site. The edge box girder sections within the road deck include the cable anchorages. These sections were also prefabricated and delivered in sections to be spliced together with on-site welding.

The bridge's prefabricated plate cross girders were delivered to the site and connected to the edge girders by a bolted cover plate splice connection. The concrete road deck has been constructed from precast panels fixed to the cross girders by in-situ concrete stich pours.

Mobile cranes lifted all prefabricated steelwork and precast concrete elements within the bridge's short assembly schedule.



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