China's New Huajiang Grand Canyon Bridge

World's Highest and Longest Suspension Span

by Charles Notley

Oct. 4—The stunning Huajiang Grand Canyon Bridge was formally opened to traffic Sept. 28, 2025, in Guizhou Province in southwestern China, and now holds two world records: It is the tallest bridge and the longest suspension bridge. It spans the Beipanjiang River, at the deepest point of a canyon incised in the Yunnan-Guizhou Plateau, in the west of the Pearl River Basin.

Built by China Railway Major Bridge Engineering Group, the Huajiang Grand Canyon Bridge（花江峡谷特大桥）had been under construction since only Jan. 18, 2022. The reported cost was around RMB 2.1 billion (USD 300 million).

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The Huajiang Grand Canyon Bridge opened to traffic September 28.

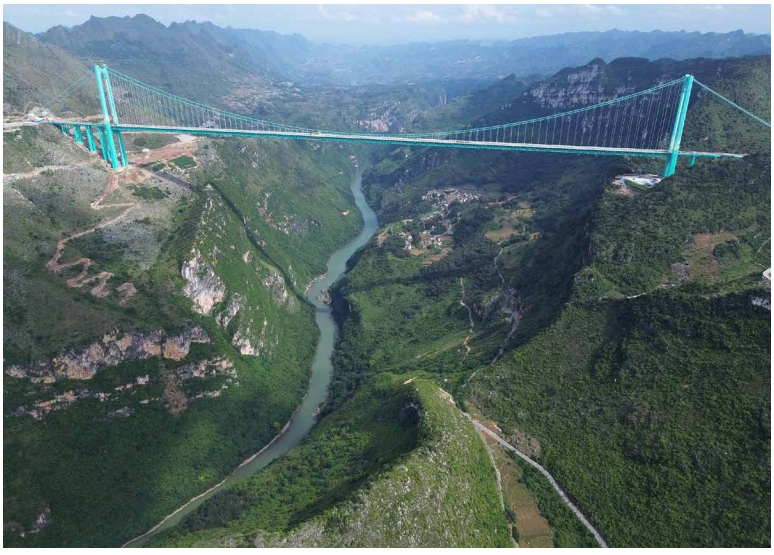
Its four-lane vehicular traffic deck is a record-breaking 625 meters (2,051 feet) above the river level. Its 1,420-meter (4,659-foot) span, suspended between two towers, carries the G56 Hangzhou-Ruili Expressway, reducing automobile and truck travel time between the two cities of Liuzhi and Anlong, from the current 3 hours to 1.5 hours, and cutting the canyon transit commute (cliff to cliff) from an hour to two minutes! This is transformative for the local economy, stimulating growth and prosperity, and integrating the previously isolated local villages with China's major cities.

Not only is the beautiful bridge an engineering feat, but it also calls attention to China's commitment to upgrade connectivity throughout all its lands, overcoming many challenges in physical conditions. It is one spectacular achievement in the road network in conjunction with China's National Trunk Highway System, launched in 1989, and its secondary National Expressway System, which has been expanding steadily over the decades.

Construction Breakthroughs

The canyon's height, rock wall formations, winds, as well as the river itself, presented enormous problems to be overcome in the construction, whose solutions forced breakthroughs in the design, technologies, and methods employed. Given that the project is in a seismically active zone, for example, the engineers designed the bridge to be flexible.

Most notable is how youthful the designers and workforce were. According to a report from *China Daily*, the average age of the project management team was 28, with more than 90% under the age of 35; of the 45 engineers from the China Railway Major Bridge Engineering Group, 32 are also under 35. The physi-



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Another view of the Huajiang Grand Canyon Bridge. The explosion of road and bridge construction began in 1989, with the launch of the National Trunk Highway System, a network of five North-South and seven East-West expressways with a total length of 22,000 miles.

cal work conditions were harsh for the initial surveyors who braved extreme temperatures, dense forests, and dangerous cliffs, and for the welders who completed millimeter-precision joints in strong canyon winds. Crews even deployed around the clock to complete the main tower top-off.

The steep slope on the north side of the canyon required the construction of a 262-meter concrete tower (the North Tower), embedded deep into the weathered rock. The South Tower's height is a more common 205 meters tall. A stiffened steel truss crosses the gap. Two dozen approach spans of 40 meters were built for the total 2,890-meter (9,481-foot) length of the bridge.

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The location of Guizhou Province in China.

The construction team independently developed heavy-duty climbing, scaffolding, and a smart cable hoisting system using positioning from the Beidou Satellite Navigation System. The hoisting system is capable of lifting steel truss girders weighing up to 215 tons with sub-millimeter precision. Satellite positioning halved the usual crane workforce required while eliminating human error. The Swedish Alimak Group and Internet of Things (IOT) technology, along with Beidou, facilitated placing the 93 truss sections hundreds of meters above the ravine.

Engineers chose a reinforced steel framework which, while strong, was 30% lighter than standard beams to make the bridge strong enough to survive the high winds and earthquakes. To address the issue of porosity in welds caused by strong canyon winds, the team even innovated a windproof welding technology.

The construction team used live data from 30 high-definition cameras, satellite-linked positioning systems, 3D-simulation tools, digital material tracking, and AI-assisted construction logic. In the words of Chief Engineer Liu Hao, "During on-site assembling, we followed [a] pre-determined sequence, achieving 100% accuracy in aligning bolts with their designated holes."

To assist in construction, the engineers used anemometers (wind sensors) which fed them real-time wind speed. They designed the bridge's trusses with minimal surface area, and its concrete columns are hollow, both features contributing to better managing wind shear. High-density cement, high-strength steel, excessive rebar, and digital simulations all help handle long-term temperature fluctuations and effects. The bridge's anti-corrosion coatings will minimize the effects of high humidity, rain, and lightning.

The final load test was conducted Aug. 27, when 92 trucks carried heavy tonnage across the span at the same time.

Outstanding Bridges and Development in Guizhou

Guizhou Province, home to 40 million people, had until recently been considered a relatively undeveloped province in China, with the nation's fourth-lowest GDP per capita as of 2020. But today the province is solidly developing. It is rich in natural, cultural, and environmental resources and supports forestry, hydroelectric-power, and mining industries, which constitute an important part of its economy. The government decided to develop Guizhou as a transportation and data hub, making it an important part of the Yangtze River Economic Belt, and turning Guizhou into one of China's fastest growing provinces. It is China's first

national-level comprehensive pilot zone for "big data," a major mountain tourism destination, a pilot zone for national "ecological civilization," and an inland open economic pilot zone.

To advance the economy of Guizhou along the Beipanjiang River, the government commissioned the construction of a number of dams, 11 airports, and seven bridges, including three railway bridges. Three of the seven were successively the world's highest, completed between 2001 and 2016. Today, the province of Guizhou is home to more high bridges than all other countries on Earth combined!

By 2030, Guizhou is projected to have more than 1,000 bridges over 100 meters high as measured from the road or rail deck to the water. Compare that with Italy, which has the world's second greatest number of high bridges, with 60 spans exceeding 100 meters in height. Of the world's 50 super-high spans exceeding 300 meters from deck to water, China is home to all but three.

Along with its primary goal of transforming the connectivity within this region, the Guizhou provincial government has ensured that the new Huajiang Grand Canyon Bridge offers amazing experiences for tourists. A 70-story glass elevator will take visitors up to the very top of the South Tower. Here, at a height of more than 183 meters (600 feet) above the road deck, visitors will be able to dine at the Stargazing Bar and Café.

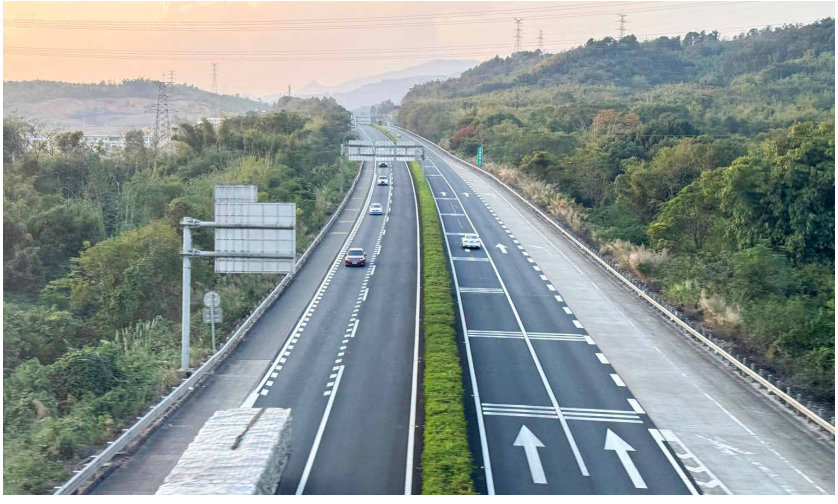
Below the road deck is an 800-meter-long, glass-bottom skywalk, leading through several glass-floored rooms, allowing visitors to seemingly float hundreds of meters above the ground. The walkway reaches a maximum height of 616 meters (2,020 feet) above the river.

The bridge also offers the world's highest bungee jumping and parachuting opportunities, and will include a sky-high swing and a running track. In addition, the bridge now links tourist sites in the mountains, especially the Huangguoshu Waterfall and local scenic caves.

National Trunk Highway System

The explosion of road and bridge construction in China first began in 1989, when the central government launched the National Trunk Highway System—a network of five North-South and seven East-West expressways with a total length of 35,000 km (22,000 miles). Divided into three stages of development, the second stage was completed in 2005—a decade ahead of schedule—allowing the entire infrastructure to be completed by 2009. The goal was to link more than 90% of all cities with a population of over half a million, and 100% of all cities with a population of more than a million. During these 20 years, the total number of highway bridges in China doubled.

In addition to the National Trunk Highway System, there is a secondary National Expressway Network, composed of several independent routes collectively known as "7918." The number "7" is for several radiating routes around the city of Beijing; the other numbers refer to 9 North-South routes and 18 East-West routes. Many of these smaller highways connect cities with populations of just 200,000. Completion of this highway system, not slated until 2040, will necessitate the construction of many more high bridges.



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Shown here, an expressway near Shaoguan, Guangdong Province, part of the National Trunk Highway System.

The new Huajiang Grand Canyon Bridge is part of the Shantian-Puxi Expressway, which is intended to advance connectivity and boost the economy throughout southwestern China.

Pride for the Future

At the Sept. 28 opening ceremony of the bridge, officials extolled the vast impact the new connection will have economically. Zhang Yin, the head of Guizhou's Transport Department, spoke at the press conference, saying, "Its opening makes enormous improvements to regional transportation conditions and injects new impetus into regional economic and social develop-

ment." He said that the bridge "reduces travel time between the two sides [of the divide] from two hours to two minutes," citing the connection between Qianxinan Buyi and Miao Autonomous Prefecture on the one side, with Anshun City on the other.

A rainbow reportedly appeared on the bridge's inauguration day, seen as a sign of celebration and accomplishment. This was the spirit expressed all along by those involved in the project. In a May 6, 2024 Xinhua article, Wang Songyu, a deputy project manager, said this about his work: "It's my great honor to build roads and bridges for the benefit of people," adding that he had a strong sense of fulfillment when the roads or bridges opened to traffic.

The success of the bridge emphatically refutes the anti-China, anti-development carping in leading Western media, typified by *The Washington Post* coverage in August. The *Post* quoted a Hoover Institution ignoramus who said that China is building infrastructure to "burnish its political prestige" on the world stage, and is seeking merely to "set records." In attempting to characterize China as an enemy and China's infrastructure building as dangerous to Western interests, such think-tankers, reporters, and politicians are needlessly heading their nations away from peace with China and instead toward war. They shamelessly blame a country for building its own infrastructure, while they promote a military build-up in an industrially crippled economy instead.

The reality of China's outlook for the future was conveyed by Liu Hao, chief engineer of the China Railway Major Bridge Engineering Group, in an interview with Xinhua in August: "When the Huajiang Canyon Bridge is opened to traffic, I will definitely bring my daughter here to see it and proudly tell her: 'This is another mega-project that your father and many other people have accomplished together.'"

Those should and could also be the words of American parents, proud, yes, of the legacy their lives will have bequeathed to the world in which their children can grow up and thrive.

As to the charge that China is stealing Western technology, how is that possible, when China's technology in many areas, including bridge-building, is in advance of Western capabilities? Maybe the Western countries should collaborate with China and work together to build a world in which every nation benefits.

The full article from which this was adapted is available from the author at CharlesNotley@gmail.com.