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Long March 90th

Long March: A Story That Still Resonates

By Staff Reporters

Twelve thousand five hundred kilometers. Two years. Over 206,000 soldiers across all Chinese Red Army units set out, but only just over 57,000 arrived.

These figures may seem remote and lifeless but the story behind them is not. It is a story of firm belief and courage that feared no sacrifice, of strict discipline and solidarity.

In October 1934, the main forces of the Chinese Red Army found themselves encircled in their base areas in Jiangxi province in east China. The forces surrounding them were far larger, and there was no realistic prospect of breaking through by remaining where they were. The Red Army then moved to break the Kuomintang's siege and continue the fight against Japanese invaders. What followed became known as the Long March.

Over the next two years, the Red Army crossed raging rivers, climbed snow-capped mountains, and traversed vast grasslands, fighting their way through repeated attempts to block and destroy them. The march lasted from October 1934 to October 1936. Some units covered as far as 12,500 kilometers, the longest distance marched by any unit.

Along the way, the Red Army fought hundreds of engagements. In late 1934, the Central Red Army suffered their heaviest loss in a single battle at the Xiangjiang River in south China, where their numbers were cut by more than half. In May 1935, to secure a path over the turbulent Dadu River in the southwest, soldiers crossed the Luding Bridge even though the enemy had removed the wooden planks of the bridge, by crawling across its iron chains with grim determination. In September 1935, they scaled sheer cliffs to capture the Lazikou Pass in the northwest, opening the road north.

In January 1935, a meeting in the town of Zunyi corrected the military approach that had led to earlier defeats and set a new direction. The Zunyi Meeting is regarded as a turning point during the Long March and a key event in the success of the Chinese revolution. From

that point on, the march became not merely a matter of survival but a purposeful advance northward, toward the front lines of resistance against Japanese invasion. This direction was progressively defined in the months that followed and culminated in the establishment of "moving north to resist Japanese aggression."

American journalist Edgar Snow, the first Western reporter to reach the Communist base areas, interviewed Red Army personnel, including Long March participants, in 1936. In the book *Red Star Over China* (1937), he sought to capture what the Long March meant, not as a military operation, but as a human experience: "Adventure, exploration, discovery, human courage and cowardice, ecstasy and triumph, suffering, sacrifice, and loyalty, and then through it all, like a flame, an undimmed ardor and undying hope and amazing revolutionary optimism of those thousands of youths who would not admit defeat by man or nature of God or death — all this and more seemed embodied in the history of an odyssey unequaled in modern times."

Snow's account reached a global audience. For many readers outside China, it was the first real evidence that the Communist movement was not the spent force its enemies claimed. It was something far more resilient, and, in Snow's telling, undeniably human. The Long March entered the world's imagination as a story of survival, resolve and endurance that could not be ignored.

Ninety years later, the Long March endures, not merely as a chapter in military history but as a record of what human beings can endure when driven by firm belief. The soldiers who walked those roads were mostly young people, many in their teens and 20s. They had no motorized transport, no air cover, no reliable supply lines. Yet against all odds, they completed the march victoriously under the leadership of the Communist Party of China.

That is why, nine decades on, it continues to resonate far beyond the borders of China.



The Fenglai Daxi River Grand Bridge under construction in southwest China's Chongqing. (PHOTO: XINHUA)

STI Frontier

World's Longest-span Steel Arch Bridge Rises with Digital Tech

By Staff Reporters

High above a deep gorge in southwest China's Chongqing, the final concrete deck panel of a bridge was lowered into place with millimeter precision. On June 12, the steel-concrete composite girder of the Fenglai Daxi River Grand Bridge was officially completed. With a main span of 580 meters, it is now the world's largest-span steel arch bridge.

Standing over a deeply incised tributary of the Wujiang River, the bridge is both an engineering marvel and a dialogue across 1,400 years — blending the ancient wisdom of the Zhaozhou Bridge, a stone arch bridge built 1,400 years ago, with modern digital technology.

Why an arch bridge?

"This is a typical deep V-shaped gorge with limited space, huge height differences and fierce valley winds," explained Chen Kejian, deputy chief engineer of China Railway Eryuan Engineering Group. Suspension and cable-stayed bridges need towering pylons, which would

be extremely difficult to erect here and costly. Arch bridges offer rational force distribution and the V-shaped cliffs in the area serve as natural abutments. A disadvantage thus became an advantage.

The first challenge was sheer weight: 25,800 tonnes of steel, equivalent to 3.6 Eiffel Towers. Traditional solid abutments would crush the load-bearing foundation.

The design team drew inspiration from the Zhaozhou Bridge. Its pioneering "open-spandrel" design reduced weight by hollowing out the spandrels. The team adapted this into an "inverted π -shaped" hollow foundation, standing on two "legs" to distribute pressure.

The 580-meter span also introduced a new mechanical problem: lateral forces. Traditional small-span arch bridges are controlled mainly by vertical forces, but here the arch foot is controlled by both lateral and vertical forces.

"We broke convention and, for the first time globally, adopted active control of arch ring internal forces using cables," said Zhang Chao, project design lead.

This transferred pressure from the lower chord to the upper chord, solving the anchoring problem and cutting steel consumption by 37 percent compared with similar bridges of smaller span.

Digital 'twin' fixes pre-assembly

The second challenge was pre-assembly. Hundreds of thousands of high-strength bolts had to pass through holes with only a three-millimeter gap. "It's like assembling hundreds of tonnes of Lego at 100 meters high and threading hundreds of thousands of screws through needle eyes," said Huang Jian, technical lead at China Railway No. 8 Engineering Group.

Worse, the only pre-assembly yard was less than 90 meters of usable length. Multi-round assembly would cause errors to snowball, potentially leading to deviations of over 10 centimeters.

Professor Zhou Jianting's team at Chongqing Jiaotong University provided the key: digital pre-assembly. Each steel component is "CT-scanned" with holographic laser scanning, and the point cloud data are stitched into a millimeter-precision 3D "virtual twin." See page 4

China-Mongolia Joint Lab a Model for Cross-border Mining Innovation

By ZHANG Jingyang

The China-Mongolia Belt and Road Joint Laboratory on Mineral Processing Technology (Preparation) is emerging as a flagship platform for bilateral scientific cooperation, offering a replicable blueprint for international technology partnerships in the mining sector.

A research ecosystem from scratch

Before the joint lab's establishment, Mongolia's mining sector faced significant bottlenecks. Jargal-saikhan Lkhasuren, director of the Institute of Chemistry and Chemical Technology of the Mongolian Academy of Sciences, said Mongolia had no standardized research facilities, no complete sets of equipment, no mature processing techniques, and no professional technical system. It was difficult for research teams to carry out practical R&D or pilot-scale production.

The joint lab changed that landscape. It has introduced a collaborative operating model driven by Mongolian demand, supported by Chinese funding, and supplied with Chinese technology. This has given Mongolia

a complete mineral and metallurgical R&D system.

On the Chinese side, a 3,280-square-meter research facility in Hohhot, capital of north China's Inner Mongolia autonomous region, has been upgraded. On the Mongolian side, a 1,100-square-meter laboratory has been built in Ulaanbaatar, equipped with 800 sets of instruments.

A team of 126 researchers and administrators from both countries now works across mining, beneficiation, metallurgy, advanced materials and secondary resource recycling.

Niu Yiding, vice president of the Inner Mongolia Academy of Science and Technology (IMAST), the lab's host institution, said it has become a fully equipped, industry-academia-research integrated platform that provides professional scientific support for technological innovation, green transformation and efficient resource utilization in both countries.

Expanding the innovation network

The lab has broadened its collaborative footprint. In June, it co-organized a thematic seminar on mineral processing advances with the Mongolian Academy of

Sciences' Division of Technological Processes and the Center for Ecology and Sustainable Development at the Mongolian University of Science and Technology. More than 50 representatives from Mongolian state-owned mining enterprises, research institutions, universities and private firms attended it and multiple preliminary cooperation agreements were signed on topics ranging from green mine construction to talent development.

Over the past five years, the lab has organized eight joint technical training sessions, trained 198 Mongolian research professionals, facilitated 15 bilateral exchange visits, and established a technology promotion center in Mongolia. See page 2



A map shows the routes taken during the Long March. (PHOTO: China Military Online)