



Clockwise from top left: Qinglongqiao Station, a statue of Zhan Tianyu and builders working on the Beijing-Zhangjiakou high-speed railway.

# FATHER OF THE CHINESE RAILWAY

The Father of the Chinese Railway, Zhan Tianyu (1861-1919) was instrumental in bringing railway transport to China.



I visited the Qinglongqiao Railway Station recently while on a Beijing trip with a group of engineers, and had the great fortune to personally pay tribute to our industrious forefather at the centenary celebration of his life.

While most people remembered him for the building the first railway from Beijing to Zhangjiakou, few people truly appreciate his superb engineering prowess. At Qinglongqiao, which is located near Badaling, the terrain at the time was regarded as too hilly for railway construction.

With steel wheels and tracks providing limited traction, railway trains are not designed for climbing steep slopes. Very few commercial railways can tackle slopes with more than a 3 percent gradient (a rise of 3 meters over 100 meters length). That is why railway lines use tunnels and bridges to cross hills and valleys.

Zhan devised an ingenious way of negotiating steep slopes while preventing the risk of damage to the Great Wall. He designed a scissor layout track, allowing the train to go halfway up a slope, and then reversing up onto another, in a see-saw fashion, to gradually climb the hill. By using two locomotives in a push and pull operation to create extra traction power, he applied his engineering skills to defeat a classic hurdle in railway alignment planning that previously baffled international railway experts.

A hundred years on, China has become one of the great railway leaders. With over 130,000 kilometers of commercial railway routes, we are now the country with the third-longest railway routes and with a huge passenger throughput of over 2,000 billion annual patrons.

China also has the longest high-speed

railway route in operation and is definitely the world leader in commercial high-speed railway, with abilities to export its expertise to foreign countries.

As I bowed to pay tribute to Zhan, I wished I could tell him that one century on, a huge underground station is being built in Badaling, replacing his masterpiece design which had served the area for the last century. As part of the new High-Speed Railway Line to service the 2022 Winter Olympics Sports Ground, it will be one of the world's largest underground railway stations, allowing hundreds of thousands of tourists to visit the Great Wall.

The station's construction faces the challenge to preserve the terrain of Badaling, an integral point along the Great Wall.

At 100 meters below ground, it will be the deepest underground High-Speed Railway Station in China. It employs the most up-to-date technology in station design, providing safe access and evacuation routes to tens of thousands of passengers. The large numbers of long escalators will allow easy access for passengers from various locations to enter and leave the station in comfort and total safety, under all conceivable emergency scenarios. Imagine taking the long reach escalators, traveling over two minutes to reach the station concourse.

As our most respected railway forefather Zhan Tianyu rests in peace, overlooking the hills of Badaling, he must be smiling with great satisfaction to see how far his country has developed over the last century. We have grown from being a new entrant in railway to becoming a world leader.

**Veteran engineer Edmund Leung Kwong-ho casts an expert eye over Hong Kong's iconic infrastructure**