

Bullet trains complement global goals

State-owned China Railway Corp plans to export new models based on the CR400 Fuxing series

By ZHAO LEI

The development of new-generation bullet train services will benefit the government's promotion of the country's high-speed railway technology in the international market, according to officials at China Railway Corp (CRC).

In a statement published on its website in September, the State-owned railway operator said it plans to design and export bullet trains based on the CR400 Fuxing, or "rejuvenation", model, the nation's newest fleet of trains.

The statement added that the

trains will meet the requirements of users overseas and will be competitive in the global market.

As prime examples of China's world-leading expertise, the CR400AF and CR400BF models were put into operation on the Beijing-Shanghai High-Speed Railway in late June, running at about 300 kilometers per hour.

On Sept 21, the speed was increased to 350 km/h on the 1,318-km-long line, becoming the world's fastest operational wheeled rail vehicles. Their deployment cut the journey time between the municipalities by 60 minutes, reducing the trip to four and a half hours.



A new Fuxing bullet train running between Tianjin and Beijing prepares to leave the capital. WANG ZHUANGFEI / CHINA DAILY

Their development began in 2012 under the Ministry of Railways, the predecessor of CRC, which aspired to manufacture bullet trains with "Chinese standards".

Before Fuxing came into service, trains running on the country's high-speed rail network had been designed and built in accordance with a range of standards in use overseas.

The new models have longer ser-

vice lives than their predecessors — 30 years compared with 20 — and their streamlined designs allow lower power consumption and more space for every passenger, according to Zhang Bo, a designer at the China Academy of Railway Sciences.

Zhang said the overall design and all of the key parts — such as traction equipment, brakes and the control software — were developed by Chinese engineers.

The trains are equipped with advanced monitoring systems that provide autonomous deceleration in the event of emergencies or malfunctions.

He Huawu, chief engineer at CRC, said the level of technology and the capabilities of the CR400 series meet the highest standards in the world. It will offer major advantages as China seeks to export homegrown high-speed railway equipment.

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transnational ultrafast transportation network, according to Mao.

"The reason we are eager to develop a 4,000 km/h version is that we believe such a line is technologically feasible, and that it will have business potential in terms of long-distance transportation in the future," he said. "Of course, safety and comfort will be at the top of our agenda when we develop hyperloop lines."

The maglev train's acceleration and deceleration within the tube would have to be relatively gradual and smooth to ensure passenger comfort, he said. Moreover, landforms and engineering considerations would determine what proportion of the line would be aboveground and how much would run underground.

Zhai Wanming, an academician at the Chinese Academy of Sciences and a professor of traction power at Southwest Jiaotong University in Chengdu, Southwest China's Sichuan province, previously told Xinhua News Agency that when a train travels at 400 km/h or faster, more than 80 percent of its traction power is used to counter air resistance. Therefore, a train can only maintain ultrafast speeds by running within a partially elevated tube, he said.

The idea of using magnetic levitation within a partial vacuum to carry people or cargo was floated by scientists many years ago. However, it gained new traction in 2012 when tech tycoon Elon Musk, CEO

Milestones for fast trains and planes

Fastest rail vehicle ever built: Japan's L0 Series superconducting maglev. In April 2015, it achieved a world record of 603 kilometers per hour.

Fastest integral rail vehicle in commercial operation: Germany's Transrapid maglev, which operates on the Shanghai Pudong International Airport Maglev Line and has a maximum operating speed of 430 km/h.

Fastest wheeled train: France's TGV POS V150. In April 2007, it

achieved a world record of 574.8 km/h.

Fastest wheeled train in commercial operation: China's CR400AF and CR400BF on the Beijing-Shanghai High-Speed Railway. These have a maximum operating speed of 350 km/h.

Fastest manned aircraft: The North American X-15 rocket-powered plane. In October 1967, it set a world record of 7,274 km/h.

Fastest civilian aircraft in active service: The US-developed Cessna Citation X, which has a

maximum cruising speed of about 978 km/h.

Fastest commercial airliner: The British-French turbojet-powered supersonic passenger jet Concorde, which had an average cruising speed of 2,140 km/h during its service life from 1976 to 2003.

Fastest commercial airliner in active service: The Boeing 747-400ER, which has a cruising speed of 933 km/h.

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of SpaceX and Tesla, announced his ambition to build a hyperloop between Los Angeles and San Francisco.

Hyperloop Transportation Technologies and Hyperloop One have designed and produced prototypes and have signed agreements with several countries to conduct feasibility studies, according to media reports.

In May 2014, Southwest Jiaotong University announced that it had built the world's first experimental elevated loop tube for technological demonstration of a high-temperature superconducting maglev vehicle it has developed.

A senior Chinese maglev scientist, who spoke on condition of anonymity, said the college plans to develop

vehicles capable of running at 400 km/h in a partially elevated loop tube. He added that the institute is also in talks with provincial authorities regarding research and development of a next-generation maglev/tube system with an estimated speed of about 1,200 km/h.

With regard to the feasibility of CASIC's hyperloop plans, the scientist said the company's researchers will need to address a number of technical issues, including communications and equipment-cooling techniques in an elevated environment.

"Moreover, CASIC will have to pay great attention to its project's profitability.

"My estimation is that the 1,000 km/h version will be economically

and technically feasible," he said.

"Of course, from a technical perspective, the 4,000 km/h model could also become a reality if the engineers are able to work out solutions to issues related to propulsion, levitation and control."

Even before CASIC announced its hyperloop program, engineers at the State-owned railcar manufacturer CRRC Corp, the world's largest train maker, had started developing a new-generation bullet train with an operating speed of 400 km/h, which will probably become the fastest train in service on the planet.

It will be deployed on a series of new lines the government plans to build in order to connect nations participating in the Belt and Road

Initiative, a multinational economic venture proposed by President Xi Jinping in 2013.

The initiative consists of the Silk Road Economic Belt, which will link China with Europe, and the 21st Century Maritime Silk Road, which will stretch from southern China across Southeast Asia, and even to Africa. The government estimates that the initiative could benefit 4.4 billion people in 65 nations.

The axles and wheels of CRRC's new bullet train will be designed so they can be adjusted to fit a range of track gauges used outside China.

Experts have also been testing an ultrafast bullet train capable of traveling at about 600 km/h, but its designers have stressed that it has been built to test next-generation railway technologies rather than for commercial use.

Moreover, CRRC is designing two types of maglev — a 600 km/h high-speed version and a 200 km/h mid-speed version. The company expects to put them into service sometime around 2021, according to the designers.

At present, China operates 124,000 km of rail lines. That figure includes more than 22,000 km of high-speed track, about 60 percent of the global total.

Every day, at least 4 million people use the nation's high-speed trains, accounting for 50 percent of daily user numbers on the country's entire rail network.