

508-KM MUMBAI-AHMEDABAD BULLET TRAIN PROJECT

High speed rail project: India's Shinkansen track takes shape in Surat factory

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Kim (Surat), May 24

AROUND 56 kilometers far from Surat in Gujarat, at a 14-acre factory, over 200 workers are manufacturing a part of a track system being used for the first time in the country.

Arjun Yadav, a site worker from Uttar Pradesh, slides out his digital depth caliper and fixes it to one side of a 4.5 tonnes track slab — which looks roughly like a double-edged razor blade. The machine reads 191 mm. Relieved, he marks "OK" on its surface. This is the 36,112th number of the track slab manufactured at the Kim, one of the two facilities in Gujarat for the 508-km Mumbai-Ahmedabad High Speed Rail project.

What Yadav measured was the thickness of the track slab, which was prepared after more than 12 hours of the rigorous work. Even a minor error could have marked it redundant.

This is what will eventually hold the rail.

The country's high-speed dreams are now being expedited with faster laying of track slabs, which is among the last works before bullet trains will run, as the 48-km Surat-Bilimora stretch of the 508-km project is scheduled to be completed by August 2027. The entire corridor from Ahmedabad to Mumbai is targeted to be made operational by 2029.

As per the National High Speed Rail Corporation Ltd, the government agency behind the implementation of bullet train projects, a total of 2.05 lakh track slabs is required for the entire project. Out of this, 75,473 track slabs have been casted in two units, another one is in Anand, and 35,327 slabs have been laid over track bed on the viaduct.

The track slab is one of the most unique features of the Japanese high speed system, so much so that even the word Shinkansen is derived from it.

This is different from the ballasted track system that Indian Railways use for its projects. "In Japanese, Shin means new, Kansen means track. It is, quite literally, a new track," said an official of NHSRCL.

The Kim facility is the largest one, which will provide track slabs for Vapi to Vadodara section of the project. It was started in September 2023. Out of the 96,000 slabs, 36,000 have been supplied. Its peak capac-



Started in September 2023, Kim is the largest track slab manufacturing facility.

SANKHADEEP BANERJEE

ity is to cast 120 slabs in a day.

Inside the cavernous factory, the Italian bar cutting machine of schnell group runs at a full flow. It cuts 11 types of bars in different dimensions (shape and size) with the smallest one of 4.84 meters and the longest of 106 meters. In one minute, it cuts 30 bars, and in a day it cuts over 10,000 bars.

The steel cage for this has arrived from Japan, there cannot be even a millimeter of error. The cage is created with 11 types of bars and then it is put in the Japanese moulds. One cage weighs 300 kg.

The spreader bucket moves vertically and horizontally with the concrete aggregate-cement admixture. The four vibrators are deployed in the mould for concrete compaction.

The steam pipe from a boiler outside runs down the mould which heats up the concrete for 12 hours at 40-45 degree celsius. Then it is submerged in treated water for three days for curing. A total of 4.5 tonnes of concrete is poured into one slab. After this process, there are a total of nine gauges which are used to check the properties. There are two pages of a checklist to check 16 items and over 50 points.

Manu Maheshwani, lab in-charge and Deputy Manager of IRCON, works at the compressor testing machine. He said the sample for each track slab is collected during the moulding. To check its strength, it should achieve a minimum 50 mpa (megapascal). It is checked two times, first after three days, second after 28 days. Along with this, a cement cube is tested for quality, aggregate test, water test of its PH and TDS. In total more than 30 tests are done to verify that a particular track slab can be used for the Bullet train.

He said a particular electri-

cal resistance test is conducted to check that the signals are not passed from the track to the slab. "A 6 volt current is passed through the rail for checking the rail fracture. The current should only pass through the rail, not the slab," said the man. This is a unique system for high speed rail. Indian Railways does not have it, but the metro performs the same function. Railways only have it in the yard area.

Sanchit Garg, overall in-charge and Joint General Manager of IRCON, said 16 engineers came from Japan to give the training. "The factory area, the shed part, is 200 meters. For the lab test, the machines used are Indian made only," he said.

Ravindra Singhal, Senior Track Expert, says three types of machinery have been deployed at the site — Japanese, Italian and Indian.

"In Japan, this kind of factory is for 20-30 slab casting in a day. This is a much larger factory than theirs. They have a factory every 20-30 kilometers. Around 1,000 people have been trained for it. They were taught under the 15 courses conducted with JARTS (Japan Railway Technical Service)," said Singhal.

Outside the 200 meters main workshop, trucks are lined up to load precast slabs and take it to one of the 13 track construction bases. One of the trucks goes to the Vaktana base, part of Surat-Bilimora section, where slabs are lifted to 23 meters above the ground to be placed on the viaduct. Then comes the role of four key machines — Flash Butt Welding Machine, Rail Feeder Car, Track slab laying Car and Cement Asphalt Mortar injection car, all lined up on the viaduct. They came together to lay a track slab, before the rails could be laid over it.