

15-storey Metro shaft to come to rescue in case of under-river crisis

No Lift To Ensure Safety, Passengers Will Have To Climb 273 Steps

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Kolkata: Apart from being India's first under-river tunnel, the upcoming East-West Metro stretch linking Kolkata with Howrah will feature another engineering marvel. It will have the country's deepest ventilation-evacuation shaft, which equals a 15-storey building. Passengers would have to climb the entire height (273 steps) of the shaft, which has been built near the Brahmapura Road Flyover, to be evacuated out. Installation of electricity-run elevators was avoided keeping the safety factor in mind.

East-West Metro's truncated Expland-Howrah Maidan section is ready for

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commissioning. Tunnels and three of the four stations dotting the 4.8km stretch were structurally completed in 2019. The 43.2m deep ventilation-run-evacuation shaft was completed in Aug 2020.

"The shaft will not only provide ventilation (by pumping in air into the river tunnels), it will play the crucial role during evacuation," said Tamas Biswas, project manager of Adcon, contractor for the 3.8km Howrah Maidan-Expland stretch, including the 320m-long under-river tunnels.

At Howrah Metro station, the 500m² in tunnels plunge 20m into the river. From there, they go deeper till 32m, crossing the riverbed. The shaft had to go as deep as

DEEPEST IN INDIA

- The vent shaft has come up on Strand Road, near Brahmapura Road Flyover
- Apart from pumping air into tunnels, it will double up as evacuation exit
- Passengers to climb 273 step to reach exit
- The staircase is split into 23 landings
- No elevators built as they can't be operated in case of fire
- The structure is 48m deep, which is as tall as a 15-storey house
- It matches 48m depth of river tunnels

Alcons encountered two aquifers, which posed risks of water ingress, while constructing the shaft

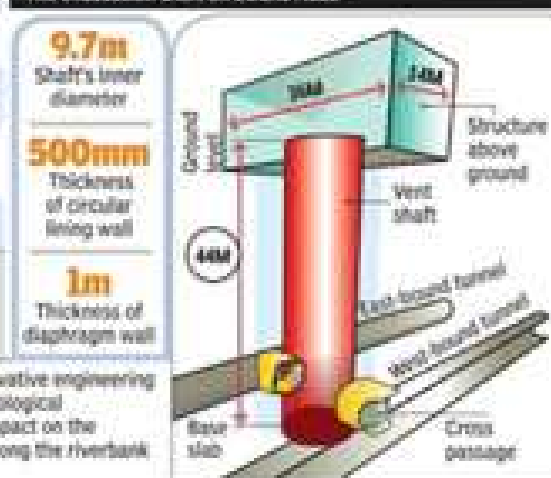
It has been built with innovative engineering techniques to navigate geological challenges and overcome any impact on the Circular Railway line that runs along the riverbank

A KMDC ENGINEER

43.2m. "It has been built with innovative engineering techniques to navigate geological challenges and overcome any impact on the Circular Railway line that runs along the riverbank," an engineer of Kolkata Metro Rail Corporation (KMDRC), the implementing agency of the 30km East-West Metro, said. The corridor, also known as the Green Line, now runs 9.25km from Sector V to Sealdah. It will eventually have a conti-



The evacuation shaft on Strand Road



nuous link to Howrah Maidan.

"Considering utmost passenger safety in critical conditions like fire or strokes, when people will have to be evacuated from the tunnel, lifts, which run by electricity, were skipped," said Biswas. In all, 273 steps are to be climbed. The staircase is split into 23 landings.

"The National Fire Protection Association (NFPA) guidelines make evacuation

shafts mandatory if the distance between two stations exceeds 302m. Alternatively, cross passages can be built every 244m. The latter wasn't possible under the river. So we ended up building India's deepest ventilation shaft, which is deeper than the usual 30m-32m ones constructed so far," Biswas said. There were challenges galore. Alcons encountered two aquifers in the river that posed risks of water ingress.

15-STOREY EVACUATION SHAFT FOR UNDER-RIVER METRO



The ventilation-evacuation shaft at the Strand Road riverside

The East-West Metro stretch linking Kolkata with Howrah — India's first under-river tunnel — will have the country's deepest ventilation-evacuation shaft equalling a 15-storey building. Passengers will have to climb the entire height (273 steps) of the shaft, built near the Brabourne Road flyover, in order to be evacuated. Installation of electricity-run elevators was avoided keeping safety of passengers in mind. The 43.5m deep shaft was completed in Aug 2020