

India's First Underwater Metro Tunnel

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Context

The Prime Minister inaugurated the Esplanade-Howrah Maidan section of the Kolkata Metro, and dedicated to the nation the first underwater transportation tunnel in the country.

Key Points

- India has recently opened its first underwater metro, marking a significant milestone in urban transportation.
- This engineering marvel demonstrates advanced technology and improves connectivity between Kolkata and Howrah.
- It not only boosts the local economy but also provides a sustainable transportation option.
- However, there are challenges in terms of safety and maintenance, and the project comes with high costs.
- It is only when the underwater metro is integrated with the already established systems of transport and acceptable to the people will it be viable.

Details about the Underwater Metro Tunnel

About

- India's first underwater metro was inaugurated in Kolkata on March 6th, 2024.

- This historic engineering landmark is 16.6 km long, including an astonishing 520 m beneath the Hooghly River.
- It connects the twin cities of Kolkata, Howrah, and Salt Lake, and comprises six stations, of which three are substantial.
- It features the deepest metro station in India at Howrah.
- The underwater section is 4.8 km long, connecting Howrah Maidan to Esplanade, forming part of the East-West Metro corridor.
- This project is a significant advancement in India's infrastructure, improving commuting in Kolkata.

Advantages

The advantages of Kolkata's underwater metro include:

- **Improved Connectivity:** It bridges Kolkata with its twin city, enhancing travel efficiency between key areas.
- **Time-Saving:** The underwater section shortens travel time significantly.
- **Environmental Benefits:** It offers a greener, more sustainable transport option, reducing reliance on motor vehicles.
- **Economic Growth:** Boosts local economy by improving accessibility and fostering business opportunities.
- **Advanced Technology:** Represents a technological leap in Indian infrastructure, showcasing innovative engineering.
- **Reduced Traffic Congestion:** Eases surface traffic, contributing to less congestion and pollution.
- **Enhanced Safety:** Offers a safe and reliable mode of transportation.
- **Tourist Attraction:** The uniqueness of the underwater route adds to its appeal as a tourist attraction.

Disadvantages

The potential disadvantages of Kolkata's underwater metro, similar to any major infrastructure project, might include:

- **High Costs:** The construction and maintenance of underwater structures can be expensive.
- **Environmental Impact:** The construction phase could have effects on the local ecosystem, especially in the river.
- **Technical Challenges:** Underwater construction poses unique engineering challenges and requires specialised expertise.
- **Risk of Water Ingress:** Ensuring a completely waterproof structure is critical to avoid risks of flooding.
- **Limited Options for Future Expansion:** Construct might have limited options for future expansion or modification since it is built explicitly for underwater placement.
- **Emergency Evacuation Complexity:** The safe and efficient emergency evacuation from an underwater tunnel may prove more complex than the same activity in above-ground structures.

Challenges

The challenges in developing and operating Kolkata's underwater metro include:

- **Technical and Engineering Challenges:** Construction and maintenance works under the object of underwater structure require sophisticated engineering solutions.
- **Environmental Concerns:** Ensuring minimal impact on the river's ecosystem during construction and operation is vital.
- **Cost Implications:** High costs for construction, maintenance, and technology upgrades.
- **Safety and Security:** Lay down rigorous, well-thought-out measures of safety in the handling of emergencies, more so the underwater environment.
- **Public acceptance and utilisation:** Public acceptance and use shall be encouraged and ensured to effectively integrate them into the existing network of transport.
- **Long-Term Sustainability:** Balancing immediate transport needs with long-term environmental and economic sustainability.

Conclusion

- The underwater metro at Kolkata actually reflects an engineering marvel towards urban transportation in unison with environmental consciousness.
- However, the benefits of the project in respect of connectivity, reduction of traffic, and development in the economy are always accompanied by the following project obstacles: high costs of implementation, environmental issues, and issues with safety.
- Its success proves one of the blueprints from which infrastructure projects into the future may take cue, focusing on the necessity of technology with sustainable practices.

Source: [Hindustan Times](#)