

Engineering excellence: Supporting the construction of Middle East largest immersed tunnel

Country

Iraq

Project type

Tunnel construction

Sector

Civil infrastructure

Main product

Monitoring solution

Context

The Khor Al Zubair immersed tunnel project is an undersea tunnel being constructed across the coastal area of Basra, Iraq. This project is one of the most crucial transportation infrastructure initiatives in the Middle East, aimed at enabling seamless connectivity with international roads linking Iraq to Jordan and, ultimately, Turkey.

Scheduled for completion in 2025, the tunnel will span 2.5 kilometers and feature six lanes. The construction is a crucial element of the larger Al Faw Grand Port project in Southern Iraq, which also involves constructing one of the world's largest container terminals.

The complexity of the project lies in the spongy soil conditions and the submerged tunnel method, which involves connecting sections to traverse beneath the Khor Al-Zubair Canal.



Solution

Construction companies involved faced significant challenges, including:

- Ensuring geotechnical stability and waterproofing
- Achieving precise alignment of underwater tunnel sections
- Minimizing environmental impacts
- Ensuring worker safety
- Coordinating complex logistics and regulatory compliance

Ejtech Co. Ltd., a leading engineering services provider utilizing advanced technology for soft-ground and structural behavior monitoring, was tasked with managing the project's engineering achievements.

During the construction of the submerged tunnel housing, the groundwater level, lowered by excavation, had to remain below the workshop floor. The company installed piezometers and groundwater level gauges, connecting them to Worldsensing wireless devices:

- +70 Analogue Data Loggers
- +40 Vibrating Wire Loggers, one and five-channel
- +10 Digital Data Loggers

The entire system was linked to Edge gateways, enabling easy installation and remote data collection. Additionally, Edge Repeaters were installed, extending the communication range underground.

Given the site's complexity and importance, data acquisition occurred every five minutes (288 times per day) to monitor water level fluctuations in near real-time during field operations. Constant monitoring and reporting ensured prompt corrective actions when needed, facilitating smooth construction progress.

“The deployment of long-range instruments like the Worldsensing Vibrating Wire allowed us to consistently monitor and report any water level rises due to heavy rainfall, particularly during the rainy season. This proactive approach minimizes disruptions and maintains project timelines.”

CheolMin Lee

General Manager

Ejtech Co. Ltd.

Benefits

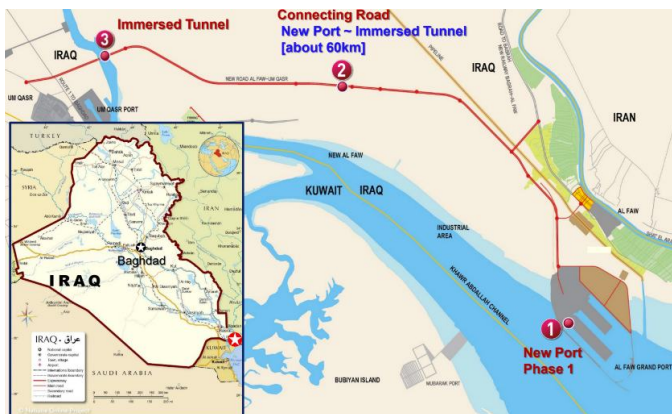
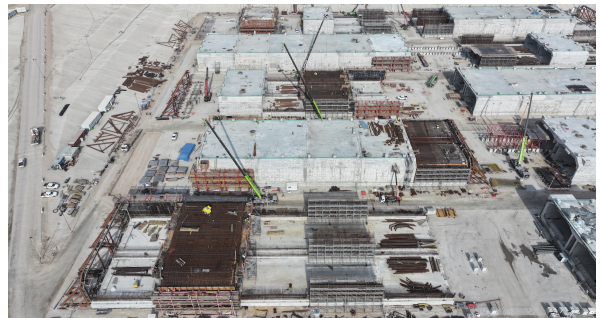
Implementing automated data collection and a remote monitoring system provides substantial advantages for both the construction company and the local community.

For the company, it delivers real-time data on groundwater levels and potential risks, enabling informed decisions and timely actions, which help minimize project delays and costs.

For the community, it helps ensure safety by mitigating construction-related environmental impacts. Furthermore, these systems improve transparency and build trust with stakeholders by demonstrating a commitment to proactive risk management and environmental care.

Advantages

- Real-time data collection through advanced remote monitoring systems reduces project delays and costs by enabling timely interventions.
- Remote monitoring enabled frequent, real-time data collection, ensuring smooth construction progress.
- Mitigation of environmental impacts and improvement of worker and community safety through proactive risk management.



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