

OPERATIONAL EXCELLENCE THROUGH SUPERIOR RELIABILITY

Case Study

Since the start of the Delhi Metro project, Honeywell has worked with the project's EPC contractors to integrate every station – more than 200 across the whole system – with comprehensive, affordable, capabilities that meet the extensive reliability and safety standards of a world-class metro system.

Honeywell systems now provide key building management capabilities such as tunnel ventilation systems (TVS) and environment control systems (ECS) to help ensure every metro station maintains safe, smooth operations, day in and day out.



Honeywell

INTELLIGENT BUILDING MANAGEMENT FOR UNDERGROUND METRO STATIONS

THE CUSTOMER

Spanning 348 km (216 mi) with 254 stations, the Delhi Metro system is already India's largest mass rapid transit system and one of the world's busiest. Yet the Delhi Metro Rail Corporation (DMRC) has ambitious plans to take it further: A smart, modern network that covers the whole of Delhi and sets a global standard for reliability, comfort, safety, and customer satisfaction.

To achieve these goals, Delhi Metro relies on a sophisticated communication and train control system, as well as an automated fare-collection system using contactless tokens and smart cards to streamline passenger entries and exits. The system also integrates seamlessly with other public transport, enabling commuters to conveniently interchange as needed to reach their destination.

To match these capabilities for optimizing the passenger experience, the system also needs smart controls and safeguards for its building, safety, and environmental systems – which is why they turned to Honeywell.

THE CHALLENGE

Honeywell was tasked with providing a solution to monitor and control all ventilation, air conditioning, and electrical systems (such as station lighting, hydraulic systems, diesel generators, and uninterruptible power supplies), for all stations, under both normal and emergency conditions. Under emergency conditions, the new system must also work in tandem with emergency systems such as the tunnel ventilation system.

Honeywell would be responsible for installation, commissioning, and integration with numerous third-party systems, and would also need to provide centralized monitoring and control of all systems and amenities from each station control room, as well as a user-friendly control interface with high system-operation reliability.

The DMRC also specified that equipment must have a high level of reliability and robustness, with a rigorous commissioning process to validate system functionality without breakdowns.

Given the scope and complexity of the metro system and this project, the DMRC faced aggressive deadlines – which was a key factor in why the project's EPC contractors selected Honeywell:

- proven record of success on similar projects
- ability of the Honeywell system to meet all safety requirements
- quality and reliability of the technologies and overall solution
- and Honeywell's local expertise at customizing





THE SOLUTION

TUNNEL VENTILATION SYSTEM (TVS)

As part of the capabilities integrated into each metro station, Honeywell has provided the TVS, along with the supervisory control and data acquisition (SCADA) platform to operate it, and a rigorous commissioning process to ensure a high degree of system reliability under both standard and emergency conditions.

- Honeywell Experion™ HS software provides the SCADA system for control
- Experion HS software also provides the human-machine interface (HMI) for centralized monitoring via desktop PCs
- Honeywell programmable logic controllers (PLCs) certified at safety integrity level 3 (SIL 3) to operate equipment

The integration of these capabilities enables the system to meet all safety requirements.

ENVIRONMENT CONTROL SYSTEM (ECS)

Honeywell provides each station control room with an ECS and a customized user interface, including central group control commands for a variety of scenarios under both emergency and standard operations.

Some of the key technologies include:

- Experion HS process control software with 5000 SCADA points
- 8 PLC panels per station, connected through a dedicated LAN covering approximately 1500 I/O points per station
- Two redundant servers per station for monitoring and control
- Ventilation control panels with Sixnet RTUs
- Local control panels with hardwired connectivity to execute modes across nearby PLCs
- Environmental sensors (e.g., for temperature, humidity, differential pressure)
- Industrial LAN switches
- Customization of the Experion HS scripting and database to achieve some exceptional features in SCADA, while alarms, events and reporting functionalities are tailored to suit the DMRC's desired format

COST-SAVING EXPECTATIONS

Given the intelligent automation and integration of the Honeywell solution, the project team anticipates a wide variety of cost savings.

- Centralized monitoring and control of distributed systems from station control rooms streamlines operations, and increases the productivity of personnel
- Optimizing temperature and humidity levels creates comfortable yet energy-efficient environments inside each station
- Optimizing the chiller-system load based on external climate conditions also saves energy
- Analyzing system and equipment data over time improves energy management and maintenance, with fewer unexpected disruptions
- Round-the-clock system monitoring and control supports daily tracking and rectification of faults

THE RESULTS

Honeywell met the tight deadline and each of the specifications and safety requirements – all without disrupting the DMRC's daily operations and business systems.

The project also provides a roadmap for how to effectively establish new metro systems and stations in other cities throughout India.

The performance of the Honeywell system was also essential in obtaining several key safety certifications within the project's schedule.

These approvals include a rail safety certificate from the Delhi Fire Service, based on live demonstrations in underground stations and at the DMRC Operational Command Center.

The TVS SCADA system also obtained SIL 2 validation, based on independent third-party testing. And finally, the Commissioner of Railway Safety inspected and validated the full system.

Honeywell's rapid deployment and rigorous engineering helped ensure that all these certifications were also obtained well within the deadline to officially put the new systems into operation.

But amidst such a large, complex project, what passengers appreciate most is something more immediate: The comfortable environment and smooth operations that each station maintains help make the metro system a vital, pleasurable part of daily life.

For more information

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