

Wuxi Transportation Tunnel System

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"The Invensys solutions use advanced component object-based technology that enable us to reuse templates from previous projects allowing faster implementation of new processes."

Dr. Wu Zhichun
Mayor of Wuxi

Invensys Technology Enables Remote Monitoring of Wuxi Transportation Tunnel System in China's Rapidly Growing Industrial and Technology Business Hub

Goals

- Remotely manage the series of tunnels, roads and pedestrian paths that connect the city's residential area, industrial zone and central business district
- Ensure the effective management of tunnel conditions and operation equipment including power, lighting, ventilation and drainage, as well as emergency response operations

Challenges

- The control center has to rapidly react to emergency events such as accidents, fires and floods in accordance with contingency plans
- Respond to tunnel operations management issues including effective operation of equipment, maintenance of road conditions and management of energy use

Solutions and Products

- Wonderware System Platform
- Wonderware InTouch HMI
- Wonderware Information Server
- Wonderware Historian & Historian Clients

Results

- The management team can now efficiently monitor various systems, achieving full deployment of the entire road
- Reduced engineering costs, improved overall operation efficiency and decreased travel time through the central city
- The system now supports more than 10 clients as compared to the previous six clients and achieved a lower headcount



Wuxi, China - Wuxi earned its nickname of "little Shanghai" for its proximity to China's most populous city and for its booming economy and rapid growth of business and industry. According to Forbes magazine, Wuxi was ranked as the third best city for business in China in 2008. The industrial focus includes technology, electronics, machinery, pharmaceuticals and chemical processing. With the rapid growth in industry came an explosion of jobs and more people moving to the city and surrounding areas. As with other metropolitan areas experiencing this type of growth, traffic congestion became an issue.

In 2005, the Wuxi city government established plans to connect the city's residential area, industrial zone and central business district via a series of tunnels that would alleviate traffic congestion and streamline travel for the city's residents. In 2008, the 50 square kilometers of tunnel work was completed and includes the Inner Ring Road loop which connects five interchange tunnels, three general traffic tunnels and three bridges. This unique traffic management design enables residents and the business community to save an extra 15 minutes when traveling through the central city.

To manage the complex series of roads, bridges and tunnels, city officials required a technology management system that could monitor traffic conditions, tunnel functions and emergency situations. After reviewing the offerings of several technology providers, Wuxi selected Invensys Operations Management solutions because it could fulfill all the requirements needed to remotely monitor the complex tunnel transportation system.

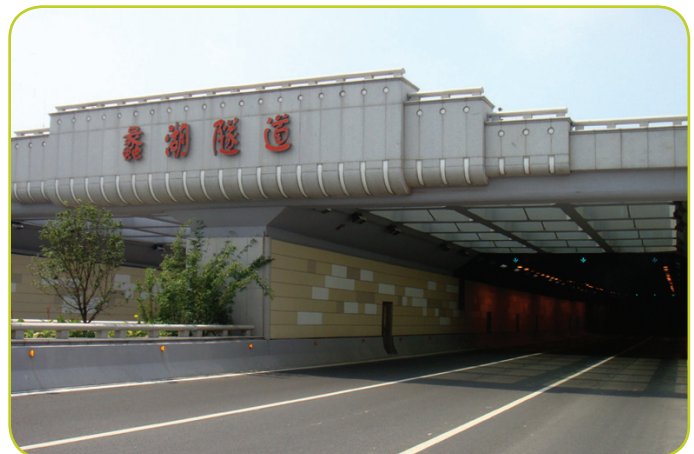
"The city required an open architecture software solution that would enable operators to quickly and easily modify the remote monitoring system to address the continually changing conditions of the tunnel and road conditions," said Dr. Wu Zhichun, mayor of Wuxi. "Because the Invensys solution uses a component object-based model, operators can quickly develop templates that can be easily replicated and revised as needed. This significantly cuts down on the cost associated with engineering development of technology applications."

Visualization Enhances Traffic Management

Monitoring the traffic paths and conditions of one of China's major industrial and business districts is no easy task. However, Invensys turned a potentially complex and difficult undertaking into a streamlined operation. The Wuxi tunnel and Inner Ring Road loop project required a software system that could successfully manage the Wuxi transportation corridor via a remote monitoring system. The solution was required to observe and manage tunnel conditions, manage equipment operations including power, lighting, ventilation and drainage, and handle emergency response procedures.

Wuxi implemented Wonderware System Platform along with InTouch and Wonderware Historian to provide a variety of remote monitoring capabilities and data collection operations. Wonderware System Platform provides a single, scalable platform that enables system managers to control and supervise operations using object-based technology which enables configuration, logging, delivery and maintenance of real-time and historical information.

InTouch is the HMI solution which operates in conjunction with System Platform and provides graphic visualization of the entire Wuxi tunnel operations for easy tunnel management, control and process optimization. The combination of these standards-driven systems maximizes productivity, optimizes user effectiveness, increases quality, and lowers development, maintenance and operational costs.



“The monitoring system is responsible for a wide range of complex operations and safety activities,” said Zhichun. “Effectively viewing, analyzing and processing a variety of tunnel data is extremely important to the overall operation of the transportation system. Knowing that Invensys software is providing accurate, real-time information on tunnel conditions is a reassuring factor in management of the transportation system.”

Advanced Analysis and Reporting Capabilities Boost Operations & Safety Processes

Not only are traffic and tunnel conditions important to monitor, emergency services rely on the remote command center to provide details on fires, flooding, or other crises that occur within the Wuxi tunnel system. Because the control center is responsible for monitoring emergency situations, it must relay information immediately in accordance with the city’s contingency rescue command plans. Wonderware Historian using Historian Clients provide historical data relating to activities in the tunnel environment.

“The use of InTouch added a great deal of power and flexibility to the system design, allowing us to efficiently and cost-effectively integrate an enormous amount of system information,” said Zhichun. “This enabled us to concentrate on the real-time control portions of the monitoring and emergency systems.”

Wonderware Historian is designed to assist users to visualize improvements in operational effectiveness and efficiency, analyze the best means to achieve their objectives and optimize existing investments in software and equipment.

By combining process analysis, predefined trend charts and reporting into a single, integrated package, transportation engineers can more easily troubleshoot operations and obtain a better understanding of their process based on detailed, accurate information.



Online Access to Information Improves Department’s Response Time

The backbone of the Wuxi tunnel technology solution is the Wonderware Information Server, which provides enhanced Web-based, enterprise-level reporting capabilities. Information Server is integrated with Historian Clients, enabling department managers and operators to analyze operation trends and provide highly informative production and performance reports. These reports can be customized and tailored to the information needs of specific operations management users. Information Server also connects operations personnel with other open data sources so they can access the system’s entire performance record.

“Information Server enables our team to access information and content anywhere at anytime,” said Zhichun. “Online access to critical data from all locations within the control command center allows us to make better operations decisions and immediately address problems as soon as they occur.”

Wonderware Information Server provides an interactive, open method of delivering critical operating information to workers engaged in a variety of industries including transportation infrastructure processes, utilities and water/wastewater. Its ability to provide data in other forms compatible with corporate portals expands its usefulness to a wide range of users within an organization.

As a unified portal and content server, Wonderware Information Server enables flexible access to applications, reporting and visualization information using a Web browser. Managers and operators at all levels can obtain an enterprise-wide view of production operations and KPIs, providing the enterprise with a common real-time information dashboard.

Lower Engineering Costs Benefit Department's Operations Budget

By using Invensys software, the Wuxi transportation department is able to reduce operating costs by reusing component templates. Designed for operations intelligence, the use of these templates significantly reduces engineering time and costs as well as the overall total cost of ownership.

"Providing a single, comprehensive solution for management of the Wuxi tunnel system enables us to rapidly reuse and deploy process components providing tremendous cost savings and streamlining engineering practices," said Zhichun. "The Invensys solution enables us to easily deploy the same process in other locations without the need for recoding."

The scalability and reusability of the Invensys solution enhances the Wuxi transportation management team's ability to effectively manage its advanced tunnel system. Invensys software enables the department to continue to cut costs through use of the component object-based technology and update the tunnel surveillance system with customized software templates. Soon Wuxi may also be known as the "city of tunnels."



Invensys Operations Management • 5601 Granite Parkway III, #1000, Plano, TX 75024 • Tel: (469) 365-6400 • Fax: (469) 365-6401 • iom.invensys.com

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