

Modernizations in Manhattan

Driven by a need to improve safety, efficiency, and reliability, America's premier city turned to the cutting-edge automation technologies of Siemens Industry to renovate infrastructure and attractions.



Siemens AG

New York City is one of the most important hubs of commerce, industry, and finance; a powerful magnet for tourists; and home to millions of people.

That a city this size must run like a well-oiled machine goes without saying. To guarantee the smooth

operation of its sights and its public transport system, the city of New York partners with Siemens for its automation solutions. The New York City subway system is benefiting from the modernization measures, in addition to the Statue of Liberty and the National September 11 Memorial.

Safety comes first

The Statue of Liberty is the symbol of New York City and has welcomed millions of visitors. Recently, access was limited while new fire and safety features were installed and design changes were implemented to improve the visitor flow. As part of this restoration work, a new rescue elevator was also installed. "This specially manufactured elevator is absolutely unique," stresses Todd Grovatt, managing director of Tower Elevator Systems, Inc. (TESI), which specializes in rack-and-pinion elevator systems. In this project, all the components were developed and put into operation for the first time using TIA Portal. This resulted in decreased configuration effort, faster initial start-up, and reduced costs.

The Simatic ET 200S safety PLC is at the heart of the control system for the TESI elevator. Brian Trapani, the lead project engineer, says, "In our company, safety is very important. The safety PLC is one of the main reasons that we decided on Siemens as a partner, since safety is now part of TIA Portal and can be easily programmed with this tool." For Trapani, TIA Portal is a decisive factor contributing to the effective completion of the project. The tool's most important feature is the ability to add elements to any directory or remove them using drag and drop.

In addition to redundant systems tracking all aspects of the operation, a lowering system was devel-

In Brief: Statue of Liberty

Installation of a new safety elevator in the course of restoration work

- Engineering with TIA Portal for minimized project planning, shorter commissioning times, and reduced costs
- Simatic ET 200S safety PLC for programming safety tasks directly in TIA Portal
- Simatic HMI Comfort Panels to monitor critical systems, provide diagnostics, and eliminate errors

oped for rescue purposes, which is integrated into this safety mechanism. The elevator was also the first project by TESI in which Simatic HMI Comfort Panels were used. "The panels offer a user interface that serves for monitoring critical systems, performing diagnostic tasks, and eliminating errors and failures," explains Grovatt. "The PLC receives feedback from the system and then moves the elevator to a specified location using the logic we developed." ▶▶



The Statue of Liberty welcomes millions of visitors every year

Now the major tourist attraction was equipped with a new safety elevator

►► **Maximum configuration efficiency**

Another example of successful modernization measures can be found in the Financial District, at Ground Zero. The impressive memorial built to commemorate the victims of the terrorist attacks on September 11, 2001, is located exactly where the twin towers of the World Trade Center used to reach into the sky. The memorial consists of two enormous granite pools inserted into the square foundations of the destroyed twin towers. More than 600,000 gallons (2,300 m³) of water are constantly pouring down the smooth walls and are then pumped up again.

Delta Fountains, headquartered in Florida, was entrusted with the project. “We had to ensure that the reflective and acoustic properties of the pools stayed the same regardless of the weather or time of day or year,” explains Scott Johnston, who co-owns Delta Fountains together with Joe Petry. The complex system required technical solutions that would be cutting edge when installed and easily upgradable with the latest capabilities in the future. The architectural fountain specialist established the precise system specifications together with the supplier AWC and Siemens application engineers.

The team chose the Simatic S7-300 controller in combination with Sinamics G120/CU230P frequency-controlled drives. This controller features fully integrated system diagnostics that require no additional programming. In addition, it communicates via a Profibus fieldbus network to 16 Simatic ET 200S distributed I/O nodes with integrated CPUs that provide local control for the motorized pumps. With their on-board CPUs, the ET 200S distributed I/O nodes can offload computing tasks from the S7-300 master controller to guarantee fast responses to time-critical signals. The frequency inverters on the pumps in turn guarantee the water flow and pressure control needed to maintain the water level in the pools at a

In Brief: Ground Zero

Two million liters of water need to be constantly circulated in two granite pools, maintaining uniform characteristics

- Simatic S7-300 controller for easy programming
- Sinamics G120/CU230P inverter
- 16 Simatic ET 200S distributed I/O nodes to control the integrated pumps
- Simatic WinCC Open Architecture to facilitate the incorporation of changes

constant level. With the help of the controller and the attached sensors, measurements can be taken at any location in the pools. These data keep the system in balance – and in time, basic operation profiles can be created, which can then be used for the further automation of the pools.

For Petry and Johnston, the Simatic WinCC Open Architecture SCADA system is the core of the entire solution, since it makes the simple incorporation of changes possible without incurring excessive costs. In addition to a broad range of operator functions and visualization options, the software also offers the option to operate the pools remotely via a secure Internet connection. Thanks to the automation technology from Siemens, the installation has many advantages, according to Petry and Johnston: “The frequency inverters drive the pumps at optimum speed at all times, saving energy, curbing CO₂ emissions, and reducing motor wear and tear and consequently maintenance costs. In addition, daily operation can be controlled remotely from Jacksonville, so that New York’s high cost of living can be avoided, too.”



The memorial at Ground Zero required state-of-the-art technical solutions from the responsible engineers

Simatic S7-300 and Sinamics G120 provide for the optimized control of water flow and pressure in the fountain





The New York subway network benefits from innovative Siemens technology



Perfectly functioning data exchange

The New York subway network was also modernized with assistance from Siemens. The network covers more than 700 miles (1,100 km) and transports more than six million people every day. The public address / customer information system (PA/CIS) is still quite new. It is based on a communication network spanning the entire system and on the ATS (automatic train supervision) train control system installed by Siemens. PA/CIS now supplies riders with both audio and visual information on the arrival and departure of trains. The system displays all information in real time and operates via the systemwide electronic communication network.

Key to the success of PA/CIS is the incorporation of the Simatic WinCC Open Architecture (OA) SCADA system. "It is the only way to handle a system of this size and complexity, since WinCC OA is able to handle huge amounts of data," explains Paul Eliea, project manager at Siemens. He adds, "It is possible to combine up to 2,054 systems. Because of this capability, WinCC OA can handle huge data volumes. PA/CIS is

currently operating with 10 million data points and was tested successfully to handle the 20 million data points that will be required to expand the B Division. These data points need be configured only once, reducing the number of possible errors during configuration. And each system has its own independent feature set. A loss of connection between certain systems does not result in the loss of functionality of the entire system." Critical to the smooth operation of PA/CIS, however, is its link to the ATS. "The data from the ATS show us the positions of the trains, which then allow the train arrival times to be calculated. It is an extremely accurate system that is constantly updating itself," explains Eliea. "The two systems work well together, and so far we have had hardly any problems with the data exchange," he concludes.

Collaboration to continue

In order to support a city such as New York in the most safe and efficient manner, groundbreaking and innovative technologies are required. Thanks to the products and systems from Siemens, this can be realized. The project teams were able to optimize performance and verifiably increase safety in all three cases. However, this does not mean the end of the collaboration. Siemens and the city of New York are continuing to pursue further improvements and modernization measures. ■

In Brief: Subway

1,100-kilometer subway network, transporting six million passengers per day

- Simatic WinCC Open Architecture enables connection to the ATS
- Up to 2,054 systems may be combined
- Data only need to be configured once; then they are updated automatically by the system

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