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WORLD Trade Center



The design and installation effort of the escalator and elevator equipment at the World Trade Center (WTC) Temporary Port Authority Trans-Hudson (PATH) station was a significant project achieved through the total commitment and cooperation between the engineers, architects, manufacturer, contractors and facility operator.

Project Description

Following the September 11, 2001 terrorist attacks, the Port Authority of New York and New Jersey initiated a construction project to restore PATH service to lower Manhattan. The result of the 16-month restoration is the WTC Temporary PATH Station serving up to 50,000 daily commuters between downtown NYC and New Jersey. The new station is an open-air, stand-alone structure built on its former footprint within the 16-acre site of the original WTC complex. The facility serves as PATH's downtown terminal station while keeping the site and surrounding areas flexible for future phases of the Downtown Redevelopment Program.

To travel between the platform level and the street level 75 feet above, passengers have to traverse through three intermediate levels. The platform level has five tracks and three platforms with each platform served by several stairways and an elevator to the mezzanine level. The mezzanine level connects to the upper mezzanine with a short stairway and an elevator to the upper mezzanine where an array of eight, 36-foot rise escalators, stairs and an elevator lead to the concourse level. On the concourse level, passengers have access to New York City Transit subway connections, a stairway and an elevator that leads to the canopied street level entrance of the station.

All eight escalators are designed and constructed in compliance with the Americans with Disabilities Act (ADA), the National Fire Protection Association (NFPA) and the American Public Transportation Association (APTA) requirements and guidelines. The escalators provide accessibility to the 36-foot rise between the upper mezzanine and concourse levels while the series of elevators provide ADA accessibility to all the levels of the temporary station.

Transport System

The temporary station project was developed on a fast-track schedule, with design beginning in December 2001 and the station opening in November 2003. The temporary station serves as an interim downtown terminal to relieve the strained PATH commuter system between New York and New Jersey until the completion of a permanent transportation hub as part of the new WTC complex.

Temporary PATH Station

The Port Authority of New York and New Jersey retained Vertical Transportation Excellence (VTX) as the vertical transportation consultant to design and coordinate the installation of the new elevators and escalators. All members of the design team dedicated themselves to thinking outside of the box and committed to a team approach in all aspects of this project. Weekly meetings were held with all the project participants to identify field coordination issues as they arose. An information network was set up to communicate and share submittals and design revisions with all the team members.

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PATH System

Table 1

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|---------------|---|
| 2001 | |
| December 2001 | Began preliminary design |
| 2002 | |
| February 2002 | Completed preliminary design |
| March 2002 | Field inspection and survey for final design |
| May 2002 | Contract document was released for bid and awarded |
| August 2002 | Escalators layout and fabrication drawings approved |
| 2003 | |
| January 2003 | Elevators fabrication drawings approved |
| April 2003 | Escalators arrived at jobsite |
| July 2003 | Elevators arrived at jobsite |
| November 2003 | Opening of WTC Temporary PATH Station with all escalators and elevators inspected and operational |

To monitor and maintain project schedule, bi-weekly updates were obtained from the manufacturer to resolve potential problems and to ensure delivery schedule. Quality controls were implemented throughout the project, including factory inspections and field inspections during all phases of the installation. These inspections incorporated mechanical and electrical field commissioning and ASME A17.1 along with NYCBC RS-18 items.

The design team also had to overcome numerous technical challenges without impacting the overall construction schedule. The following are some of the highlights of these technical challenges:

- ◆ Due to long lead-time relative to the project schedule, the elevator and escalator equipment needed to be approved for fabrication prior to the architectural layouts and structural design were finalized.
- ◆ All the existing supports had to be carefully designed and field coordinated to ensure height and safety zone clearances for the new equipment were met.
- ◆ A custom water stop ring had to be designed for the 36-foot holed jack to counter the excessive pressure from the ground water.
- ◆ The escalator pits had to be modified to accommodate the "three flat steps" design of the new escalators.
- ◆ Protection and maintenance of the installed elevator and escalator equipment in the midst of an intensive construction environment.

The constant concern for the riding public pushed the team's effort to complete the project on schedule and maintained the highest level of quality during all phases of the design and construction. Table 1 is a quick reference noting key milestones achieved over the two-year design schedule.

The installed escalator equipment consists of the following:

- ◆ Eight Schindler 9700 heavy-duty escalators with a 36-foot rise serving the upper mezzanine and the concourse levels.

The installed elevator equipment consists of the following:

- ◆ Three 4,000-pound, 14-foot rise, holeless hydraulic twin jack units with custom cabs serving the platform and mezzanine level
- ◆ One 5,000-pound, 10-foot rise, holeless hydraulic twin jack unit with custom glass cab serving the mezzanine and upper mezzanine levels
- ◆ One 4,000-pound, 36-foot rise, in-ground hydraulic unit with custom cab serving the upper mezzanine and concourse levels
- ◆ One 5,000-pound, 18-foot rise, holeless hydraulic twin jack 18-foot unit with a custom glass cab serving the concourse and the street levels

Conclusion

Within a few months after the temporary station was opened, the station has already reclaimed its position as the busiest station in the PATH system. An average of 36,000 passengers and 280 PATH trains going through the station each weekday, bringing immediate benefits to the downtown economy. The temporary station is the first phase of the Port Authority of New York and New Jersey's effort in restoring the WTC site and recovery of Lower Manhattan from the September 11 disaster.

List of Credits

Port Authority of New York and New Jersey
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Anthony York is with The Port Authority of New York and New Jersey.