

# WMATA Escalator Modernization

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The Washington Metropolitan Area Transit Authority's (WMATA) Metrorail system, built in 1976, operates the second-largest rail-transit-system network in the U.S. The WMATA system transports more than a third of the federal government to work, in addition to millions of tourists to national landmarks on its 106.3-mile rail network comprising **86** stations, **588** escalators and **238** elevators.

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# WMATA Escalator Mod

Opposite page (clockwise from top left):

- Controllers at the Forest Glen Station
- New motors and drives at the King Street Station
- Chris Inskeep, Schindler Elevator mechanic, at Cleveland Park Station
- Escalator modernization
- New motors and drives at the King Street Station

Left:

- Matt Sonneman of Jones Vertrans performing comb-impact-device testing

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The system serves a population of 3.5 million within a 1,500-square-mile area that includes Washington, D.C., Northern Virginia and Southern Maryland. Over the past 38 years, ridership has increased, and the time that the system is in service has also increased. When the system first opened, service hours were 6:00 a.m. to 8:00 p.m., Monday through Friday. Current operation has the trains running from 5:00 a.m. to midnight on Monday through Thursday, until 3:00 a.m. on Friday and Saturday and from 7:00 a.m. until midnight on Sunday.

Consequently, routine maintenance on many of the system's escalators can only be scheduled during non-revenue "off-hours." As the hours of service to the riding public have steadily increased, time available for routine maintenance has decreased. Also, as the system and its equipment has aged, the escalators have aged accordingly. As such, they have become a source of frustration and complaints from riders dissatisfied with the number and frequency of escalators being taken out of service. For years, WMATA struggled with the critical maintenance issues required to keep its aging system in top form while also addressing the concerns of riders. Many of the escalators had been in service for more than 30 years and were subjected to almost continuous crush loading.

Therefore, WMATA embarked on a 10-year capital-improvement program to modernize and upgrade some of its oldest and most troublesome pieces of equipment. In 2000, a General Architectural and Engineering Contract (GAEC) was awarded to Capital Transit Consultants, a joint venture comprised of Parsons Transportation Group, Parsons Brinkerhoff, DMJM Harris and Booz-Allen-Hamilton. Vertical Transportation Excellence (VTX) was brought in to work as the vertical-transportation consultant for the Division of WMATA Elevator and Escalator Services.

To date, **179** escalators have been upgraded at **51** stations within the system, **38** in 2004 alone.

As part of this initial GAEC, Schindler Elevator and Jones Vertrans were contracted to provide the modernization of the escalators, while Mid-American Elevator Co., Inc. was the contractor on record for the elevator upgrade. Maintenance of the equipment for the escalator modernization was handled by Schindler Elevator, Jones Vertrans, KONE Elevator, and WMATA's internal elevator and escalator department (ELES) and maintenance for the elevator upgrade was performed by Mid-Atlantic Elevator Co., Inc. and ThyssenKrupp Elevator.

Additionally, WMATA's board of directors created a "blue ribbon panel" to get an outside perspective on how to improve the reliability of the vertical-transportation equipment in a cost-effective manner while minimizing disruption to its patrons. VTX joined a group of vertical-transportation managers, technicians and customer-service representatives to participate on the panel to evaluate labor, personnel, maintenance, capital plan and customer service for the board. The panel recommended that to improve system reliability and availability, WMATA should contract with private companies to help service the escalator system and invest in upgraded equipment.

Beginning in March 2000, contracts were initiated with the goal of modernizing the hundreds of aging Westinghouse modular escalators throughout the system. To date, 179 escalators have been upgraded at 51 stations within the system, 38 in 2004 alone. An additional 293 escalators are scheduled to be completed over the next five years through WMATA's recent award of a second five-year GAEC contract to P<sup>2</sup>D, a joint venture of Parsons Transportation Group, Parsons Brinkerhoff and Delon Hampton. VTX has been retained as the escalator consultant.

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# WMATA Escalator Mod



- At left:
- Newly modernized escalators at the Van Ness Station
- At right:
- A map of the WMATA system

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## Transport System

VTX provided design requirements and contract oversight for the rehabilitation of more than 800 escalators, elevators and other vertical-transportation equipment for the system. This included 588 escalators serving transit stations and rail yards. VTX performed daily system-wide contract-compliance inspections, third-party jurisdictional acceptance inspections and developed design requirements and construction specifications to modernize and replace escalators. VTX also performed equipment surveys, suggested critical repairs and energy-savings proposals, developed contract documents, prepared documents for release and detailed construction estimates. The construction-phase support involved overseeing the construction schedule, conducting client/contractor progress meetings, reviewing change notices, modifying contracts and invoices, providing independent estimates and assisting with contractor negotiations.

This rehabilitation contract was expanded to include survey and design requirements for the replacement of 14 critical obsolete escalators, and the modernization and upgrade of 20 others. These escalators were difficult to service, as the parts availability was poor. This was

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because they had been manufactured by companies which were no longer in business. Equipment deterioration, lack of parts support and increased service interruptions brought

about the need for replacement of this equipment. These escalators were located in existing stations where modification of the station exits and support structure required a unique design to maintain current patron flow and handling capacity. In response to these issues, VTX performed equipment and basic station surveys, reviewed structural drawings to determine design constraints, coordinated site visits and design inputs from major escalator equipment manufacturers and prepared construction estimates and design alternatives.

### Conclusion

Having completed its first, five-year contract in June 2005, WMATA continues to quickly proceed with a steady flow of modernization and major repairs. Some escalators have undergone modernization, which put them out of service for several months. During this time, major components of the escalators were taken out and replaced piece by piece. This comprehensive, multiyear maintenance program is improving the reliability and safety of WMATA's vertical-transportation equipment.



The program has thus far:

- ◆ Completed the rehabilitation of 178 escalators
- ◆ Completed the design and initiated procurement efforts for the modernization of 20 escalators to upgrade them to the latest codes and technology
- ◆ Completed the design for the replacement of all 14 escalators that have proven to be problematic and unreliable
- ◆ Completed (in-house) remote-monitoring capabilities on 315 of 588 escalators in the system
- ◆ Installed four canopies under a pilot program and initiated canopy work at other locations.

Under the direction of ELES Director, David Lacosse, and Project Manager of the Capital Improvement Program, Jeff Griffin, the availability of WMATA's 588 escalators has improved significantly. This major rehabilitation project calls for overhauling 70% of its escalators by 2010, and is at its halfway mark. The investment in overhauling vertical transportation has led to gains in escalator avail-

ability, the elimination of the top-20 poor-performing escalators and a reduction in injuries.

Escalator availability increased from 89% in the year 2000 to 93% today with, on average, 44 of the 588 escalators out of service daily to date, compared to 61 units out of service daily in 2000. About half of the repairs are on unscheduled break-downs, while 40% are modernization or scheduled repairs.

**Credits:**

**Design Team:** Parsons Brinkerhoff, Parsons Transportation Group, DMJM Harris, Delon Hampton and Vertical Transportation Excellence

**Modernization Contractors:** Schindler Elevator, Jones Vertrans joint venture and KONE Elevator

**Maintenance Contractors:** Schindler Elevator, Jones Vertrans joint venture and ThyssenKrupp Elevator

**Owner/Operator:** Washington Metro Area Transit Authority

*Amy K. Bomberger and W. Timothy Eason are both with Vertical Transportation Excellence*



- No Smoking
- No Eating or Drinking
- No Animals (except service animals)
- No Audio or Video Devices (without earphones)
- No Litter or Spitting
- No Dangerous or Flammable Items