



**Customer Service and Operations Committee**

**Board Action Item IV-B**

**February 10, 2011**

## **Escalator Performance Report**

Washington Metropolitan Area Transit Authority  
**Board Action/Information Summary**

<input type="radio"/> Action <input checked="" type="radio"/> Information	MEAD Number:	Resolution: <input type="radio"/> Yes <input checked="" type="radio"/> No
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**TITLE:**

Escalator Performance Report

**PURPOSE:**

The purpose of this presentation is to provide the Board of Directors with information about Metro`s escalator maintenance program and how escalator performance is tracked.

**DESCRIPTION:**

This presentation will clarify how the Vital Signs Report Key Performance Indicator (KPI) for escalator availability is calculated and what information that KPI conveys. Also to be covered in this presentation is an overview of the escalator maintenance program including internally tracked performance measures used to assess escalator maintenance; and, an update on actions to improve performance including recommendations from the external escalator review conducted in 2010.

Metro`s strategic goals of Creating a Safer Organization and Delivering Quality Service are both impacted by the viability of the escalator maintenance program.

**FUNDING IMPACT:**

No impact on funding.

**RECOMMENDATION:**

N/A



**Washington Metropolitan Area Transit Authority**

# Escalator Performance Report

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# Escalator Overview

- Metro has the most escalators (588) and elevators (237 in stations and parking garages) of any transit system in North America
- Installed between 1976 and 2004
- Multiple manufacturers, many no longer in business
- No standardized size/length installed
- Stairs not available adjacent to all escalators
- Elevators and escalators may be out of service --- (safety, repair or scheduled maintenance)



## Purpose

- Clarify escalator system availability measure
- Explain escalator maintenance activities that occur when the rail system is open to customers
- Present three maintenance activity performance measures
- Update on actions to improve performance (including VTX assessment recommendations)



# Escalator Availability: Snapshot

## Elevator & Escalator Service Status

\*Last updated: 01/10/2011 06:30:04

### Summary Service Status

Escalators Operating	Under Repair	Total	Elevators Operating	Under Repair	Total
521	67	588	228	9	237

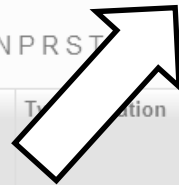
Escalators Under Repair	Number
Service Call	23
Safety Repair	13
Modernization	11
Walker	8
Preventive Maintenance Inspection	4
Preventive Maintenance Repairs	2
Safety Inspection	1
Customer Incident	1
Major Repair	1
Minor Repair	1

Elevators Under Repair	Number
Service Call	4
Customer Incident	2
Preventive Maintenance Inspection	1
Safety Repair	1
Scheduled Support	1

### Status by Station

A B C D E F G J L M N P R S T

Station	Type	Location
Archives-Navy Memorial-Penn Quarter	ESC / Escalator between	mezzanine

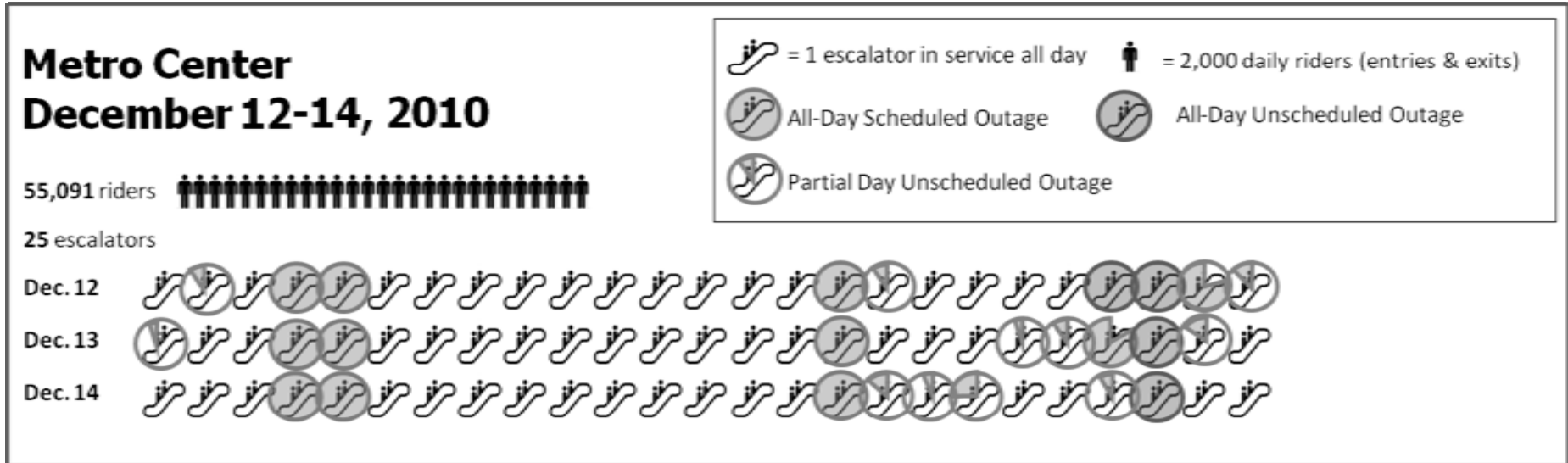


Metro Center	ESC / Escalator between mezzanine and platform to Glenmont	Modernization	2/17/11
Metro Center	ESC / Escalator between mezzanine and platform to Glenmont	Walker	2/17/11
Metro Center	ESC / Escalator between street and mezzanine	Preventive Maintenance Repairs	1/13/11
Metro Center	ESC / Escalator between street and mezzanine	Service Call	1/13/11
Metro Center	ESC / Escalator between mezzanine and platform to Shady Grove	Safety Repair	1/14/11
Metro Center	ESC / Escalator between upper and lower platforms	Modernization	4/10/11

- Real-time information on [wmata.com](http://wmata.com)
- Customer perspective
- To manage, Metro needs a system perspective



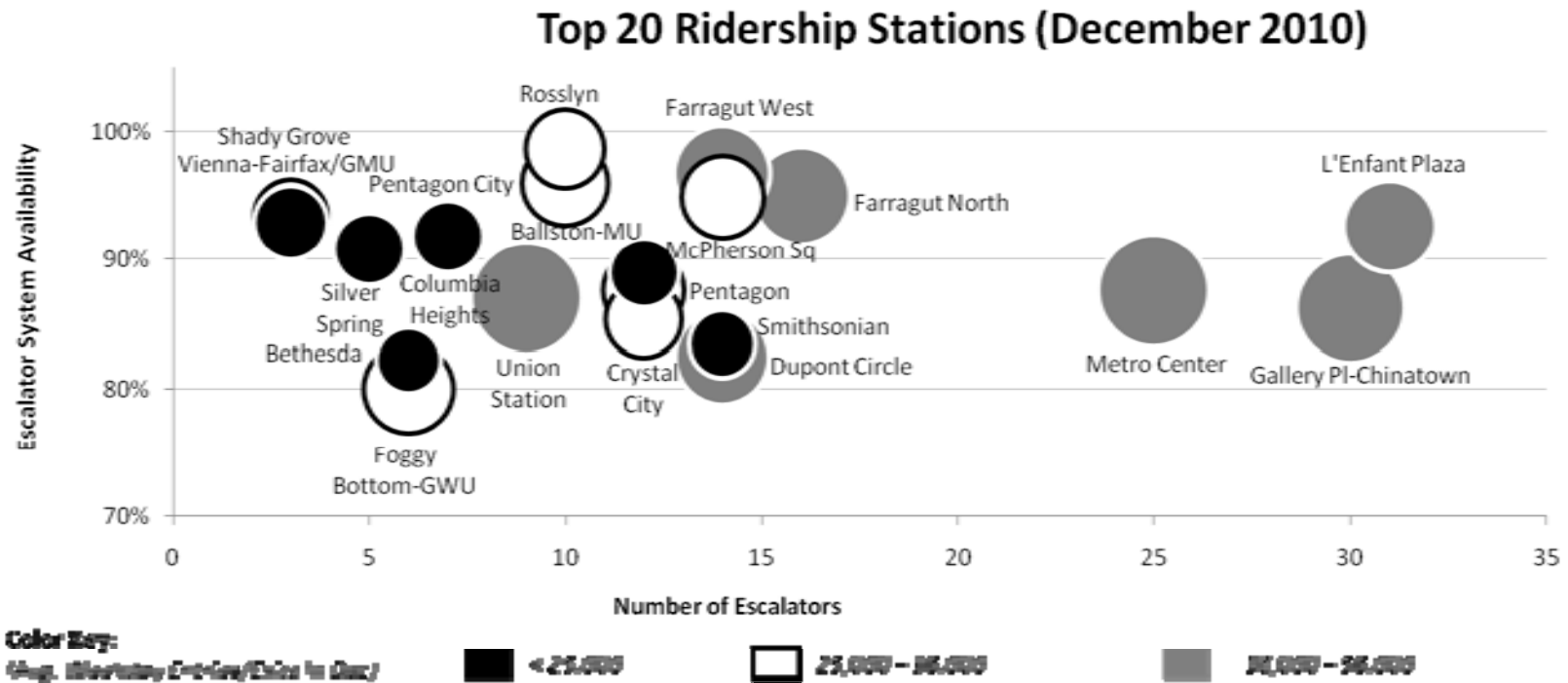
# Escalator Availability at One Station by Day



- Visual summary of availability for one station by day
- Differentiates scheduled, unscheduled and partial day outages
- Interesting daily perspective, but a longer view necessary to evaluate escalator performance



# Escalator Availability at Multiple Stations by Month

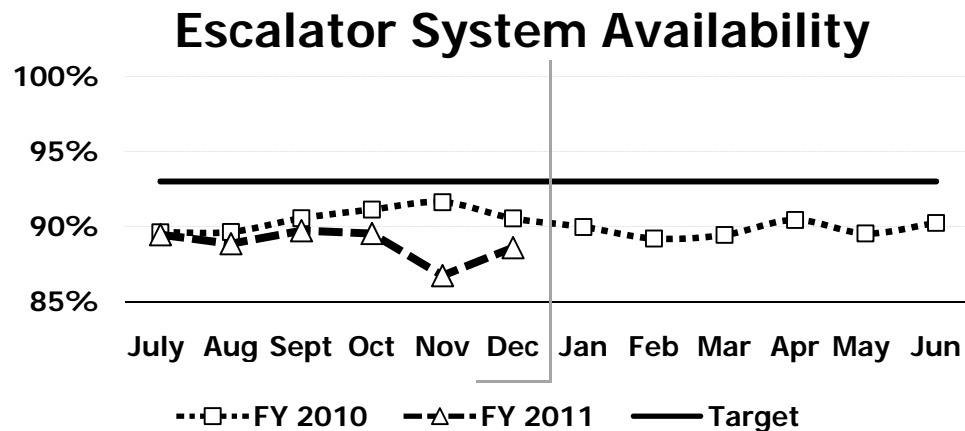


- Chart combines number of escalators, ridership (bubble size and color) and availability to help prioritize repair efforts
- Useful information but need system-wide and trend data



# Escalator Availability: System-wide

## Vital Signs Report – December 2010



- This measure communicates to the Board a strategic view of system-wide performance being at an acceptable level, or not

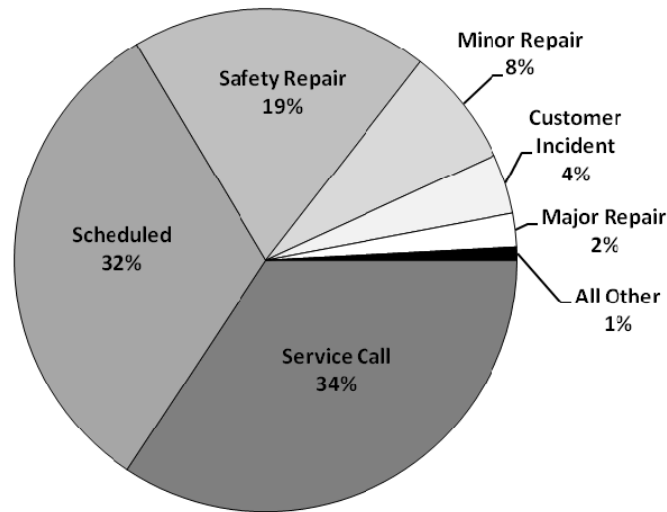
*Strategic Goal: Deliver Quality Service*

- Not intended to communicate information to individual riders about their travel
- The measure calculates the average of all 588 escalators' availability while the rail system is open ("revenue hours")



# What Maintenance Activity Occurs During Open Hours?

**Escalator Maintenance Hours by Type of Activity**  
(December 2010)



\*"All Other" includes outages caused by power surges or fire alarms.

Scheduled maintenance: modernization, corresponding walker units, preventive maintenance and jurisdictional inspections

## Unscheduled Maintenance:

*Service calls*: work to address units turning off unexpectedly, handrails skipping, loose side panels, noises, etc.

*Safety repair*: work identified during inspections

*Minor / Major repair*: tasks that are estimated to take less than one day (minor) or more than one day (major)

*Customer incident*: when unit shut down for inspection after customer incident



# Breaking Down System Availability: Mean Time Between Failure

## Measure #1: Mean Time Between Failure

Calendar Year	Mean Time Between Failure (Revenue Hours)
2010	153
2009	172
2008	178

- Measures how often escalators are breaking down on average

*Strategic Goal: Deliver Quality Service*

- Influenced by parts availability, preventive maintenance program, staffing levels, equipment reliability and productivity
- Want this number to go up



# Mean Time Between Failure - Details

To better understand reliability, staff is examining factors influencing MTBF. In December 2010:

Model	No. of Units	Average Age (Years)	Dec. MTBF (Revenue Service Hours)
Westinghouse 100	430	31	180
Westinghouse 250	59	20	179
O&K	8	33	165
Kone	7	6	165
Montgomery	20	24	162
Schindler	9	28	134
Fuji	49	11	128
APV Baker	6	30	91
<b>TOTAL/AVERAGE</b>	<b>588</b>	<b>28</b>	<b>171</b>

- Westinghouse 100 and 250 units went the longest before failure. Fuji and APV Baker units had the shortest MTBF.
- Some of Metro's oldest escalators performed better than newer units, indicating that design and Metro's modernization program impact reliability.
- Escalators located inside stations operated almost twice as long as outside, uncovered escalators.



# How fast are we getting escalators back in service?

## Measure #2: Mean Time to Repair

Calendar Year	Mean Time to Repair (Revenue Hours)
2010	14.00
2009	13.29
2008	9.94

- Measures how long (on average) escalator repairs take across all types of unscheduled outages

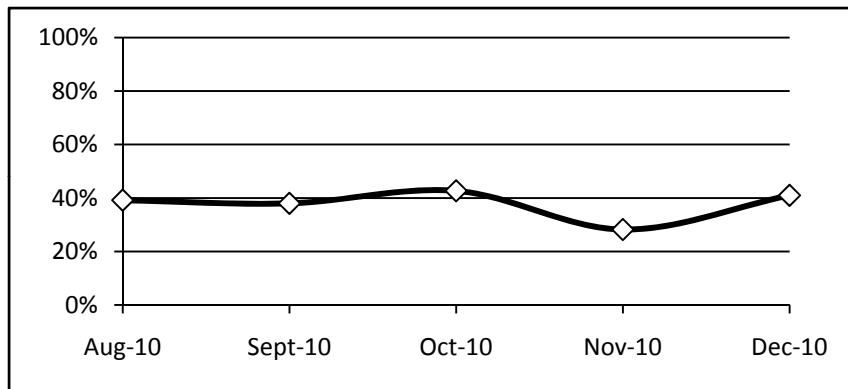
*Strategic Goal: Deliver Quality Service*

- Influenced by parts availability, preventive maintenance program, staffing levels, equipment reliability and productivity
- Want this number to go down



# Preventive Maintenance Compliance

## Measure #3: Preventive Maintenance Compliance\*



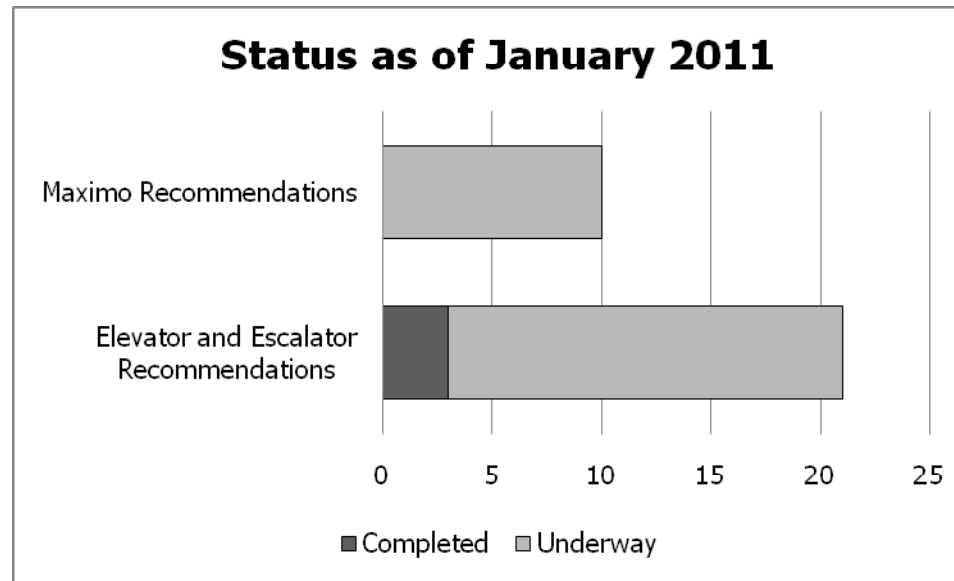
- Measures adherence to escalator preventive maintenance schedule

*\*Additional data verification is underway*

- Inspections proactively identify maintenance issues to reduce units going out of service unexpectedly
- Conducted monthly, quarterly and annually primarily when the rail system is closed to customers
- This measure should be going up



# VTX Assessment Recommendations: Implementation Status



- Metro has started implementing the 31 recommendations listed in the VTX assessment
- Four recommendations are completed
- Safety-related recommendations will be turned into Corrective Action Plans and tracked by the Safety Department



# Actions to Improve Performance

- New General Superintendent of Elevator/Escalator Services
  - Strengthen the ELES organization
  - Elevate visibility of maintenance challenges
  - Incorporate feedback from employee teambuilding efforts
- Analyze Performance Information to Focus Maintenance Work
  - As the system ages, some equipment wears faster than others
  - Turn Maximo data into information
  - Develop equipment performance trends to identify problems
  - Prioritize based on equipment condition (vs. “one size fits all”)





# Actions to Improve Performance

- Improve Preventive Maintenance
  - Realign maintenance staffing to improve efficiency
  - Aggressively reduce vacancy rate
  - Add more resources to the workforce
- Increase Escalator Modernization
  - Modernize additional escalators, targeting low-performing high-usage units. Examples: Foggy Bottom and Dupont Circle.
  - Work with contractors to accelerate scheduling of modernization work.
  - Capital program funding is critical for escalator performance (\$63 million for escalator rehabilitation in 6-year CIP).





# Actions to Improve Performance

- Increase Parts Inventory

- Identify new part manufacturers for units not yet modernized. In some cases, the original equipment manufacturer is no longer in business.
- Develop in-house engineering and technical capability to make parts.
- Standardize parts through the modernization program.



- Improve Accountability and Transparency

- Monthly Vital Signs Report
- [http://www.wmata.com/rail/elevators\\_escalators/](http://www.wmata.com/rail/elevators_escalators/)



## Next Steps

- Provide a report to the Board in six months on Elevator/Escalator program to include:
  - Escalator maintenance activity performance measure trends
  - Implementation status of:
    - VTX assessment recommendations
    - Actions to improve performance