

Passenger Environment Survey: Representing the Customer Perspective in Quality Control

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New York City Transit

835 track miles • **five** boroughs • **321** square miles • **24** hours • **seven** days a week • **6,388** subway cars • **13** yards • **23** subway routes • **three** shuttles • **468** stations • **5,105** stairways • **163** elevators • **174** escalators • **207** local bus routes • **36** express routes • **12,499** bus stops • **55,000** weekday trips • **1,852**-mile route network • **4,576** buses • **19** depots • more than **eight million** rides a day









= Colossal Quality Control Task

Since **1983** • **four** passenger environments • **four** categories • **nine** surveys • **68** indicators • **25** surveyors • **four** analysts • **two** supervisors • **8,000** assignments a year • **95%** confidence • **±5%** precision • **one** team

= Passenger Environment Survey



68 PES Indicators

<p>Categories</p> <p>Environments</p>	 <p>Cleanliness/ Appearance</p>	 <p>Functioning Equipment</p>	 <p>Customer Information</p>	 <p>Operations</p>
 <p>Subway</p>	<p>(8) Litter, Graffiti, Windows...</p>	<p>(3) Door Panels, Lighting, H.V.A.C.</p>	<p>(3) System Map, Signage, Stop Annc.</p>	<p>(1) Conductors in Uniform</p>
 <p>Station</p>	<p>(5) Litter, Cleanliness, Graffiti...</p>	<p>(6) Trash Cans, Escalators, Phones...</p>	<p>(4) Maps, PIC, Signage, Delay Annc.</p>	<p>(2) S/A Uniform and Badge</p>
 <p>Bus</p>	<p>(10) Litter, Dirt, Graffiti, Panels...</p>	<p>(5) Kneeling, Wheelchair, Rear Doors...</p>	<p>(6) Signs, Maps, Priority Seats, Pub. Annc.</p>	<p>(3) Proper Stops, Uniform, Badge</p>
 <p>Express</p>	<p>(10) Litter, Dirt, Graffiti, Panels...</p>	<p>(2) Reclining Seats, Reading Lights</p>	<p>(N/A)</p>	<p>(N/A)</p>

Data Collection Methodology

- Multiple indicators surveyed on same form
- Operating rule based standards
- Quantitative measurements
- Integral auditing information
- Clearly documented failing scores
- Clear definitions for ordinal ratings
- Independent surveyors **hired from outside** of operating departments

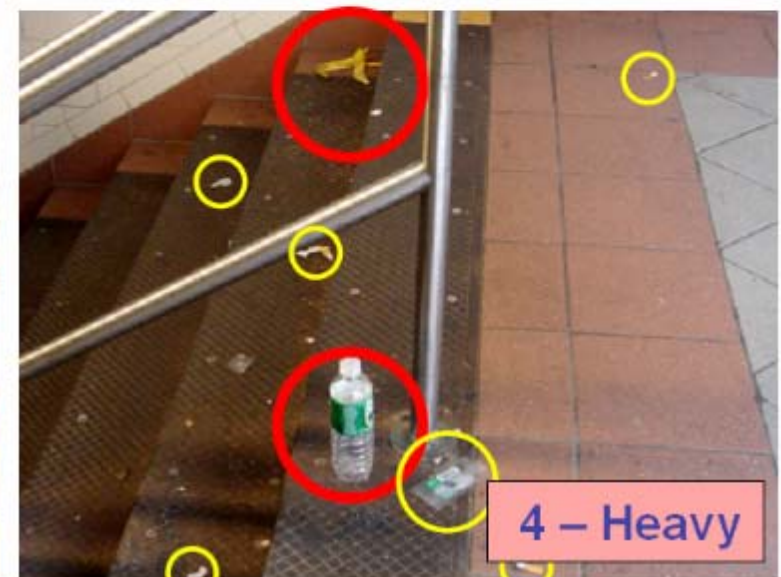
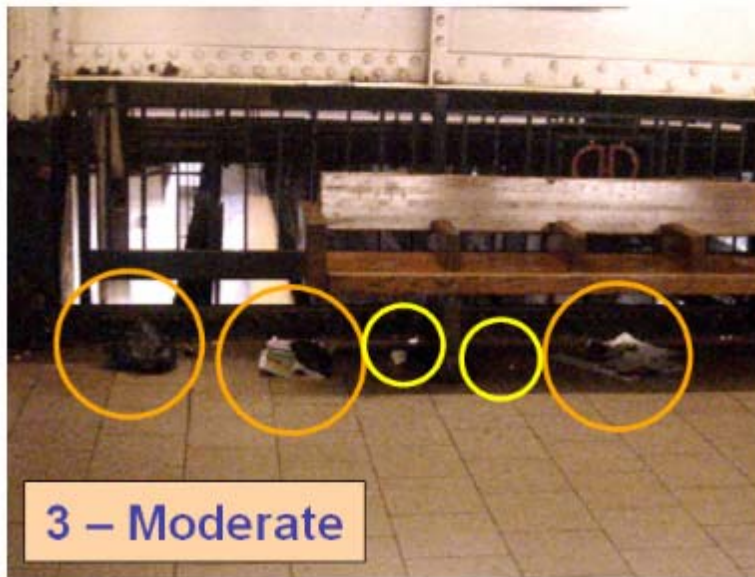
Rating	Definition
(1) None	Basically litter free
(2) Light	Scattered dry litter (e.g. MetroCards)
(3) Moderate	Noticeable assortment of litter
(4) Heavy	Opened or spilled food, malodorous and hazardous conditions, any wet litter

PASSENGER ENVIRONMENT SURVEY		IN SERVICE RAPID										AS OF 2/2007				
JOB #	6	ROUTE	6										PAGE	7	OF	7
DATE	November 28, 2008		DAY:	WEDNESDAY										MORNING		
SURVEYOR	BRIGGS										WEATHER	Cold				
BOARDING TIME	0945	1037	BOARDING STATION	125th st												
ALIGHTING TIME	1120	1058	ALIGHTING STATION	14th st												
CAR #	1	2	3	4	5	6	7	8	9	10	11					
EXTERIOR GRAFFITI	1,2	1	1	1	1	1	1	1	1	1	1	1				
# DOOR PANELS OUT	0-8	0	0	0	0	0	0	0	0	0	0	0				
LIGHTS	0,1,2	1	1	1	1	1	1	1	1	1	1	1				
# LIGHT BULBS OUT		4	5	7	7	5	0	1	0	0	0	0				
TEMPERATURE #1		66.1	67.7	67.7	68.2	69.4	68.4	70.9	68.9	69.9	68.9					
SYSTEM MAP #1		1160	1160	1160	1160	1160	1160	1160	1160	1160	1160					
SYSTEM MAP #2		1160	1160	1160	1160	1160	1160	1160	1160	1160	1160					
ROLL / ELEC SIGN	1,2	1	1	1	1	1	1	1	1	1	1	1				
TEMPERATURE #2		67.5	67.9	67.8	68.3	67.7	72.1	69.9	70.3	70.7	72.5					
LITTER	1,2,3,4	2	2	1	1	1	1	2	2	2	3					
GRAFFITIED WINDOW	1,2	2	2	1	1	1	1	2	1	1	1					
SCRATCHED WINDOW	1,2	2	2	1	1	2	1	2	1	1	1					
CRACKED WINDOW	1,2	1	1	1	1	1	1	1	1	1	1					
DIRTY FLOOR/SEATS	1,2,3,4	1	1	1	1	1	1	1	1	1	1					
UNIFORM	0,1,2	0	0	0	0	0	1	0	0	0	0					
Car #1	cup, newspaper, napkin															
Car #2	cup, candy wrappers, newspaper															
Car #3																
Car #4																
Car #5																
Car #6																
Car #7																
Car #8	coffee cups, newspaper															
Car #9	candy wrappers, newspaper															
Car #10	newspapers, cup, brown bag, magazine															
Car #11																
NOTE: BOTH "LITTER" AND "DIRTY FLOOR / SEATS" RECEIVE A RATING OF "4" FOR BOTTLE(S), CAN(S), LARGE QUANTITIES OF FOOD PRODUCTS OR BIOLOGICALS.																

PES Cleaning Standards

Annotated photos of **actual station conditions** used in:

- Surveyor training
- Station supervisor training
- Manager training
- PES Roadshows



Sampling & Scheduling

- **Number of observations** vary depending on environment, e.g. **120 observations** per subway line per quarter
- Assume independent observations within cluster
- **90% ± 6%** accuracy by subway line, **95% ± 5%** systemwide
- **1~3 survey assignments** (5~7 hours) per shift
- Surveys 'linked' together to form assignments based on geographic proximity
- Pre-blocked survey assignments simplify scheduling effort

$$\text{Sample Size } (n) = Z^2 \times \frac{p \times (1 - p)}{e^2}$$

p = Assumed Rate of Detection (i.e. receiving a failing score)

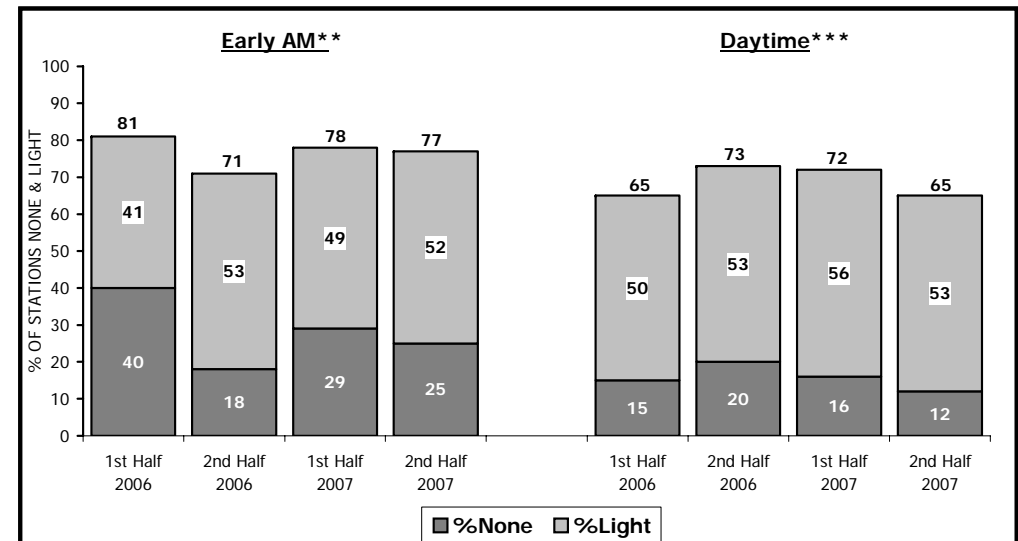
e = Acceptable Standard Error



Semi-Annual Public Reporting

- Reported to the **NYCT Committee** twice a year
 - similar to 11 Board of Directors
- All indicators shown at the systemwide level
 - **Litter and Cleanliness** shown by operating district
- Definitions stated and methodology explained
- Clearly explains statistical significance
- Departmental goals shown

Passenger Environment Survey
Litter Conditions in Stations* (without Trackbed)



* Includes mezzanine, passageway, stairway and platform components only, not trackbed.
 ** Measured before heavy passenger utilization (pre-AM Peak).
 *** Measured after heavy passenger utilization (post AM Peak).

Definition

Litter Conditions in Stations (Presence of Litter)

None- basically litter free;

Light- scattered dry litter;

Moderate- noticeable assortment of dry litter;

Heavy- heavy litter; any opened or spilled food, or hazardous conditions (bottles, cans).

2007 Annual Goals: (% none & light) Early AM: N/A Daytime: N/A

Semi-Annual Results

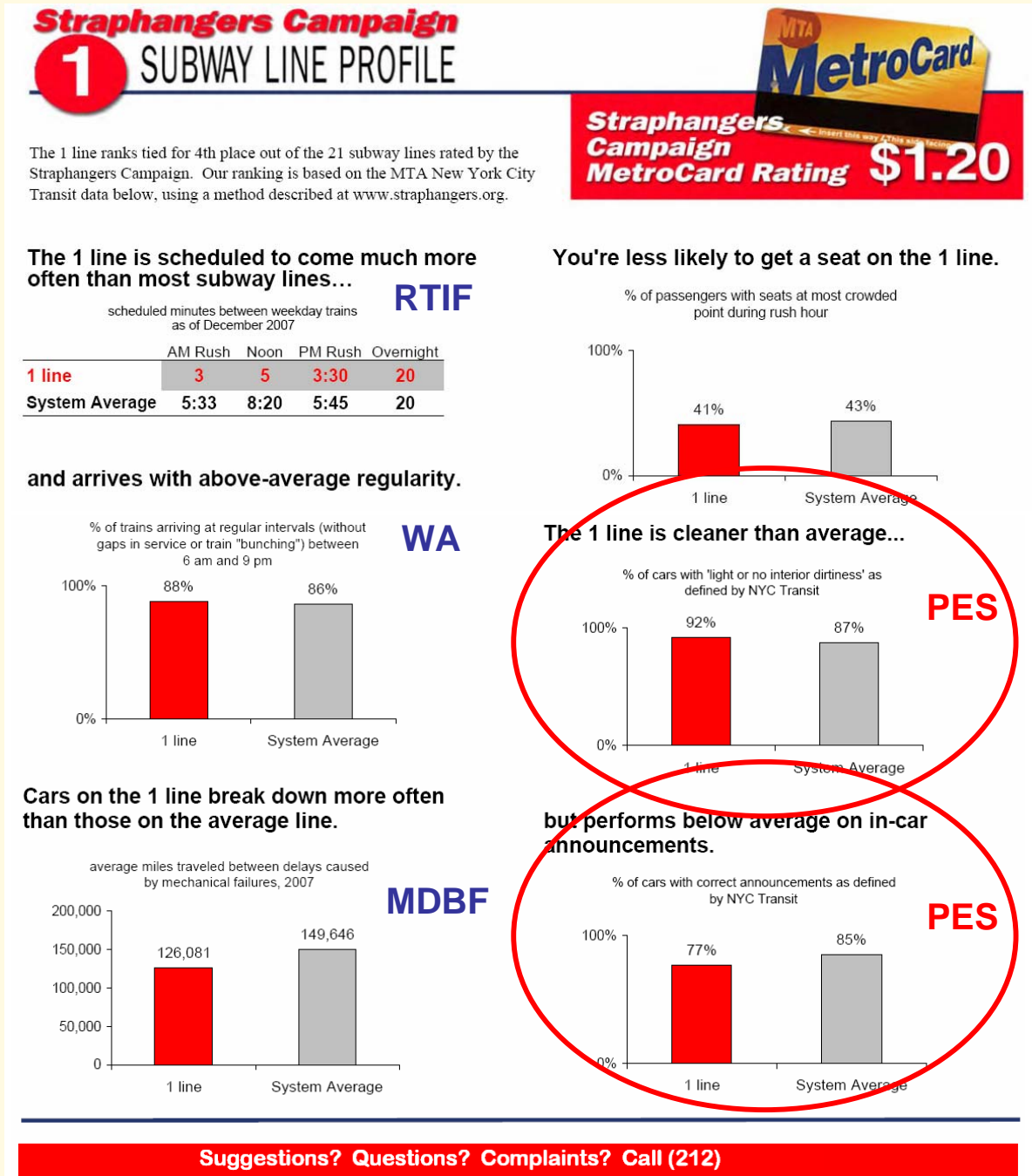
	Early AM				Daytime			
	None	Light	Mod.	Heavy	None	Light	Mod.	Heavy
2nd Half 2007	25%	52%	21%	2%	12%	53%	32%	3%
1st Half 2007	29%	49%	20%	2%	16%	56%	25%	3%
2nd Half 2006	18%	53%	25%	4%	20%	53%	24%	3%
1st Half 2006	40%	41%	16%	3%	15%	50%	31%	4%

Discussion of Results: an increase/decrease of less than 3% is statistically unchanged.

2nd Half 2007 vs. 2nd Half 2006: "Early AM" showed an increase of (+6%) while "Daytime" results decreased (-8%). As a result, a pilot program to address station cleanliness has been initiated.

Rider Advocacy Groups

- Uses **NYCT statistics** as inputs to scoring metric:
 - PES (Cleanliness, Car Announcements)
 - performance indicators (Wait Assessment)
 - operational statistics (MDBF)
- Demonstrates **public trust** in performance measurement methodology



Internal Diagnostic Report

SUBWAY - Monthly Report

Cleanliness Conditions - by Line

Measured "At Terminal" with cleaners present

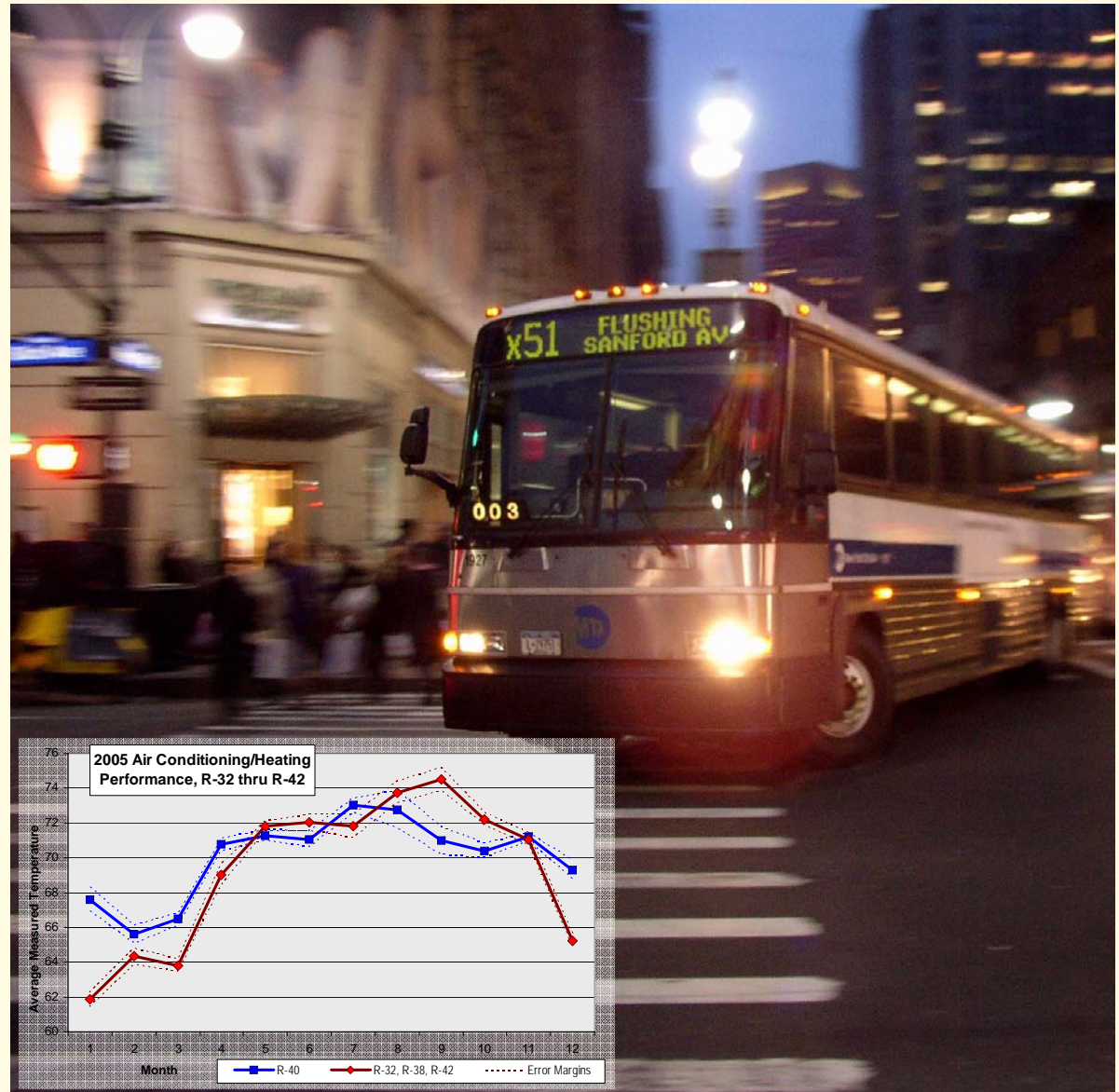
% None & Light

Results thru May 31, 2008

Year	Quarterly Results												Monthly Results			
	2005				2006				2007				2008	2nd Qtr. results thru...		
Quarter	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	April	May	
District 1	1	77%	97%	99%	97%	99%	98%	99%	100%	100%	100%	100%	99%	95%	97%	
	2	98%	100%	81%	83%	96%	97%	100%	100%	92%	96%	100%	99%	100%	99%	
	3	88%	99%	94%	100%	97%	92%	100%	81%	100%	92%	96%	99%	97%	84%	92%
	7	96%	76%	71%	94%	95%	94%	89%	96%	98%	96%	100%	97%	98%	96%	98%
	District 1	91%	94%	89%	95%	97%	96%	97%	93%	98%	96%	99%	99%	99%	94%	96%
District 2	4	99%	93%	92%	98%	98%	97%	95%	94%	100%	100%	94%	96%	100%	98%	99%
	5	100%	99%	98%	98%	86%	100%	97%	98%	99%	96%	98%	99%	100%	100%	100%
	6	97%	97%	97%	100%	97%	99%	99%	92%	100%	94%	99%	95%	97%	100%	100%
	District 2	98%	96%	95%	99%	94%	99%	97%	95%	100%	97%	97%	96%	99%	99%	100%
District 3	B	97%	97%	97%	98%	100%	100%	100%	98%	100%	98%	100%	96%	96%	100%	99%
	D	98%	77%	88%	91%	97%	90%	89%	100%	95%	98%	96%	96%	88%	81%	91%
	N	93%	87%	100%	99%	94%	97%	100%	95%	93%	89%	97%	77%	95%	99%	99%
	Q	93%	98%	95%	87%	97%	97%	100%	100%	99%	89%	98%	99%	99%	100%	99%
	W	98%	98%	100%	100%	99%	92%	99%	99%	97%	98%	99%	99%	98%	98%	95%
	District 3	96%	91%	95%	95%	98%	95%	98%	99%	97%	95%	98%	94%	96%	96%	97%
District 4	A	96%	94%	100%	100%	84%	93%	99%	98%	99%	100%	99%	100%	98%	99%	96%
	C	93%	94%	97%	97%	96%	94%	98%	97%	91%	96%	99%	70%	98%	95%	97%
	J Z	98%	92%	99%	99%	99%	93%	99%	91%	98%	100%	99%	96%	91%	51%	73%
	M	100%	99%	100%	99%	97%	97%	100%	95%	85%	95%	95%	95%	95%	95%	94%
	L	96%	98%	100%	89%	99%	99%	99%	100%	98%	98%	96%	98%	99%	99%	99%
	District 4	96%	96%	99%	96%	94%	96%	99%	98%	93%	97%	97%	90%	96%	88%	92%
District 5	E	95%	97%	100%	91%	99%	92%	99%	95%	92%	91%	93%	88%	86%	88%	94%
	F	90%	82%	75%	84%	98%	84%	94%	87%	84%	89%	97%	84%	80%	100%	99%
	G	93%	96%	88%	100%	91%	95%	81%	88%	97%	74%	96%	94%	91%	96%	93%
	R	93%	96%	99%	99%	98%	98%	93%	95%	95%	91%	96%	89%	99%	100%	98%
	V	92%	99%	74%	99%	100%	83%	88%	81%	88%	84%	94%	89%	85%	96%	89%
	District 5	92%	94%	85%	94%	97%	90%	91%	90%	91%	86%	95%	89%	88%	96%	94%
Systemwide	95%	94%	93%	96%	96%	96%	96%	96%	96%	95%	97%	94%	96%	94%	95%	

Data Mining

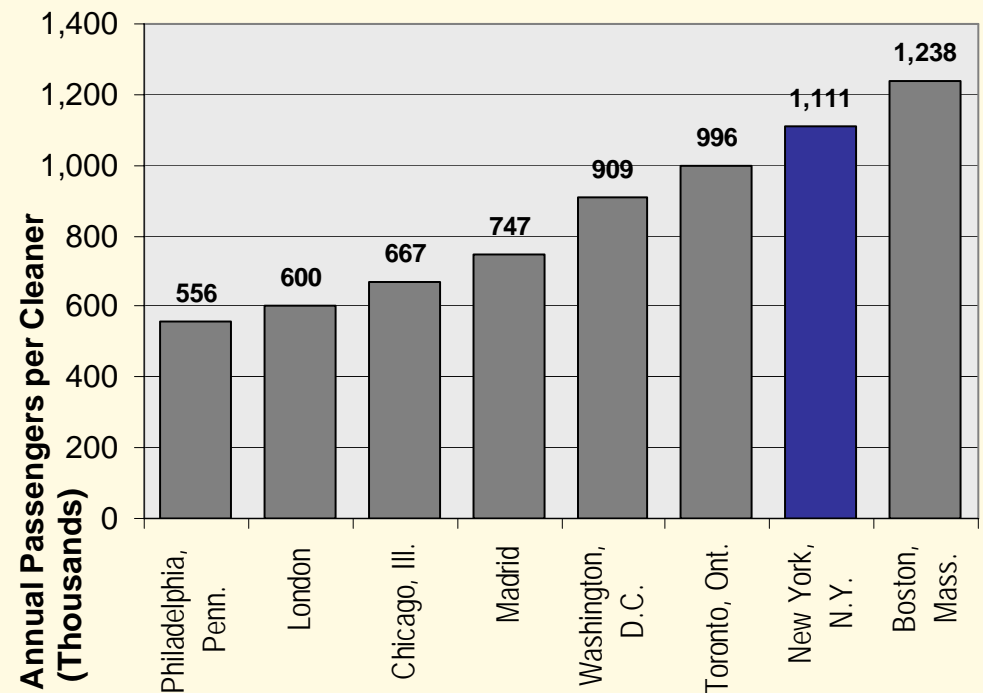
- **International Benchmarking**
 - Cleaner task-time and performance assessment
 - Peer comparisons
- **Policy Initiative Assessment**
 - Resource allocation versus performance
- **Governor's Report**
 - Analyze reasons for performance changes
- **Summer Temperature Program**
- **Line General Manager Program**



Assessment of Station Cleaning

- Cleaning staffing levels in peer systems assessed after PES scores showed significant changes in 2005 and 2007
- NYCTA and MBTA amongst **most cost-effective** for station cleaning
- Results led to multidisciplinary effort to improve cleanliness:
 - **Station-based** cleaner assignments
 - Focus on **transfer stations**
 - Double supervision resources
 - Shifting emphasis from tasks completed (input) to station condition (product)

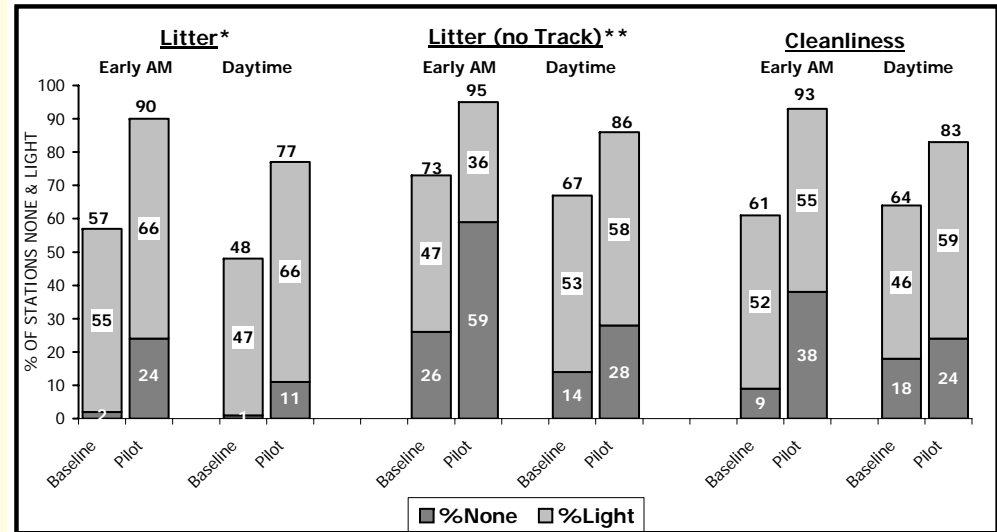
City	Cleaners	Annual Passengers (millions)
Philadelphia, Penn.	153	85
London, England	1,580	948
Chicago, Ill.	225	150
Madrid, Spain	825	616
Washington, D.C.	198	180
Toronto, Ontario	251	250
New York, N.Y.	1,283	1,426
Boston, Mass.	156	193



Station Cleaning Pilot PES Results

- PES station cleanliness 'flash' report issued to senior management every two weeks
 - Field management receives **improved feedback**
 - High visibility of station cleaning
- Dramatic improvement in station cleanliness at **pilot** stations within three months
- New cleaning management practices and additional staff instituted in President's **Line General Manager Program**
 - Pilot on **L** and **7** Lines
 - Expanded to **1 2 3 4 5 6**

Passenger Environment Survey
Policy Initiative - Station Cleaning



Baseline - the 64 pilot stations surveyed prior to pilot implementation.
Pilot - 1st Half 2008 Pilot Stations Results.

* Includes **all** components of station: mezzanine, passageway, stairway, platform and trackbed.
 ** Includes mezzanine, passageway, stairway and platform components only, not trackbed.

Background

Starting in mid-September 2007, NYCT initiated a stations cleaning program on 50 pilot stations on the Broadway, Lexington, Flushing and Canarsie lines, since expanded to 64 stations in January 2008. Additional cleaners were deployed at these stations, working in multiple shifts to provide 24 hour coverage. The above graph shows the result of 64 pilot stations surveyed prior to pilot implementation vs. the pilot station results for the first half of 2008.

Baseline Results and 1st Half 2008 Pilot Results

	Litter				Litter (no Track)				Cleanliness			
	Early AM		Daytime		Early AM		Daytime		Early AM		Daytime	
	Baseline	Pilot	Baseline	Pilot	Baseline	Pilot	Baseline	Pilot	Baseline	Pilot	Baseline	Pilot
None	2%	24%	1%	11%	26%	59%	14%	28%	9%	38%	18%	24%
Light	55%	66%	47%	66%	47%	36%	53%	58%	52%	55%	46%	59%
Moderate	39%	10%	48%	21%	25%	5%	31%	13%	35%	7%	32%	16%
Heavy	4%	0%	4%	2%	2%	0%	2%	1%	4%	0%	4%	1%

Discussion of Results:


The across-the-board increases demonstrate the effectiveness of the additional resources and shift coverage.

Future Development

- **Paperless Data Collection**
 - Handheld computers (PDAs)
 - Automatic data syncing, upload, tallying, and analysis
 - Currently in testing
- **Staten Island Program**
 - Develop PES program for MTA Staten Island Railway
- **Additional Policy Initiatives**
 - More samples to assess program performance
 - Potential expansion
 - Station Cleanliness
 - Subway Car Cleanliness
 - Graffiti and Scratchitti



Lessons Learned

- Quantitative and scientific approach to measuring qualitative customer perception
 - Independent audit function promotes internal accountability
 - Accepted by outside advocacy groups and the NYCT Committee
- Consistent, well-defined, clearly understood **standards**
- Evolved over time to support quantitative management decision making
-  **New York City Transit** is willing to understand service delivery from a **customer's perspective**

