

Washington Metropolitan Area Transit Authority
Board Action/Information Summary

Action Information

MEAD Number:
201863

Resolution:
 Yes No

TITLE:

Safety Report for First Quarter 2017

PRESENTATION SUMMARY:

The Department of Safety & Environmental Management (SAFE) Quarterly Report (1Q17) publicly communicates safety-related information and statistics.

PURPOSE:

The Metro Safety Quarterly Report informs the Safety Committee regarding the ongoing safety culture in the Metro system and indicates performance measurement in accordance with the Authority goals. Further, the public report increases communication to enhance safety of WMATA's employees, customers and surrounding Washington metropolitan area community. The Quarterly Report will summarize and highlight progress in 2017 and other relevant safety actions.

DESCRIPTION:

Two measures of an improving safety culture are the customer and employee injury rates. As such, both performance measures are included as part of Metro's Strategic Plan. The 2017 target for the Customer Injury Rate (CIR) is less than 1.75 injuries per million passenger trips; the Employee Injury Rate (EIR) target is less than 5.1 injuries per 200,000 work hours.

Additional metrics that will be reviewed for statistical purposes are highlighted below and actions taken will be covered in the discussion. These metrics include rail fires, derailments, red signal overruns, pedestrian strikes, and bus collisions. It should be noted that WMATA's internal standards are much more stringent than those used for the National Transit Database (NTD) reporting; however the presentation will include a comparison of our performance versus other transit agencies with NTD reporting thresholds for benchmarking purposes.

Comparable systems were identified by the Urban Integrated National Transit Database (iNTD), developed by the Florida Department of Transportation. The iNTD tool utilizes a series of data points (e.g., ridership, population served, miles) to identify like-properties. These are the comparable properties seen within the presentation.

In addition, the presentation will only depict annual statistics as that is how NTD data is collected. NTD requires reporting of unlinked passenger trips, where WMATA uses linked trips; the former will always result in lower rates as a result of having more trips associated with each mode/metric; therefore, WMATA numbers will be somewhat inflated and is not an "exact apple to apple" comparison.

NTD reporting criteria is as follows: customer injuries (transported from the scene for medical care); fires (any fire that requires active suppression); derailments (starting in 2016, yard derailments were included in addition to those that occurred on the mainline); and bus collisions (greater than \$25k damage, or if a passenger was transported from the scene for medical care). There is no reporting criteria specific to pedestrian strikes. NTD does not track red signal overruns; however WMATA has requested FTA's system comparison data as part of April 2016's Safety Advisory 16-1 and is awaiting the final report.

Key Highlights:

- Employee Injury Rate (EIR) – For 1Q17, the EIR is 5.0; this is a 6% decrease over 1Q16's EIR of 5.3 injuries per 200,000 hours worked (equivalent to 100 employees working for a year) and 25% below the Bureau of Labor Statistics average for transit industries (i.e., 6.7). There were 144 OSHA recordable employee injuries in 1Q17, 15 fewer injuries than 1Q16.
- Customer Injury Rate (CIR) – For 1Q17, the CIR was 2.29; this is a 2% decrease over 1Q16's CIR of 2.33. There were 166 NTD reportable customer injuries for 1Q17 or eight fewer than 1Q16. Of the five like-properties reviewed for each mode, WMATA had the lowest rail-related CIR, was in the middle for bus-related CIR, and the second highest for the paratransit CIR.
- Fires – For 1Q17, there were 20 fires internally recorded; 29% lower than 1Q16. WMATA was lower than one but higher than four like-properties for CY16.
- Derailments - For 1Q17, there were two derailments compared to one in 1Q16. WMATA was the same as one but higher than four like-properties for CY16.
- Pedestrian strikes – For 1Q17, there were five incidents, the same number as 1Q16. WMATA was lower than two but higher than two like-properties for CY16.
- Bus Collision Rate – For 1Q17, there were 146 fewer collisions, with a rate 22% below 1Q16. WMATA was lower than two but higher than two like-properties for CY16.
- Red Signal Overruns – For 1Q17, there were four compared to one in 1Q16. No like-property data is available at this time.

Background and History:

The Quarterly Safety Report is required by the Board of Directors system safety policy statement as part of the approved System Safety Program Plan (SSPP). The SSPP is required under FTA Final Rule Code of Federal Regulations 49, part 659; Rail Fixed Guideway Systems: State Safety Oversight.

The Department of Safety and Environmental Management utilizes multiple datasets to monitor safety activities that impact employees and the riding public. Daily review of incidents, systematic inspections of facilities and regulatory programs, and employee/contractor training are effective uses of resources which ensure a safer workplace and environment for our passengers. The following discussion highlights some of the metrics and incidents used to gauge system safety.

Discussion:

The EIR met the established target, however the CIR did not. The 1Q16 CIR was 2.29, which was above the target of <1.75. The primary driver behind this increase was an increase in non-preventable collisions and hard braking events for Bus, and slip/trip/fall injuries on rail station platforms. The 1Q16 EIR was 5.0, which was below the target of <5.1. The primary drivers behind these injuries were slips/trips/falls due to inattentiveness and ice, non-preventable collisions, inattentiveness contributing to lifting/lower and struck by injuries, and stress related injuries.

MetroBus - CIR

The 1Q17 CIR for MetroBus was 2.67 per 1,000,000 passenger trips; down 10% from 1Q16. There were 99 customer injuries for the quarter. The primary injury type was non-preventable collision-related, specifically rear end collisions. Hard braking events was another leading factor that contributed to customer falls.

MetroBus has several initiatives to reduce customer injuries. Bus Training has bolstered its defensive driving curriculum in an effort to decrease rear end collisions. This includes using DriveCam to identify all hard braking events regardless of injury and coach the impacted operator. Collision hot spots have been identified and management staff are routinely deployed to those areas. Bus berthing practices are being reviewed to determine if bus stop locations are contributing to rear end collisions.

MetroBus falls in the middle of the group for the CY16 NTD CIR, at 2.5 NTD reportable injuries per million unlinked passenger trips. This is above Miami Dade Transit (MDT, 1.0) and Chicago Transit Authority (CTA, 1.8), but below Metropolitan Atlanta Rapid Transit Authority (MARTA, 2.8) and Southeastern Pennsylvania Transportation Authority (SEPTA, 4.4).

MetroAccess - CIR

The 1Q17 CIR for MetroAccess (MACS) was 1.93 injuries per 100,000 passenger trips, 5% lower than 1Q16. There were 11 customer injuries for the quarter. As with MetroBus, the primary driver was non-preventable collision related injuries. Slip/trip/fall injuries also increased; these injuries occurred while the passenger was being escorted to/from the vehicle. MACS has formed a working group of contractors and MACS staff to work with the Occupational Therapist, and the collaboration has already identified aspects of driver training that can be improved to reduce injuries. The group has been examining everything from the customer's disability profile and susceptibility to losing balance; to proper techniques for escorting customers to, from, into, and out of the vehicle. SAFE will be presenting on this initiative in May.

When compared to other properties, MACS CY16 CIR rate of 2.9 is below MARTA (3.0), but is above SEPTA (2.5), Massachusetts Bay Transportation Authority (MBTA, 1.3) and Miami Dade Transit (0.4).

MetroRail - CIR

The 1Q17 for MetroRail was 1.80 injuries per 1,000,000 passenger trips; up 6% from 1Q16. There were 77 customer injuries for the quarter. Slip/trip/fall injuries in the station is the leading injury type. These falls primarily occurred while passengers are running through the station, are intoxicated, or trip on uneven or wet platform surfaces.

There has been an increase in station safety inspections in CY2017 to reduce the number of facility issues that may result in customer injuries, such as loose floor tiles and poor housekeeping. In addition, WMATA is piloting automated precaution announcements at the escalators that have experienced the most injuries. The announcements will warn when the escalator is ending and remind passengers to hold onto the handrail. Overall station announcements are also in place which remind passengers to be aware of their surroundings and to be safe while using the system. Finally, a new customer safety communication campaign will begin in the spring of 2017.

MetroRail is the lowest of the group for the CY16 NTD CIR, at 0.9 NTD reportable injuries per million unlinked passenger trips. This is below MBTA (1.1), MARTA (1.4), CTA (1.4) and San Francisco Bay Area Rapid Transit (BART, 3.6).

Employee Injuries – EIR

The 1Q17 EIR was 5.0 per 200,000 hours worked, down 6% from 1Q16. There were 144 OSHA recordable employee injuries in 1Q17, 15 fewer than 1Q16. The main injury types were: slip/trip/fall (25%); collision-related (23%); and stress (10%). The departments that had the most injuries include: Bus Transportation (45%); Rail Transportation (14%); MTPD (9%); and Track/Structures (8%).

Lack of employee situational awareness was the leading contributing factor for employee injuries. WMATA will be strengthening the implementation of Job Hazard Analysis (JHAs) with the goal of reducing these types of injuries. As complacency contributes to injuries, focusing on the hazards present and having staff communicate how those hazards are mitigated will bring more safety awareness to day-to-day tasks.

Non-preventable collisions are a leading contributing factor of injuries. This factor is also the leading cause for customer injuries. WMATA will be encouraging fleet vehicle operators to take a defensive driving class, which has been sanctioned by the National Safety Council. Bus Training has also bolstered its operator training defensive driving curriculum. Finally, non-preventable collision hot spots have been identified; bus and safety management will continue to monitor these areas to determine if other contributing factors are present, and to reinforce safe driving to bus operators.

Poor job-site environment has also been identified as a contributing factor to injuries. Conditions such as poor lighting and housekeeping result in slips/trip/falls while in the field. Job site inspections, especially in the SafeTrack areas, aim to improve materials management and tool use. Additionally, portable job site lighting solutions are being explored to improve employee safety.

Fires

There are three main types of fires that occur within the rail system: debris/rubbish, electrical cables, and arcing insulator.

Debris/rubbish fires typically consist of material on the roadway that flare up when the source is not electrically-related, including leaves or newspapers on heated components (e.g., switch heaters) or debris in street-accessible shafts that start due to discarded cigarettes. For 1Q17, there were seven of these fires, 53% fewer than 1Q16. Efforts to reduce these fires include track cleaning and shaft debris/leaf cleaning.

Cable fires are the result of either unsecured cables or degraded insulation. These cables are what provide power to the third rail. For 1Q17, there was only one incident, the same as 1Q16. Actions to reduce these fires include the cable replacement and securement program, which involves a team of inspectors whose primary role is to inspect and repair these cables. Additional efforts include tunnel cleaning and tunnel leak repair.

The final events reviewed are arcing insulators. These arcing events occur when stray current from the third rail finds an alternative path, primarily as a result of wet conditions. For 1Q17, there were 12 of these events, one more than 1Q16. The main drivers behind these events are wet/muddy conditions and insulator contamination and degradation. To resolve these aspects, proactive drain cleaning and mud removal in at risk areas (e.g., Red Line) is occurring, and improvements to the insulator inspection process have been made, both in the field and prior to field replacement.

The NTD criteria for reporting fires are events that require suppression. Events that self-extinguish are not included. Additionally, event interpretation may lead to data discrepancies by system. When comparing WMATA to other like-properties for CY16, WMATA had the second highest number of fires per million train revenue miles, at 8.1, followed by CTA (6.1), SEPTA (2.1), BART (1.9), and MARTA (0.3). MBTA was significantly higher at 38.0.

Derailments

There were two derailments in 1Q17, both of which were Rail Maintenance Machines (RMMs). RMMs are small and light pieces of equipment that are used to repair and/or build the railway. Pieces include quad drill, spike driver, spike puller, tie remover, tie crane, spot tamper, and prime mover. Of the two that occurred in 1Q17, one was in a work zone, and the other occurred on the mainline. There was one derailment in 1Q16. The main causal factor of these events are improper movement. A representative sample of RMM hours used of 11 months prior to SafeTrack, and 11 months since the start of the program shows a 230% increase. When reviewing derailment data for the same time period, there were four derailments prior to SafeTrack, and 13 since the start of the program, demonstrating a correlation of increased RMM usage and derailments.

To reduce RMM derailments, maintenance operators are being trained on proper operation of the units, and an evaluation committee has been formed to review the use and operating conditions of these vehicles. When comparing WMATA to other like-properties for CY16, WMATA and MBTA both had 0.5 derailment incidents in CY16, where CTA (0.1), BART, MARTA, and SEPTA (0.0) all had fewer incidents per million train revenue miles.

Red Signal Overruns

There have been four red signal overruns in 1Q17, two more than in 1Q16. Two of the four occurred on the mainline, and two occurred in the yard. The primary cause is operator inattentive blindness, where the operator does not recognize the red signal. An additional cause is miscommunication between the governing authority (e.g., interlocking operator) and the train operator. Actions to reduce these incidents include retraining of train operators, replacing signal lights with Light Emitting Diodes (LEDs) to improve conspicuity, and rail vehicle modifications for stop and proceed modes (e.g., requiring the operator to perform several tactile functions to move the train when a red

signal is encountered). There is no data for property comparisons.

Pedestrian Strikes

There have been five pedestrian strikes for 1Q17, the same number as 1Q16. The main drivers behind these incidents are individuals falling into the bus while the bus is departing, cyclists striking the bus, pedestrian impairment, and operator inattention. All incidents in 1Q17 occurred outside the cross walk, and 92% of strikes for the past four years have occurred outside the cross walk. To reduce these incidents, Bus Transportation hosts a ‘Pedestrian Summit’ several times a year, which involves management, operators, and Union representation. Aspects covered during the summit include training, root cause analysis, and operator feedback. Lessons learned from these summits are then distributed to all bus operators. In addition, DriveCam is used to coach operators on the typical conditions surrounding pedestrian strikes (e.g., time of day, location). When comparing WMATA to other like-properties for CY16, WMATA’s count of 18 is below CTA (38) and SEPTA (30), but above MARTA (3) and MDT (0).

Bus Collision Rate

The 1Q17 bus collision rate is 54 collisions per million miles, 22% lower than 1Q16’s rate, and 146 fewer collisions. Note that WMATA tracks all collisions regardless of damage amount, from mirror strikes caused by tree branches to a head on collision. The primary collision causes are non-preventable rear end collisions, improper bus positions, and operator inattention. Efforts to reduce bus collisions include “Safety Blitzes”, where management is deployed at accident hot spots to reinforce safe driving behavior, operator evaluations via unannounced ride-alongs, and expanding divisional mentoring programs, where novice operators are paired with vetted seasoned operators. When comparing WMATA to other like-properties for CY16, WMATA’s NTD collision rate of 3.8 is below SEPTA (5.8) and CTA (4.6), but above MARTA (3.0) and MDT (0.2).

FUNDING IMPACT:

Necessary funding is within approved annual budget.	
Project Manager:	Patrick Lavin
Project Department/Office:	SAFE

TIMELINE:

Previous Actions	<ul style="list-style-type: none"> • Annual Safety Report presented February, 23, 2017
Anticipated actions after presentation	<ul style="list-style-type: none"> • Continue to build a premiere safety culture and system. • Mitigate human factors as potential safety risks.

RECOMMENDATION:

To inform the Board’s Safety Committee of the positive and proactive safety foundation status being implemented and accomplishments for the first quarter of 2017.



Washington Metropolitan Area Transit Authority

1st Quarter Safety Review

Safety Committee
April 27, 2017



Reporting Criteria Differences

National Transit Database vs WMATA

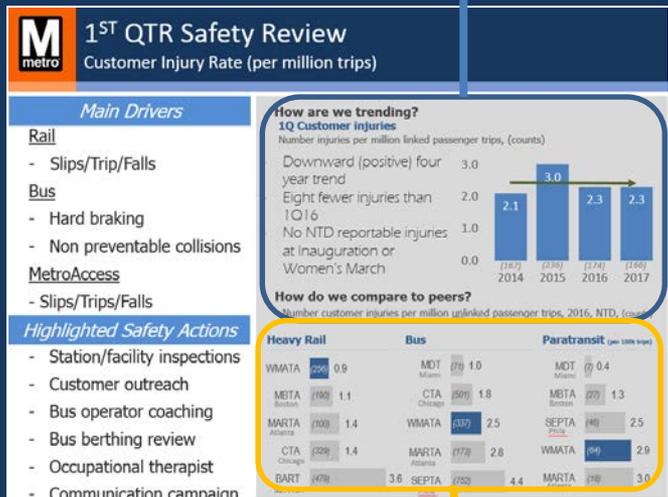
WMATA Quarterly analysis uses counts with no threshold

- Fires
- Derailments
- Bus collisions
- Rate calculations: Linked passenger trips are used

Property Comparisons

- Federal Transit Administration's National Transit Database (NTD) has specific reporting thresholds

- Fires: Requires active suppression
- Derailments: Starting in 2016, yard derailments were included in addition to those that occurred on the mainline
- Bus collisions: Greater than \$25k damage, or if a passenger was transported from the scene for medical care
- Rate calculations: Unlinked passenger trips are used





Customer Injury Rate

Main Drivers

Rail

- Slips/Trip/Falls

Bus

- Hard braking
- Non preventable collisions

MetroAccess

- Slips/Trips/Falls

Highlighted Safety Actions

- Station/facility inspections
- Customer outreach
- Bus operator coaching
- Bus berthing review
- Occupational therapist
- Communication campaign

How are we trending?

1Q Customer injuries

Number injuries per million linked passenger trips, (counts)

- Downward (positive) four year trend
- Eight fewer injuries than 1Q16
- No NTD reportable injuries at Inauguration or Women's March



How do we compare to peers?

Number customer injuries per million unlinked passenger trips, 2016, NTD, (counts)

Heavy Rail

WMATA	(256)	0.9
MBTA Boston	(190)	1.1
MARTA Atlanta	(100)	1.4
CTA Chicago	(329)	1.4
BART San Fran	(479)	3.6

Bus

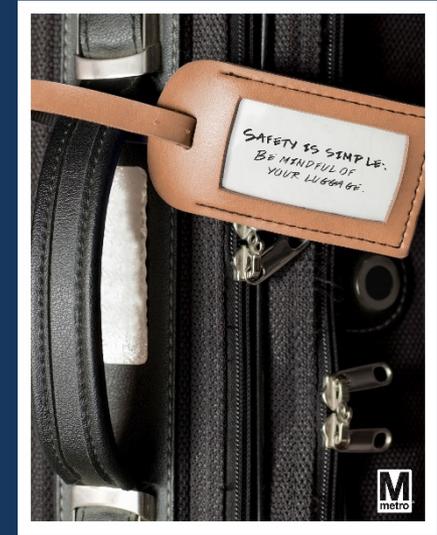
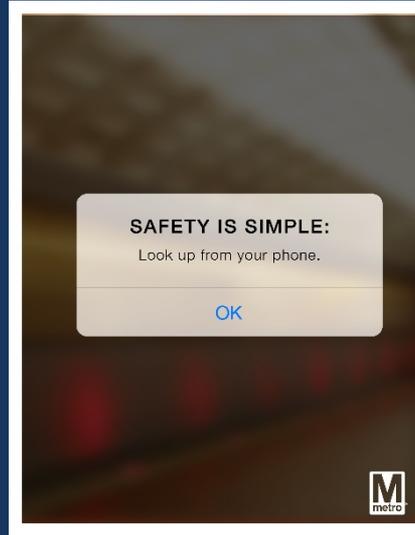
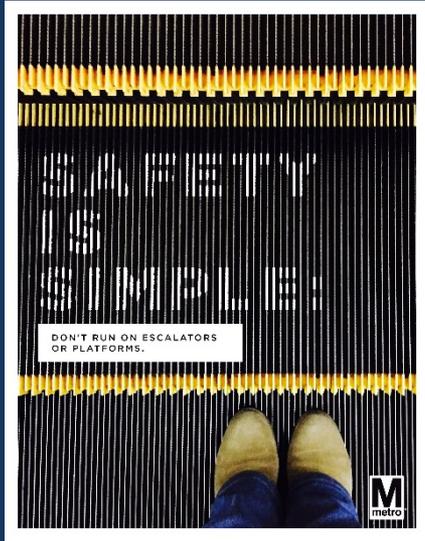
MDT Miami	(71)	1.0
CTA Chicago	(501)	1.8
WMATA	(337)	2.5
MARTA Atlanta	(173)	2.8
SEPTA Phila	(752)	4.4

Paratransit (per 100k trips)

MDT Miami	(7)	0.4
MBTA Boston	(27)	1.3
SEPTA Phila	(46)	2.5
WMATA	(64)	2.9
MARTA Atlanta	(18)	3.0



Safety Communications Campaign





Employee Injury Rate

Main Drivers

Slips/Trip/Falls

- Poor Housekeeping

Collision-related

- NP Collisions

Lifting/Lowering

- Poor Ergonomics

Highlighted Safety Actions

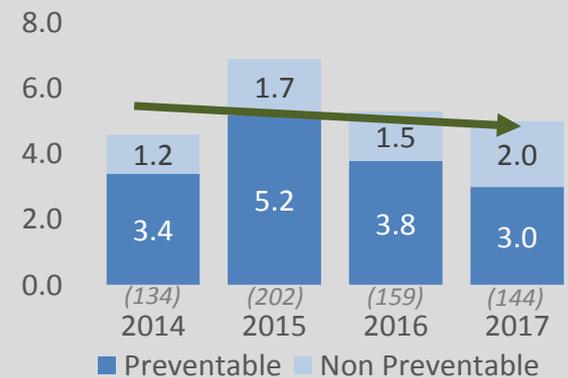
- Increased worksite inspections
- Bus berthing review
- Training
- Job hazard analyses
- Worksite lighting

How are we trending?

1Q Employee injuries – Preventable vs. Non Preventable

Number injuries per 100 employees (count)

- Downward (positive) four year trend
- Fifteen fewer injuries than 1Q16
- 6% reduction in overall EIR
- 21% reduction in preventable EIR



How do we compare to peers?

Number injuries per 100 employees, Bureau of Labor Statistics 2015 (Q1 – WMATA)





Rail Fires – Debris

Main Drivers

- Debris / Rubbish
 - Switch Heaters
 - Newspapers
 - Leaves

Highlighted Safety Actions

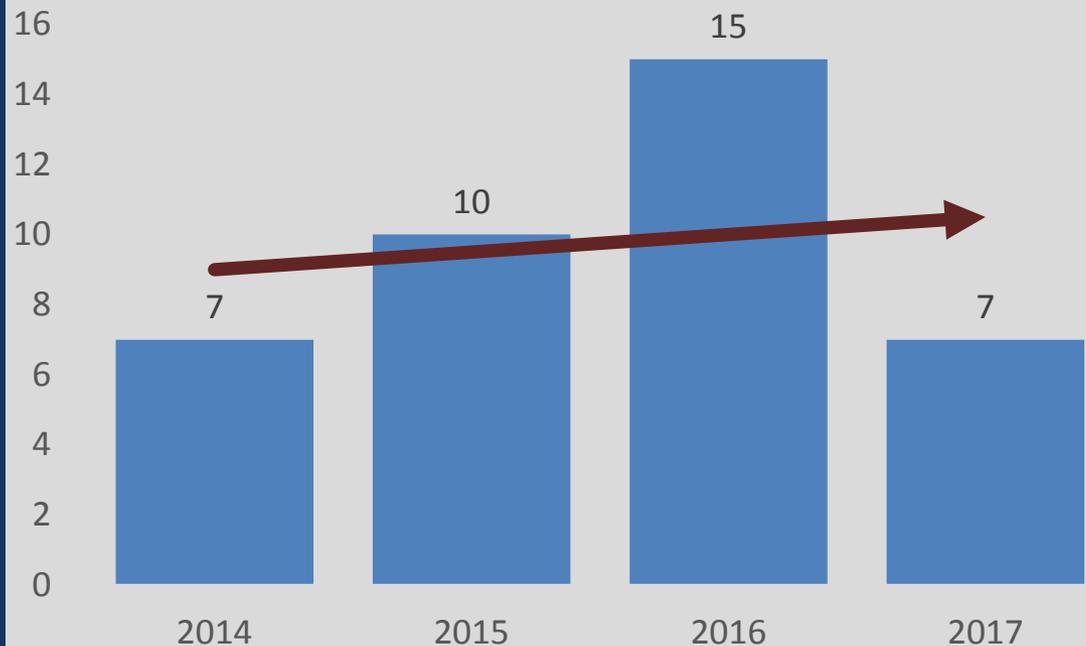
- Proactive track cleaning
- Drain maintenance
- Shaft debris/ leaf cleaning
- Evaluation of vacuum devices

How are we trending?

1Q Debris-related Fires

Number of fire events (count)

- Upward (negative) four year trend
- Eight fewer fires than 1Q16
- 9+ average per quarter





Rail Fires – Cable

Main Drivers

- Unsecured Cables
- Degraded Insulation
- Water Penetration

Highlighted Safety Actions

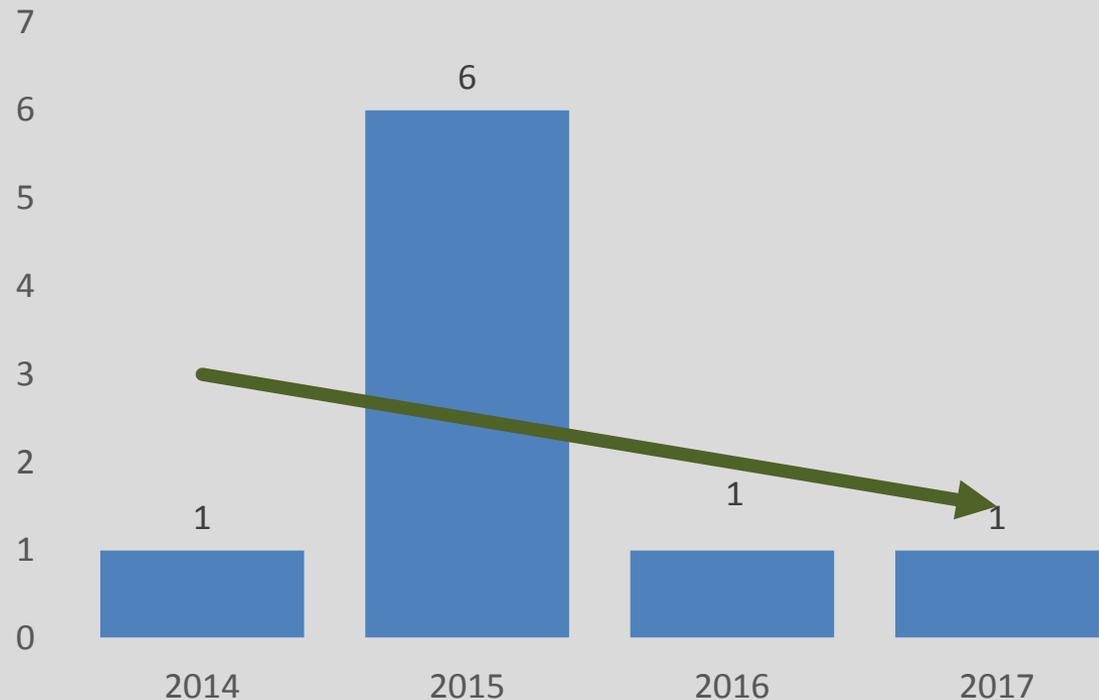
- Cable Replacement and Securement Programs
- Regularly scheduled cable inspections
- Repairing tunnel leaks

How are we trending?

1Q Cable-related Fires

Number of fire events (count)

- Downward (positive) four year trend
- No change from 1Q16, down from a high of six in 1Q15





Rail Fires – Insulator

Main Drivers

- Wet/muddy conditions
- Contamination

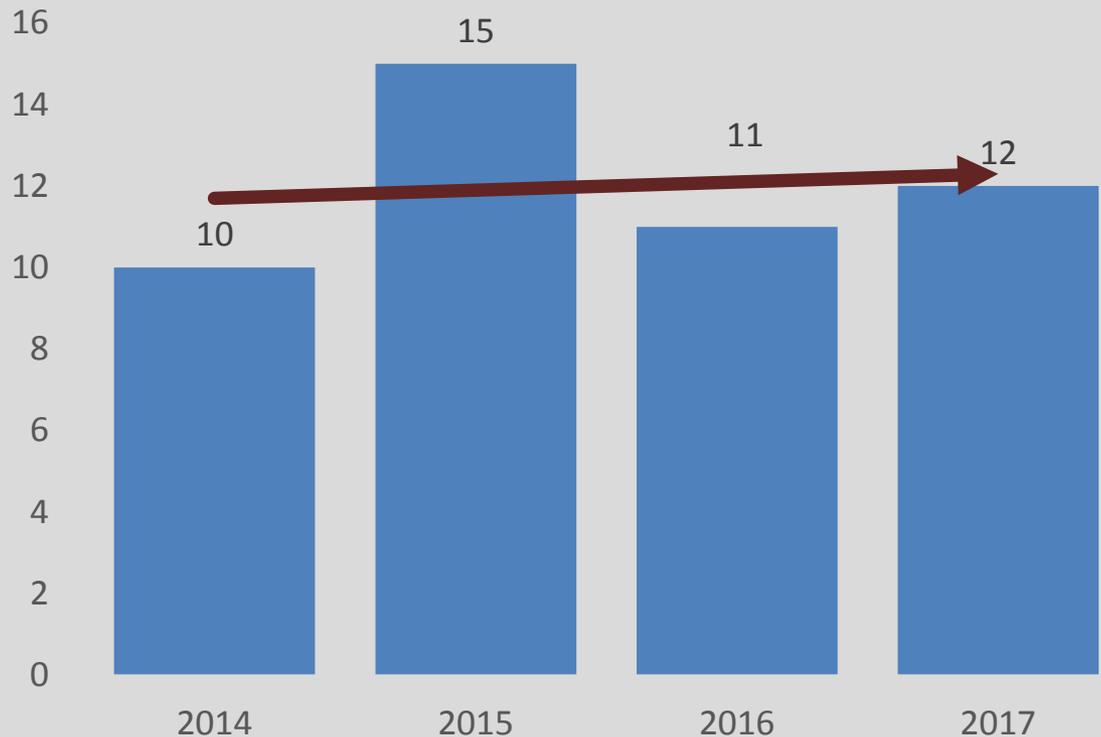
Highlighted Safety Actions

- Drain Cleaning
- Mud Removal
- Improved inspection processes

How are we trending? 1Q Insulator-related Fires

Number of fire events (count)

- Upward (negative) four year trend
- One more fire than 1Q16, down from a high of fifteen in 1Q15



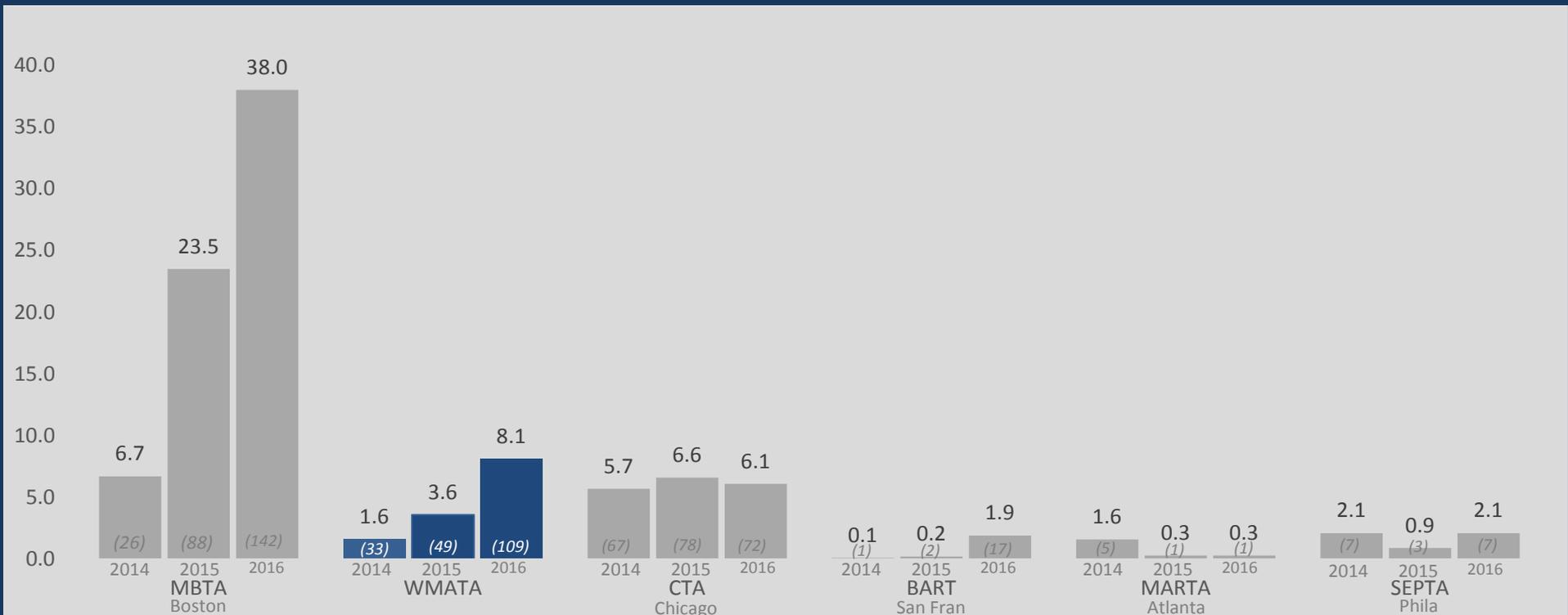


Rail Fires – Benchmarking

- Standard federal reporting criteria
- Event interpretations may lead to data discrepancies by system
- NTD reported fires require suppression
- Events that self extinguish are exempt from reporting, per NTD

How do we compare to peers?

Number fires per 1 million train revenue miles, 2014-16, FTA NTD, (incident counts)





Derailments

Main Drivers

- Improper rail maintenance machines movement (RMMs)
- Poor communication
- Increase in usage

Note: NTD reporting criteria expanded in 2016 to include all derailments, not just mainline

Highlighted Safety Actions

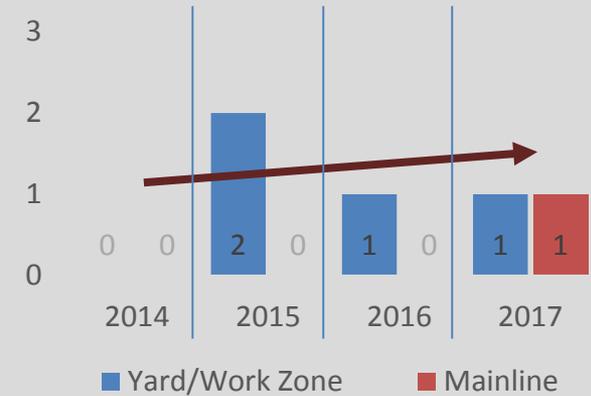
- Retraining of operators
- RMM evaluation committee

How are we trending?

1Q Derailments – by location/type

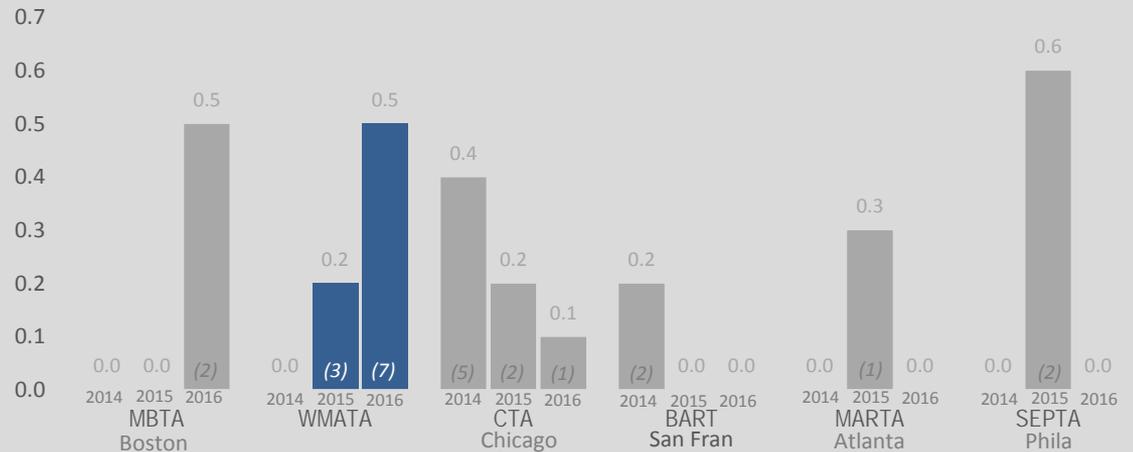
Number of derailments

- All 1Q17 derailments were roadway maintenance machines
- 80% of all derailments occurred within work zone or rail yard



How do we compare to peers?

Number mainline derailments per 1 million train revenue miles, 2014-16, FTA NTD (Counts)





RMM Derailments – SafeTrack

- 11 month before/after analysis
 - Increase in hours used
 - Increase in derailments

- RMMs include:

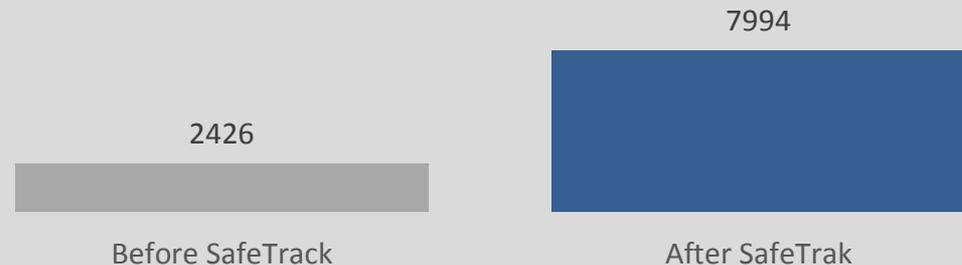
- Quad Drill
- Spike Driver
- Spike Puller
- Tie Remover
- Tie Crane
- Spot Tamper
- Prime Mover

- 230% increase in hours used (representative sample)
- 225% increase in RMM derailments

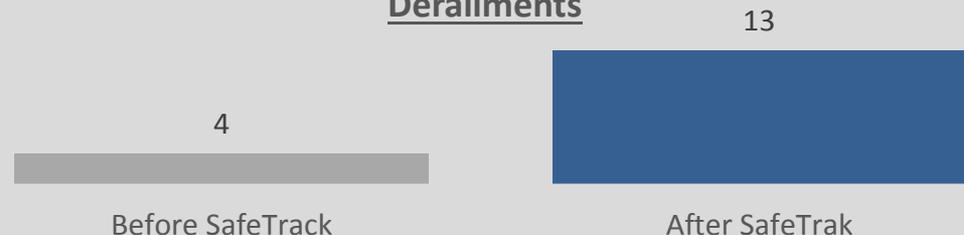
Has RMM usage increased?

Number of hours used (representative sample) vs number of RMM derailments
11 months prior SafeTrack, 11 months since the start of SafeTrack

Equipment Hours (Rep Sample)



Derailments





Red Signal Overruns

Main Driver

- Operator in-attentional blindness
- Miscommunication

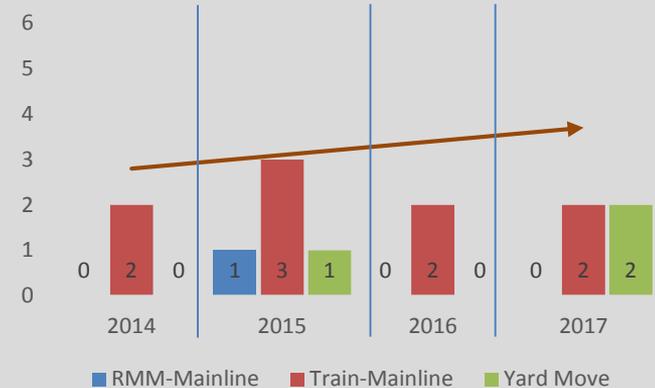
Highlighted Safety Actions

- Retraining of operators
- Signal LED replacement
- Vehicle modification for stop and proceed mode
- Red signal analysis

How are we trending?

1Q Red Signal Overruns – by vehicle type / movement

- Slight upward trend
- 85% are trains
- 77% occur on the mainline



How do we compare to peers?

Number red (stop) signal overruns per 1 million train revenue miles, FTA

Red signal data is not tracked by NTD. Upon publication, the FTA Safety Advisory 16-1 Findings Report will provide system comparisons.

FTA estimated date of completion: May 2017



Pedestrian Strikes

Main Drivers

- Falling into bus after departure
- Cyclist striking side of bus
- Pedestrian impairment
- Operator inattention

Highlighted Safety Actions

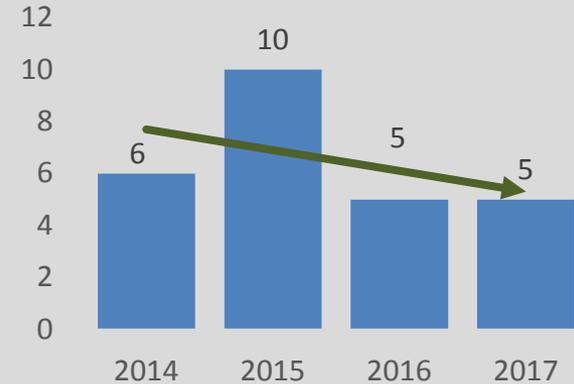
- Bus operator pedestrian summit
- Bus management ride-alongs
- DriveCam coaching

How are we trending?

1Q Pedestrian Strikes

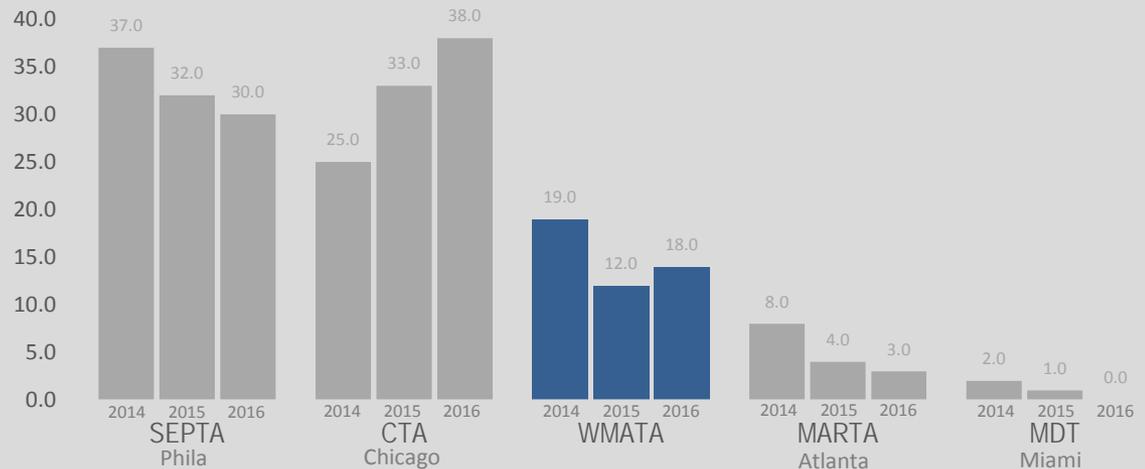
Number of pedestrian/cyclist strikes

- 50% reduction from peak in 1Q15
- 92% of all strikes occurred outside of crosswalks



How do we compare to peers?

Number of pedestrian/cyclist strikes by bus, 2014-2016, NTD





Bus Collision Rate

Main Drivers

- Operator inattention
- Non preventable rear end collisions
- Improper bus position

Highlighted Safety Actions

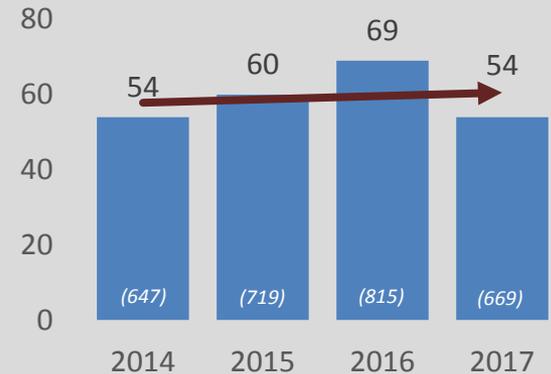
- Safety Blitzes / safety awareness programs
- Safety observations
- Expand divisional mentoring programs

How are we trending?

1Q Bus Collision Rate

Number of bus collisions per million miles (all collisions count)

- Slight upward four year trend
- 22% reduction from 1Q16
- 60% are non preventable (WMATA not at fault)



How do we compare to peers?

Number of NTD reportable bus collisions per million miles, 2014-2016

NTD collision criteria (>\$25k damage or transported for medical treatment)





Questions

