Safety and Operations Committee

Board Information Item III-B

June 9, 2022

Metro Safety Initiatives

Washington Metropolitan Area Transit Authority

Board Action/Information Summary

○ Action ◉ Information	MEAD Number: 202370	Resolution: ○ Yes ◉ No

TITLE:

Metro Safety Initiatives

PRESENTATION SUMMARY:

A robust Safety Management System (SMS) allocates resources against safety risks. This presentation outlines the key safety initiatives that Metro is implementing as part of allocating resources against safety risks.

PURPOSE:

To keep Metro leadership informed and engaged on the strategy and progress associated with implementing Metro's SMS.

DESCRIPTION:

KLD Labs, Inc. provided the automated wheel inspection system that Metro procured as part of the strategy to leverage technology as part of safety returning the 7000-series back to service.

Key Highlights:

- Metro installed the first automated inspection system to test wheelsets of the 7000-series railcars in real-time. This is a key component of Metro's strategy for safely returning the 7000-series to service, with the ability to see patterns and trends in wheel migration that enable action to be taken before an incident has the opportunity to occur.

- Metro is preparing a procurement to expand installation of the collision avoidance system to 300 buses. The system provides advance warning of impending collisions, providing bus operators with time to respond before an incident has the opportunity to occur.

- Securement of scooters and wheelchairs is a critical safety function of MetroAccess. With sedans being introduced to the fleet and fewer riders during the pandemic, the risk for loss of proficiency was identified. In response, action was taken to increase re-certification to twice per year (once every six months), effectively mitigating this risk before an incident had the opportunity to occur.

Background and History:

In 2016, the Federal Transit Administration (FTA) published 49 CFR Part 670 Public Transportation Safety Program, which states “The [FTA] has adopted the principles and methods of Safety Management Systems (SMS) as the basis for enhancing the safety of public transportation in the United States.” (49 C.F.R. § 670.3). SMS is a comprehensive, collaborative approach that brings management and labor together to build on the transit industry’s existing safety foundation to continuously improve how safety risks are identified and assessed with mitigating actions taken before an accident or incident occurs.

In July 2018, the FTA published its Public Transportation Agency Safety Plan found at 49 CFR Part 673. Transit operators that receive federal funds (under the FTA’s Urbanized Area Formula Grants) are required to develop Agency Safety Plans (ASPs) that specify how SMS will be implemented over the course of a three-year period. Metro’s ASP has been approved by the Executive Management Team (EMT), Board of Directors, Washington Metrorail Safety Commission (WMSC), and certified with the FTA.

Discussion:

RAIL Benchmarking and Performance

The analysis compares Metro’s performance to peer agencies in four categories: NTD collisions, derailments, employee injuries, and customer injuries. Data are obtained from the National Transit Database (NTD) and the Bureau of Labor Statistics. The most recent comparison year is calendar year 2021 and includes transit properties Southeastern Pennsylvania Transportation Authority, Massachusetts Bay Transportation Authority, Chicago Transit Authority, Bay Area Rapid Transit Authority, and Metropolitan Atlanta Rapid Transit Authority.

Rail collisions include any contact between two rail transit vehicles or any collision that causes substantial damage to Class I or Class II vehicles. When compared to our peers, Metro had the fourth lowest overall rail collision rate, at 0.3 rail collisions per million train revenue miles. Rail collisions decreased from seven to four from calendar year 2020 to calendar year 2021. In calendar year 2021, three of the four collisions occurred in rail yards, while the fourth involved maintenance equipment on the mainline. These collisions involved various pieces of maintenance equipment moving within the storage tracks or during maintenance activity. Note: These collision numbers do not include intentional actions that resulted in a collision between a train and a person.

In calendar year 2021, Metro experienced three derailments of high-rail equipment, such a flat cars and tamper regulators on the mainline and one derailment with a revenue train carrying customers in October 2021. The derailment in October 2021 resulted in the removal of 7000s series cars and the reduction in revenue service while the incident is investigated. When

compared to our peers, Metro was the fifth lowest with 0.3 derailments per million train revenue miles.

The NTD rail employee injury rate is a representation of Metro employees injured and requiring immediate medical transportation from the scene of the incident. When compared to our peers, Metro tied for the lowest rate, with 0.2 injuries per million unlinked passenger trips. Note: These injury criteria are different than the OSHA-recordable injury rate that Metro uses for internal performance metrics). In comparison, the OSHA rail system employee injury rate increased by 33% from 2.7 injuries per 100 employees in calendar year 2020 to 3.6 in calendar year 2021. Overall, the most common injuries involved stress claims and slips, trips, and falls.

The NTD customer injury rate was 0.9 customer injuries per million passenger trips in calendar year 2020. When compared to our peers, Metro was the lowest with 0.9 injures per million unlinked trips. Note: Unlinked trips measure a trip as every time a person boards and alights a vehicle; Linked trips capture the entire journey as one trip, even if there is a transfer in the middle. The NTD customer injury rate was 0.6 customer injuries per million passenger trips in calendar year 2021 compared to 2.0 in calendar year 2020, a 70% decrease. Nearly 93% of the customer injuries were related to slips and falls on escalators or within the rail station. The most frequently noted factors contributing to slip/fall injuries were inattention, distraction, and perceived intoxication.

RAIL Safety Initiatives

Metro is replacing 130 escalators at 32 stations over a seven-year period, starting with the oldest, least reliable escalators. Metro completed the replacement of four units – Brookland, Federal Center, Virginia Square, and Rhode Island Ave. The escalator overhaul is expected to further mitigate the risk of customer injuries.

The 6000-series fleet are being retrofitted with new couplers, which are expected to effectively mitigate the risk of train separations. The fleet experienced two separation incidents where the root cause involved existing couplers. New couplers have been installed in 82 out of a total of 182 railcars. Testing and inspection are completed before the railcar receives approval to return to service.

Software upgrades are continuing for 2000- and 3000-Series railcars to enable use of automated Precision Station Stopping and Stop and Proceed commands in passenger service. Final installation is anticipated in fiscal year 2023. This project is expected to mitigate station and red signal overruns.

As part of radio infrastructure replacement, Metro has advanced below ground station installation to 98% and is continuing above ground construction, fiber installation, bus and rail radio installations, and portable radio distributions.

This project upgrades the radio communications system and enhances safety by improving communications between Metro employees, the Operations Control Centers, and first responders in surrounding jurisdictions throughout the system in the event of an emergency.

Safety Sprints are targeted campaigns designed to help frontline employees understand their role in recognizing, reporting, and mitigating safety risks. A safety sprint occurred from March to May of 2022 and included four one pagers – recognizing safety risk, mitigating safety risk, reporting safety risk, and acting on safety risk. The sprint engaged over 1190 non-represented employees from over 100 different teams across COO.

Metro installed the first automated inspection system to test wheelsets of the 7000-series railcars in real-time. With the first installation now complete, engineers will begin configuration, testing, and commissioning of the system. This is a key component of our strategy for safely returning the 7000-series to service, with the ability to see patterns and trends in wheel migration that enable action to be taken before an incident has the opportunity to occur.

BUS Benchmarking and Performance

The analysis compares Metro's performance to peer agencies in four categories: NTD pedestrian strikes, NTD collision rate, employee injury rate, and NTD customer injury rate. Data are obtained from the National Transit Database (NTD). The most recent comparison year is calendar year 2021 and includes transit properties Southeastern Pennsylvania Transportation Authority, Massachusetts Bay Transportation Authority, Chicago Transit Authority, and Metropolitan Atlanta Rapid Transit Authority.

The NTD pedestrian collision metric (i.e., pedestrians transported from the scene for medical care) has increased calendar year over year. There were eight strikes in calendar year 2020 compared to 13 in calendar year 2021. When compared to our peers, Metro has the third highest pedestrian strike rate of 0.4 strikes per million revenue miles.

The NTD bus collision rate had a 12% year over year increase from calendar year 2020 to calendar year 2021, with a rate of 3.3 NTD collisions per million mile in calendar year 2021 compared to 2.9 in calendar year 2020. The majority of the collisions were rated as non-preventable, which includes cases where the bus was struck in the rear or an adverse vehicle ran a stop sign or red light and struck the bus. When compared to our peers, Metro experienced the third highest collision rate with 4.3 collisions per million revenue miles.

The NTD metric for injuries (both employees and customers) includes only people who require immediate transport from the incident scene for medical attention. When compared to peer agencies, Metro has the fourth highest injury rate for employees. When evaluating employee injuries using OSHA-recordable criteria, Metro's employee injury rate had a 43% year over year

increase, with a rate of 8.0 employee injuries per hundred employees in calendar year 2020 compared to 14.0 in calendar year 2021. The three leading injury categories for Bus employees in calendar year 2021 were stress, assault, and collision.

The customer injury rate had a 17% year over year increase, with a rate of 2.4 customer injuries per million linked trips in calendar year 2021 and 2.0 in calendar year 2020. Both preventable and non-preventable collisions saw significant increases in injury rate. When comparing all sources of customer injuries with our peers, Metro is fourth with 2.0 customer injuries per million unlinked trips.

BUS Safety Initiatives

Metro is preparing a procurement to expand installation of the collision avoidance system to 300 buses. The system provides advance warning of impending collisions, providing bus operators with time to respond before an incident occurs.

Metro implemented the Performance Behavior Analysis program to support consistency in monitoring DriveCam and standardizing management's response to employees. Metro created a coaching manual to focus on providing best practices for effectively coaching operators that trigger DriveCam events. Additionally, Bus Transportation's Safety Coordinator collaborates with division management to identify high-risk operators (with excessive events), conduct joint coaching sessions, and suggest further corrective action, as needed.

BUS has partnered with the Metro Transit Police Department to mitigate the risk of Bus Operator assaults. The risk mitigation strategy includes:

- Bus operator de-escalation and conflict resolution training
- Deployment of officers to ride and follow buses along high-risk lines
- Patrol of high-risk bus bays during all revenue hours
- Deployment of High Intensity Targeted Enforcement (HITEs) to problem stops

The following safety equipment has been standardized on buses:

- Silent alarm and protective shield
- Pedestrian strobe lights with continuous flashing on top of the buses
- Deceleration/servicing lights (flashing lights while decelerating)
- High-mounted mirrors

Recruitment is currently underway for the Program Manager, Safety and Performance Improvement position to lead strategic safety efforts. This individual leads the team responsible for SMS implementation within BUS.

The next series of buses will include 7” brake lights for increased visibility in addition to:

- Exterior side sensors / cameras (2) to monitor both sides of the bus for pedestrians, vehicles, and objects in the path of a turn
- Windshield mount sensor (1) to monitor the front path of the bus for following distance and other objection in a direct path of a bus
- Interior driver alert display (3) that provides visual alert when any of the sensors detect a possible collision

A small scale five-bus test at Four Mile Run (VA) garage implemented in fiscal year 2020 shows a decrease in the occurrences of near misses with pedestrians. The overall improvement in operator behavior resulted in a 25% reduction in vehicular and pedestrian alerts.

MetroAccess Benchmarking and Performance

The analysis compares Metro’s performance to peer agencies in two categories: collision rate and NTD customer injury rate. Data are obtained from the National Transit Database (NTD). The most recent comparison year is calendar year 2021 and includes transit properties Southeastern Pennsylvania Transportation Authority, Massachusetts Bay Transportation Authority, Chicago Transit Authority, and Metropolitan Atlanta Rapid Transit Authority.

The overall MetroAccess collision rate had a 7% year over year increase, with a rate of 1.6 collisions per million miles (i.e., revenue and non-revenue) compared to 1.5 collisions per million miles in calendar year 2020. The majority of collisions were the result of a non-preventable action, such as when the MetroAccess vehicle was rear-ended while stopped. When compared to our peers, Metro’s rate was the lowest among transit agencies with 1.0 major collisions per million revenue miles.

The NTD customer injury rate increased 60% year over year, with a rate of 1.6 customer injuries per one hundred thousand linked trips in calendar year 2021 compared to 1.0 customer injuries per one hundred thousand in calendar year 2020. Injuries were primarily related to slip/trip/falls during boarding/alighting. When comparing all sources of customer injuries to our peers, Metro was the lowest with 0.6 customer injuries per one hundred thousand trips in calendar year 2021.

MetroAccess Safety Initiatives

In preparation for SMS implementation, MetroAccess is requiring contractors to align their local safety committees with the policies and processes being implemented within Metro. The safety committees serve as the operating rhythm for the proactive identification, assessment, and mitigation of safety

risks as part of SMS.

MetroAccess continues to implement the psychological safety campaign, “Safety is No Accident.” Messaging and information are aimed at supervisors, managers and leaders to enable them to create and sustain a psychologically safe environment where front line staff are free to admit mistakes, provide feedback, and share suggestions without fear of ridicule or being shut down.

In response to collision incidents and related injuries, a messaging campaign was launched aimed at operators to provide tactical safety messaging around the three pillars of MetroAccess customer injury prevention – safe driving, safe securement, and proper door-to-door service.

As part of implementing data driven, proactive risk management, MetroAccess is reorganizing the observation and complaint reporting forms to capture and trend information. This will continuously improve MetroAccess’ ability to detect trending safety risks.

Securement of scooters and wheelchairs is a critical safety function of MetroAccess. With sedans being introduced to the fleet and fewer riders during the pandemic, MetroAccess identified loss of proficiency as a safety risk. In response, MetroAccess increased re-certification to twice per year (once every six months), effectively mitigating this risk before an incident had the opportunity to occur.

FUNDING IMPACT:

Development and implementation of SMS has already been accounted for in the budget. This presentation is a report on the progress being made.	
Project Manager:	Theresa Impastato
Project Department/Office:	Department of Safety (SAFE)

TIMELINE:

Previous Actions	As documented in the Agency Safety Plan (ASP).
Anticipated actions after presentation	Implementation of the Safety Management System throughout Metro is planned as a multi-year process. No change to the timeline is proposed. The Department of Operations groups are prioritized for baseline implementation.

Metro Safety Initiatives

Safety and Operations Committee
June 9, 2022

Background

"Before SMS was made complex by the consultants and process people, it was meant to do one simple thing — allocate resources against risk. I would suggest that we measure that instead of counting our meetings and posters."

- William R. Voss, 2012
Flight Safety Foundation President (ret.)

Step 1: Identify Risks

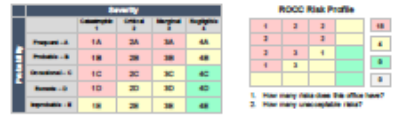
Metro employees submit potential safety risks to their supervisor or through safety reporting mechanisms

Step 2: Assess Risk

Safety Risk Coordinators review submissions, gather necessary data, and facilitate risk assessment with Local or Department Safety Committees

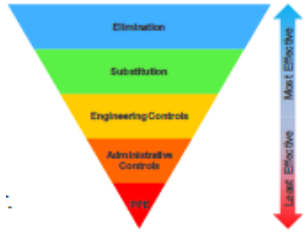
Step 3: Current Risk Profile

Once assessed, the safety risk is prioritized and included in the current risk profile, made visible to everyone through the SMS dashboard



Step 4: Mitigate Risks

The Safety Risk Coordinator, Safety Committee, and necessary subject matter experts determine the actions required to mitigate the safety risk as low as reasonably practicable

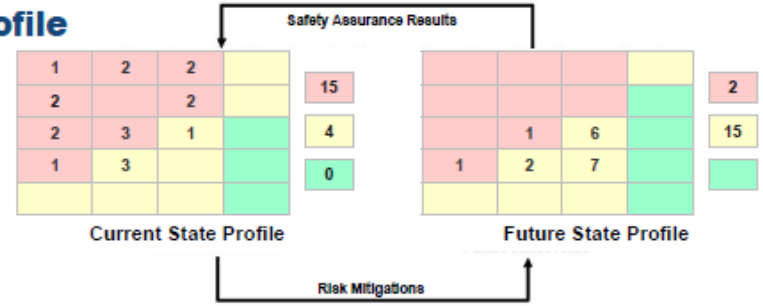


- Physically remove the risk
- Avoid the risk
- Improve conditions to reduce risk
- Improve how people work to reduce risk
- Protect against exposure

Step 5: Future Risk Profile

Safety Targets are set and the future state profile is established

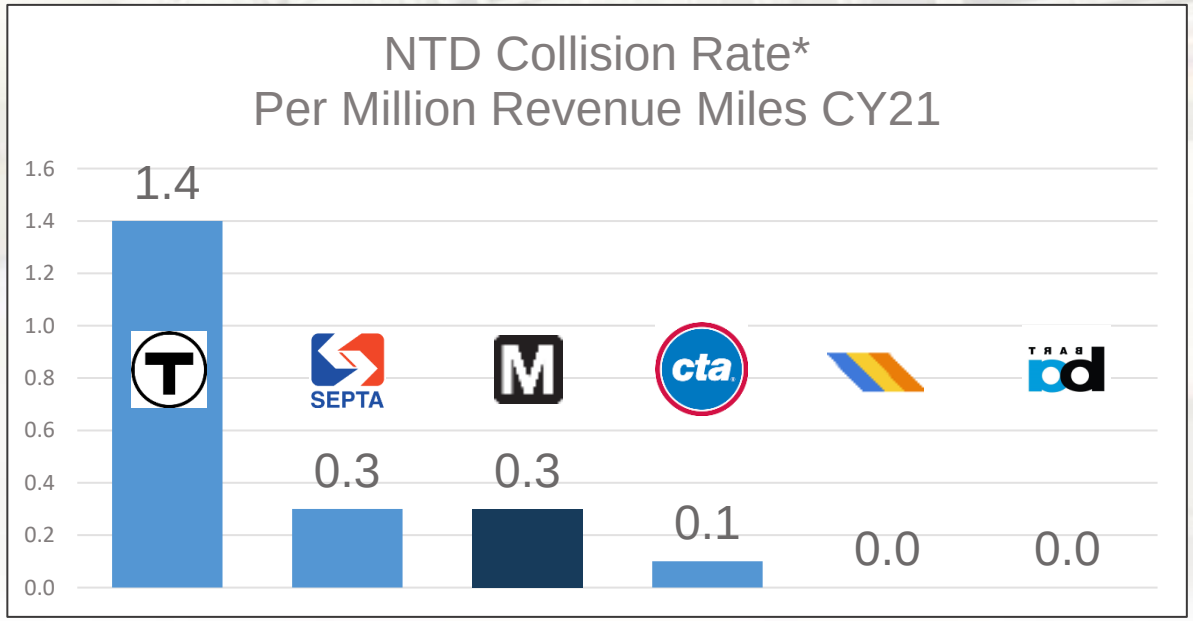
The Safety Committee tracks mitigating actions and adjusts the risk rating based on progress

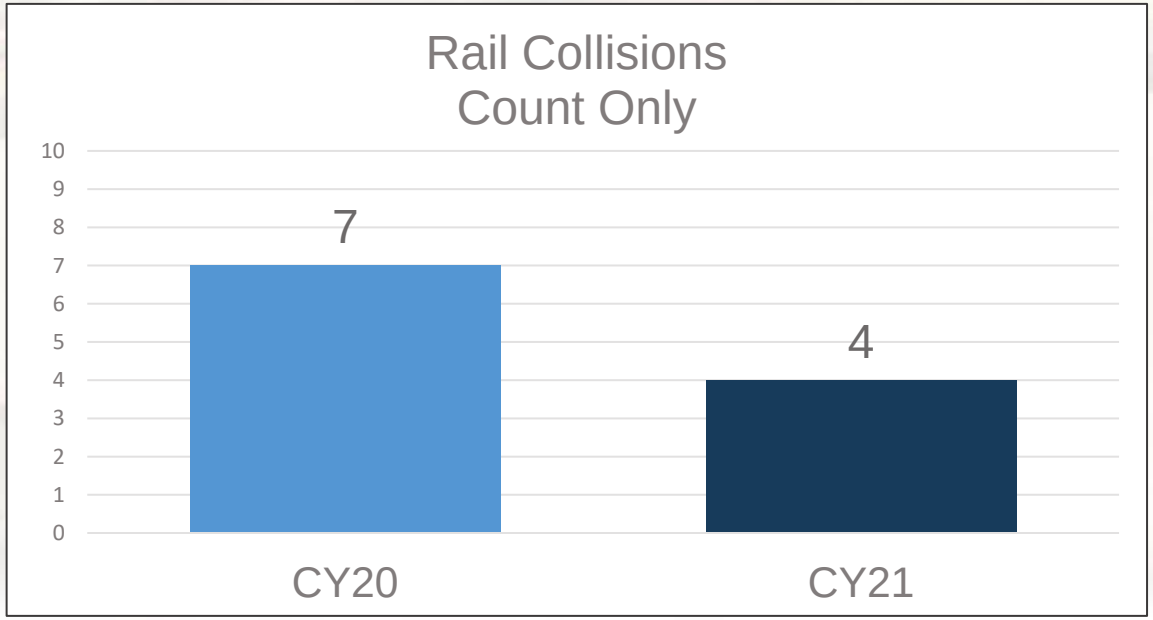


Step 6: Verification of Effectiveness

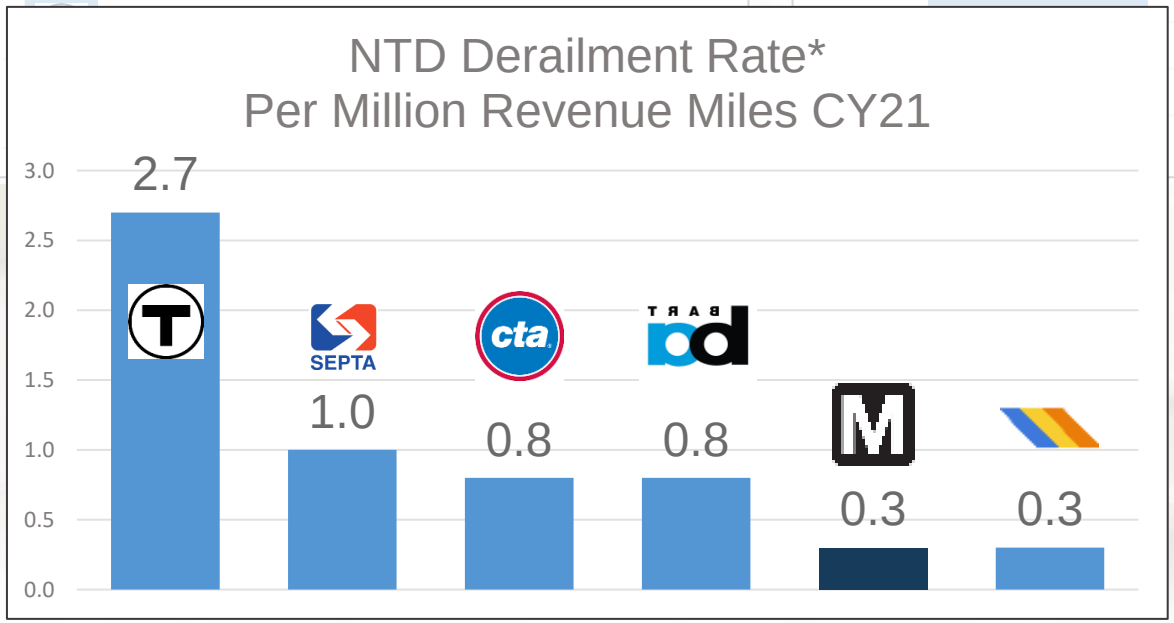
The Safety Risk Coordinator and Safety Committee verify compliance and measure effectiveness through data analysis. Additional mitigations are developed and implemented as needed.

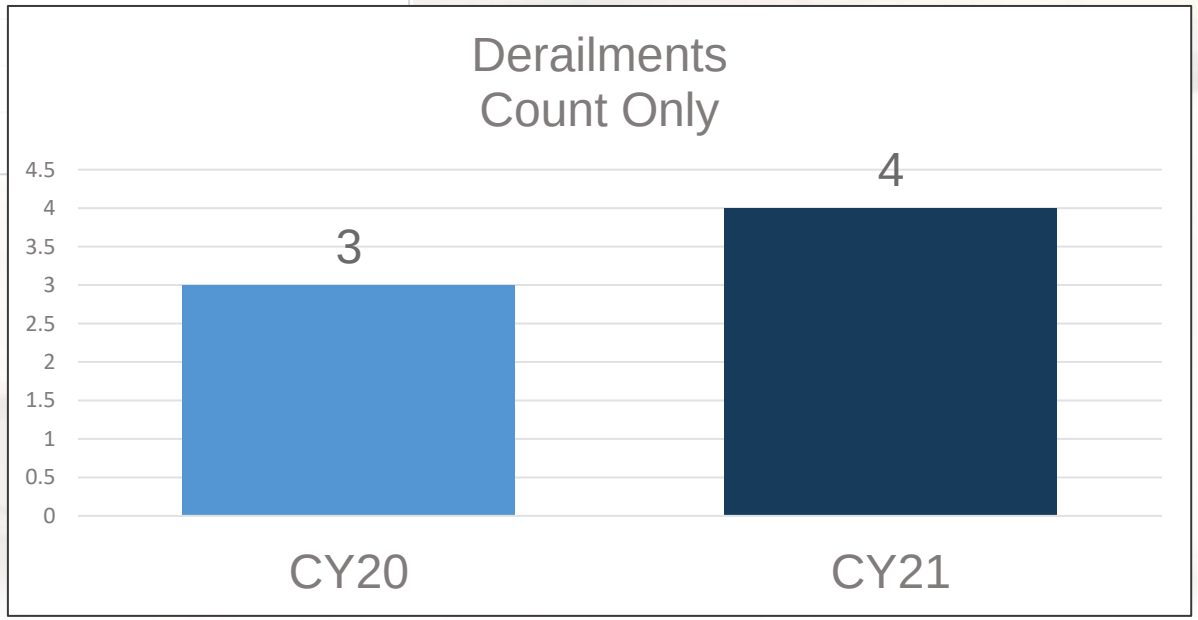
Rail Safety Initiatives – Performance and Benchmarking



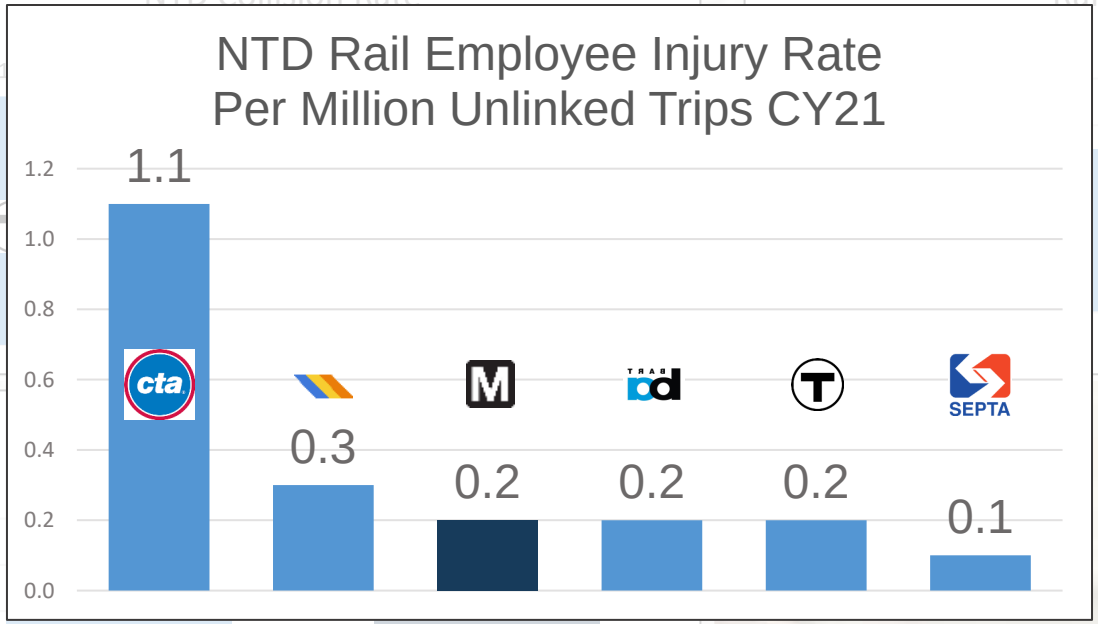


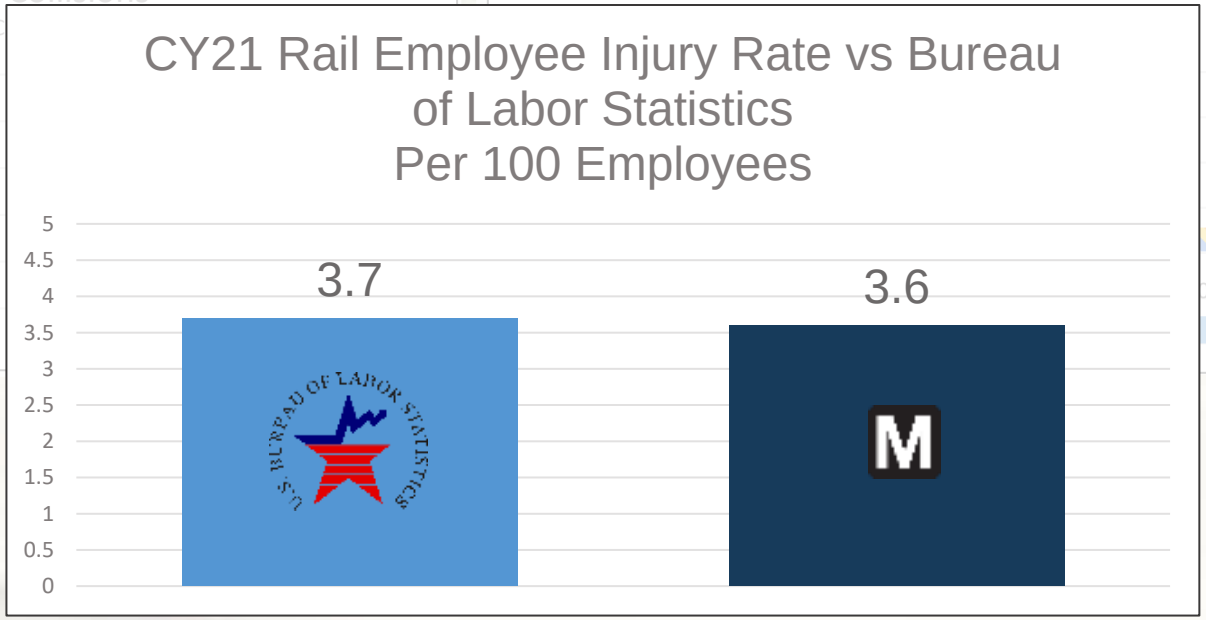
Rail Safety Initiatives – Performance and Benchmarking

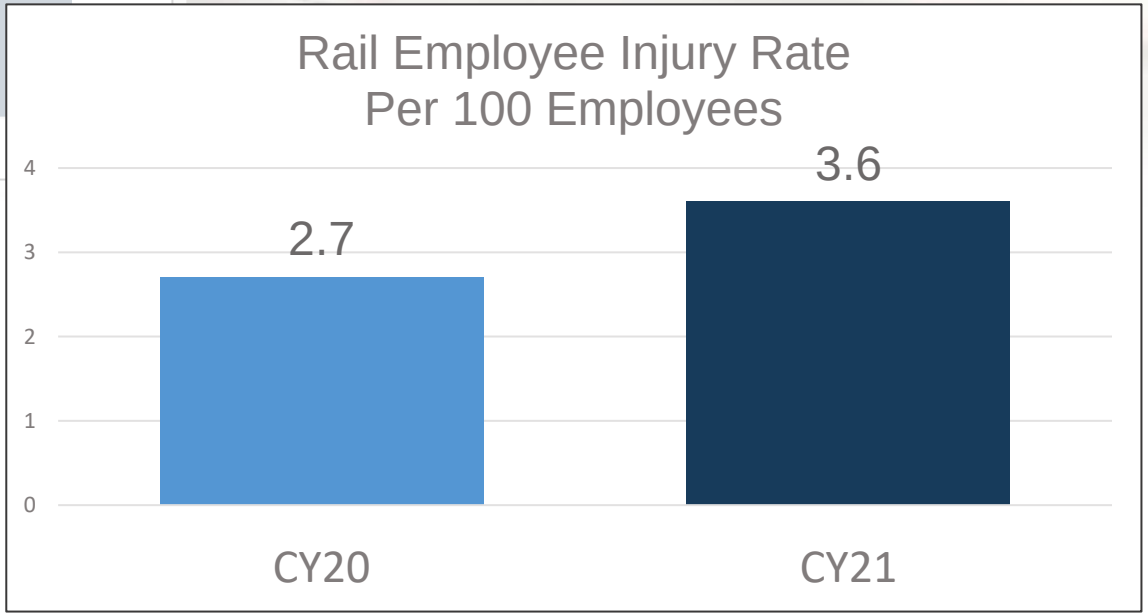




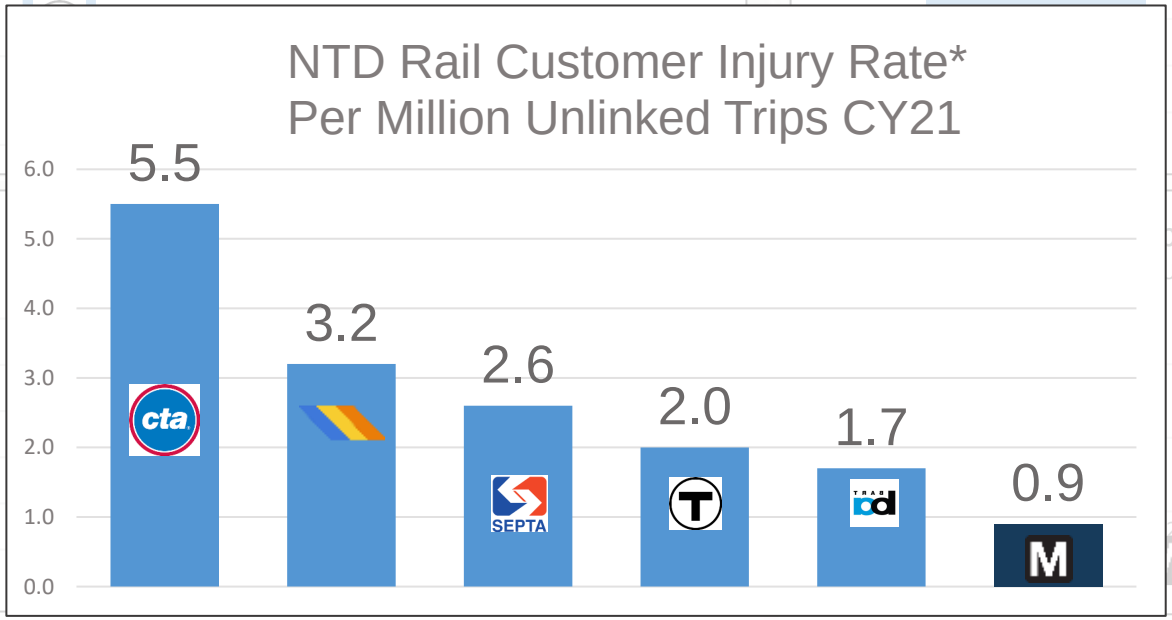
Rail Safety Initiatives – Performance and Benchmarking

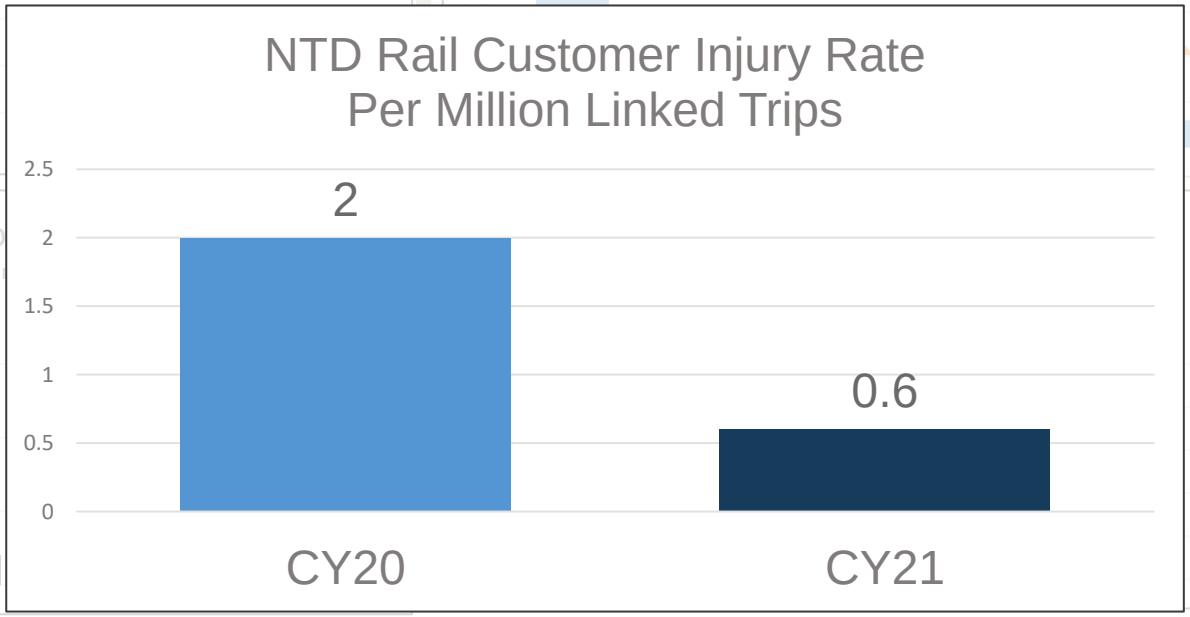






Rail Safety Initiatives – Performance and Benchmarking

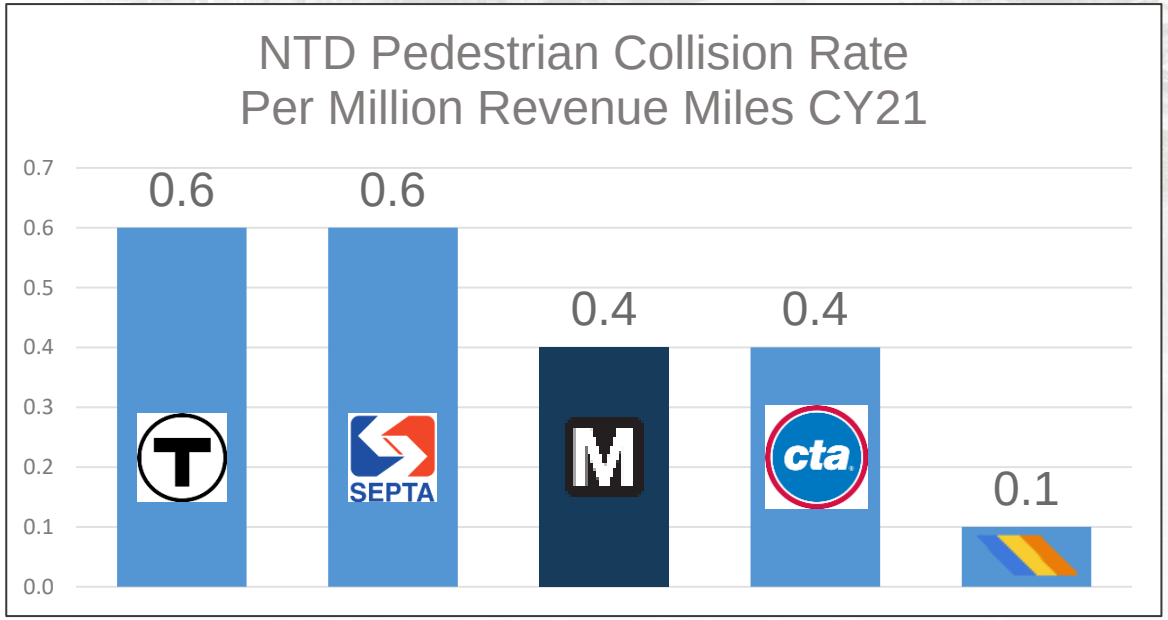


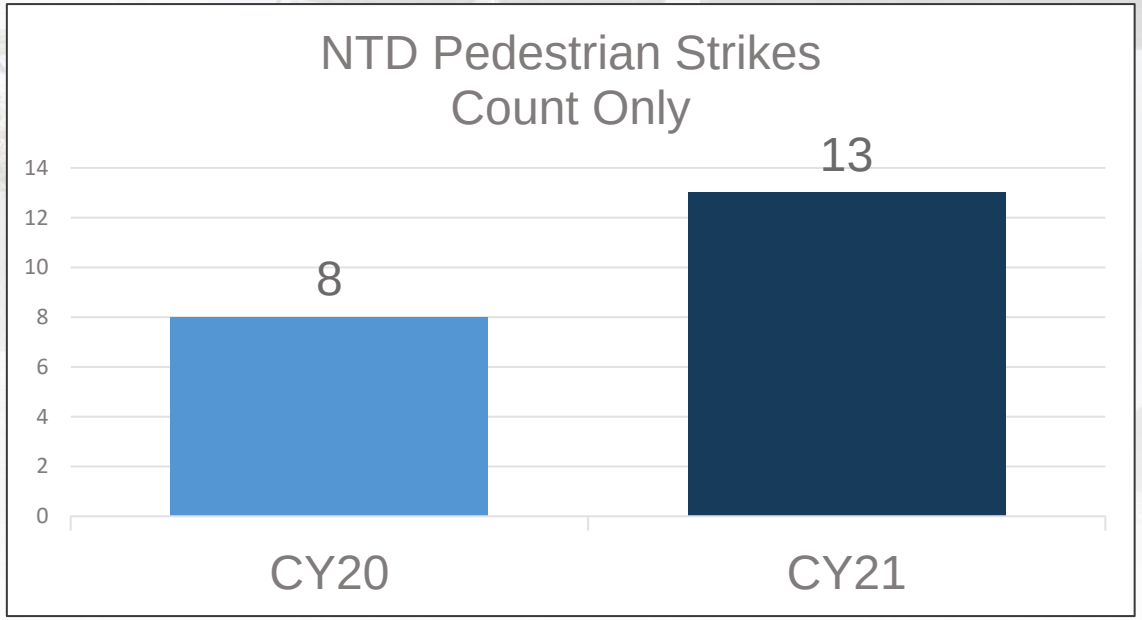


Rail Safety Initiatives

- New couplers for 6000 series fleet
- Software upgrades for 2000 and 3000 series fleets
- Radio infrastructure replacement
- Escalator rehabilitation and replacement
- “Safety Sprint” to operationalize safety practices
- Automated wheel inspection system

Bus Safety Initiatives – Performance and Benchmarking





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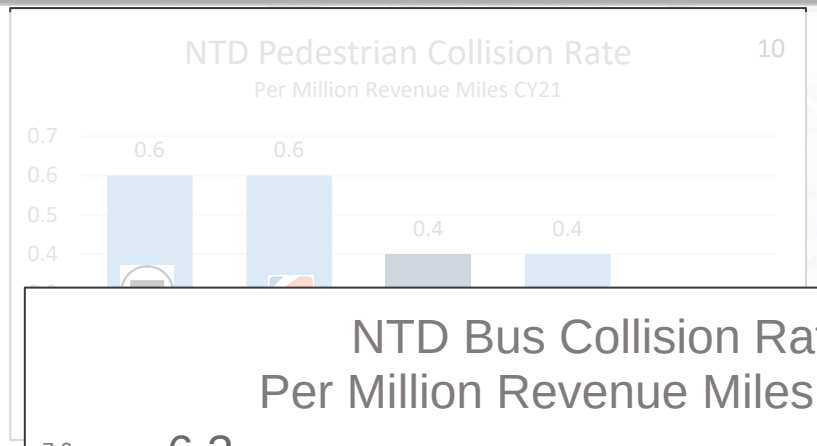
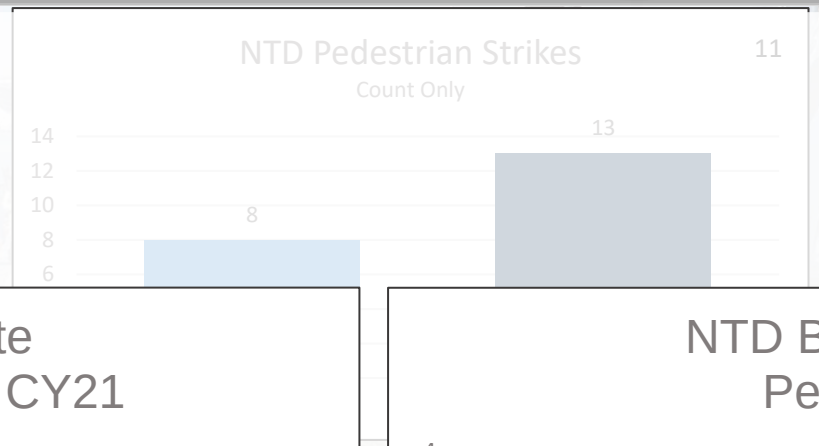
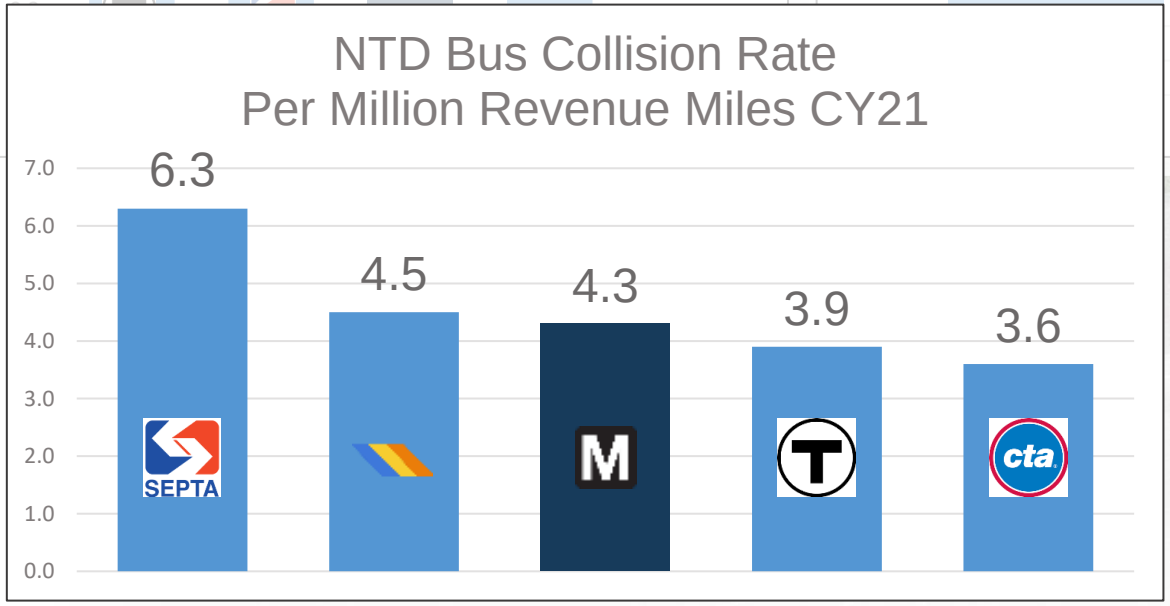
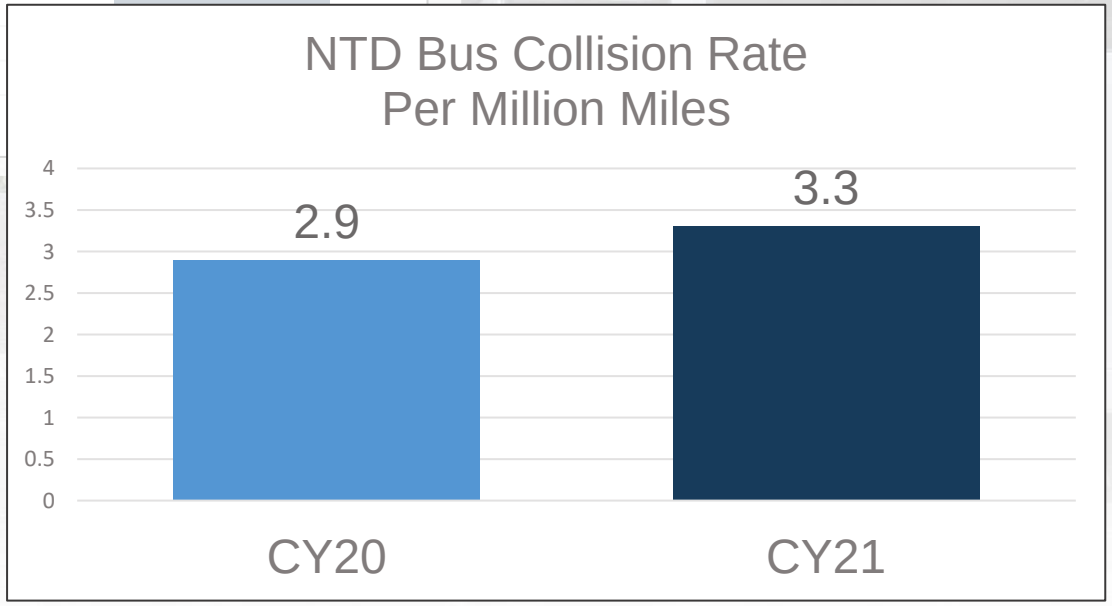
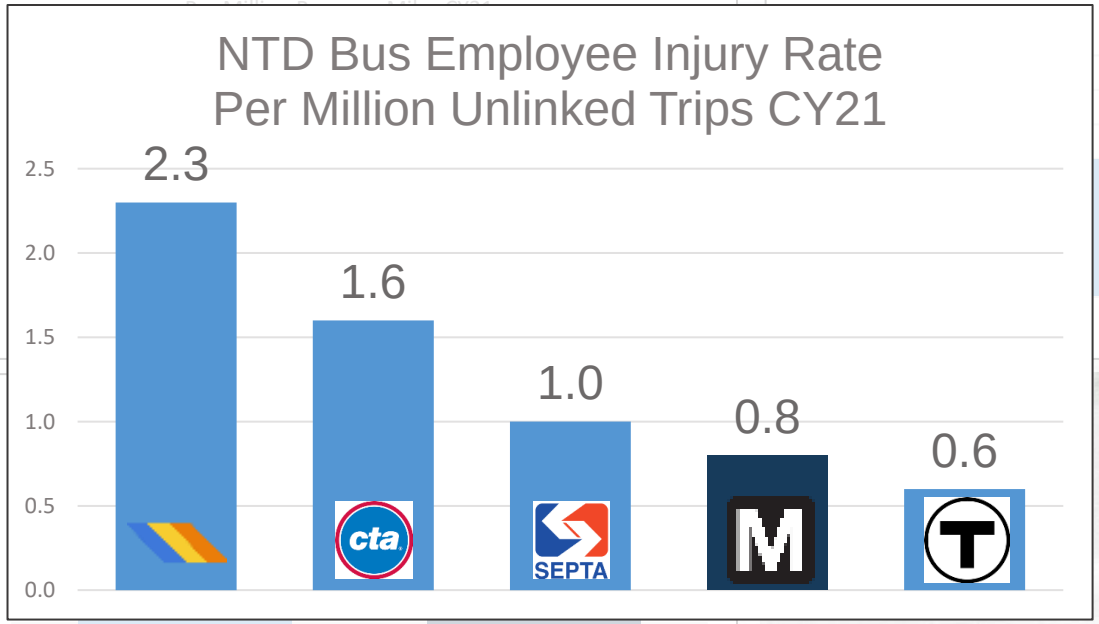


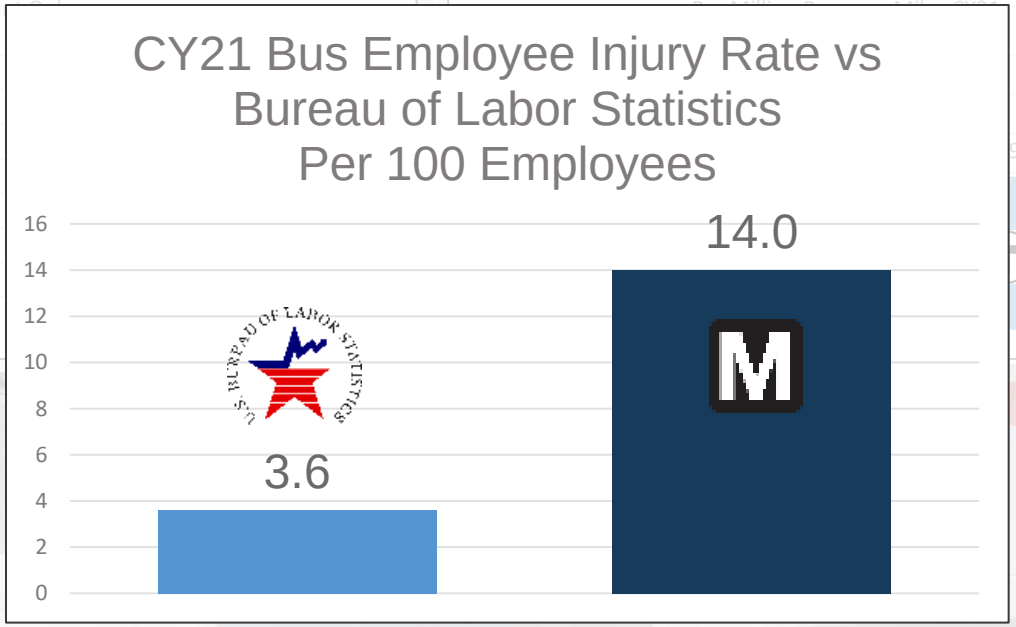


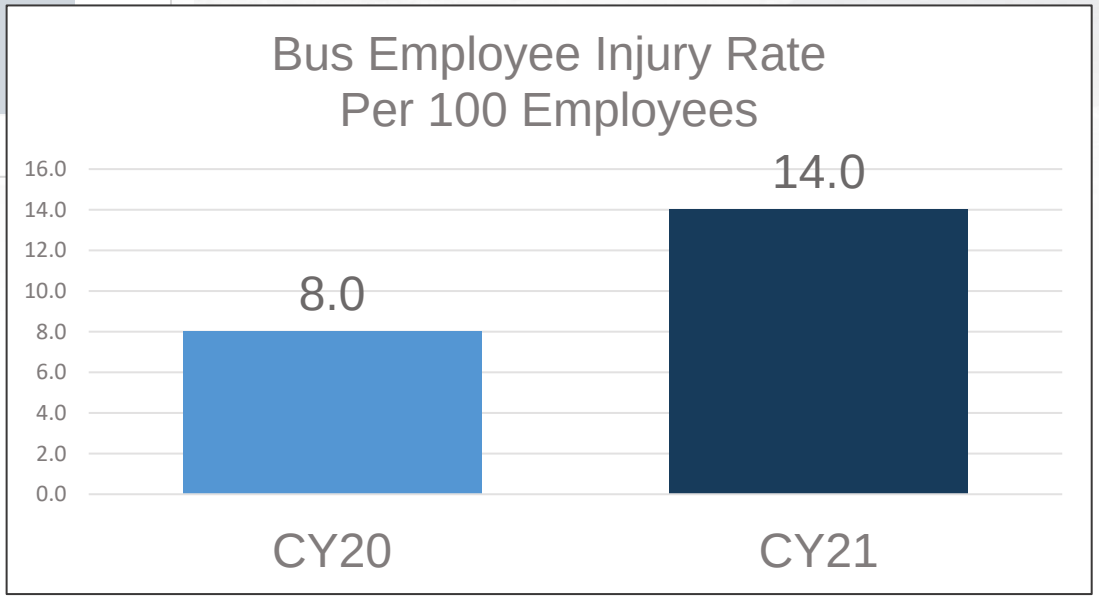




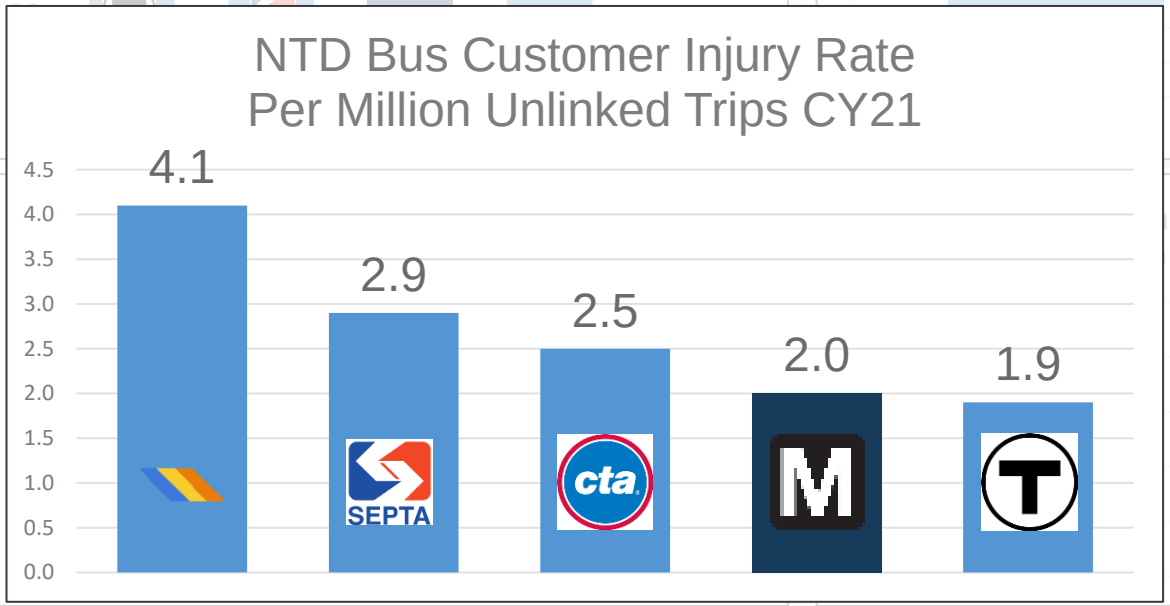
Bus Safety Initiatives – Performance and Benchmarking

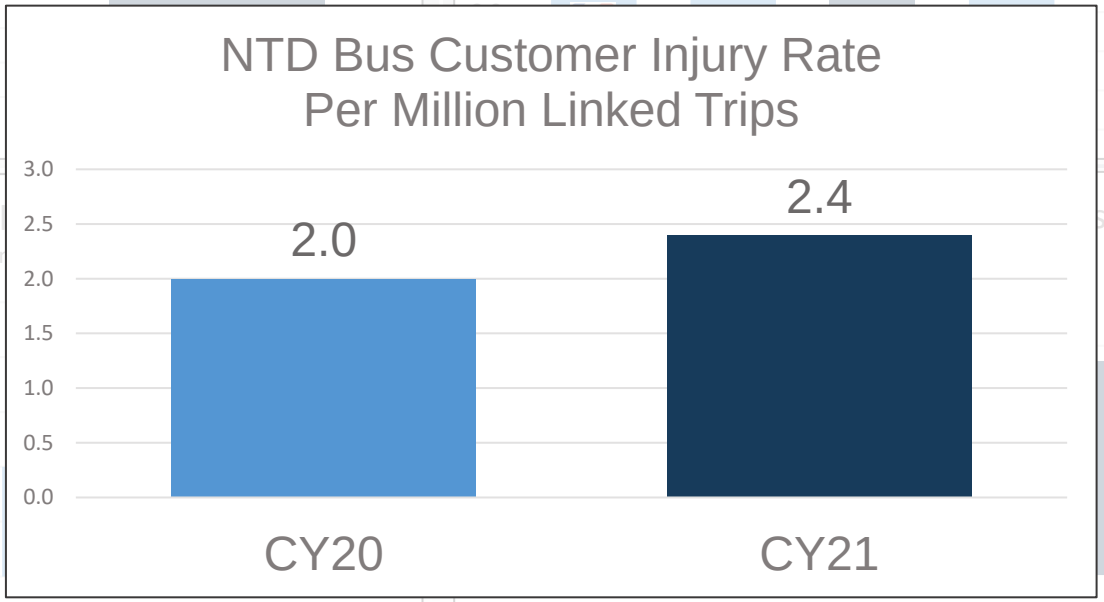






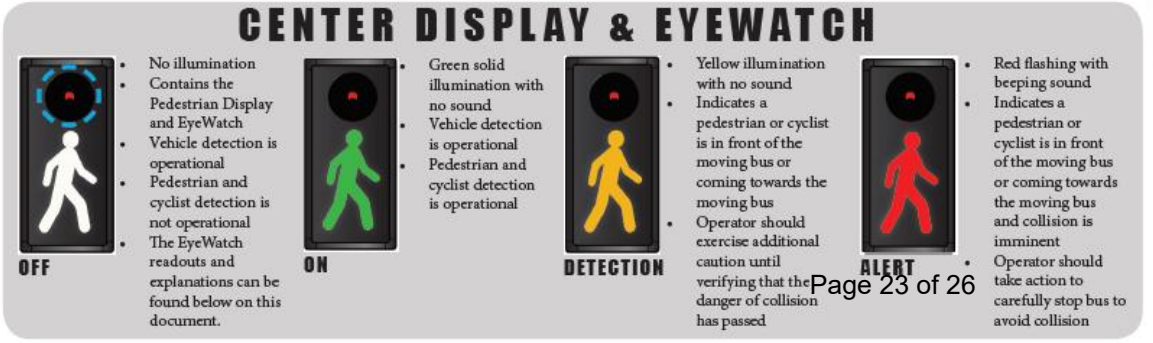
Bus Safety Initiatives – Performance and Benchmarking



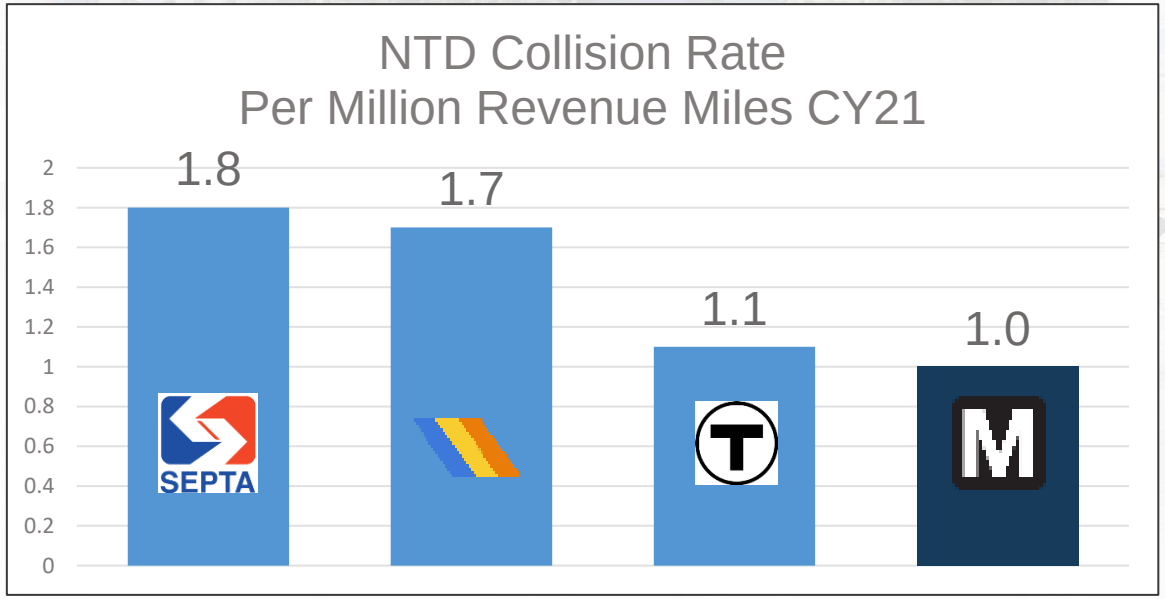


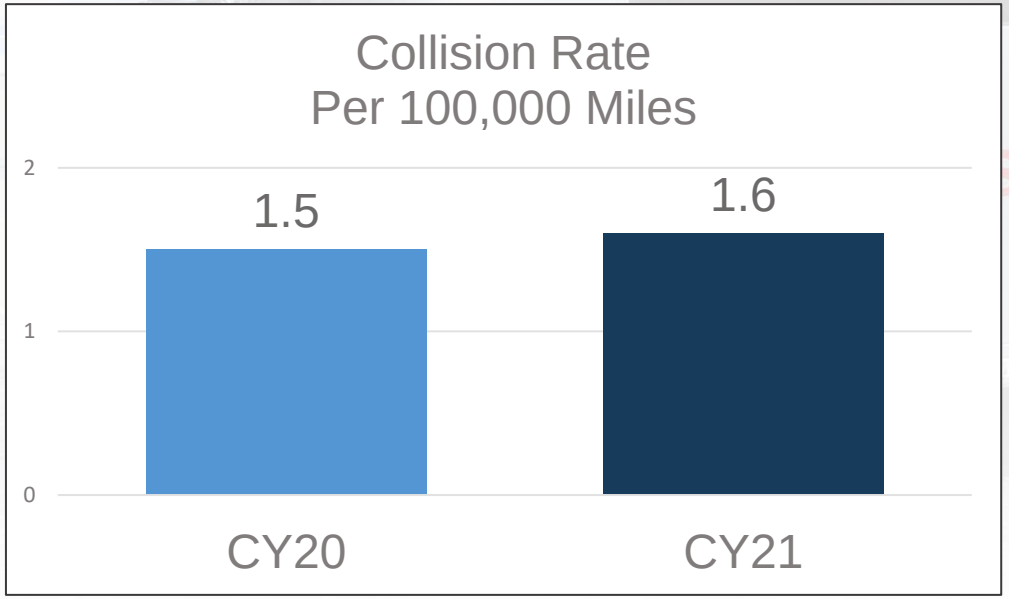
Bus Safety Initiatives

- Expand the Collision Avoidance System
- Analyze DriveCam data to identify and address at-risk behaviors
- Partner with MTPD to mitigate bus operator assaults
- Standardize safety equipment on all buses
- Staff team required to implement SMS
- Embed safety requirements in next bus series procurement

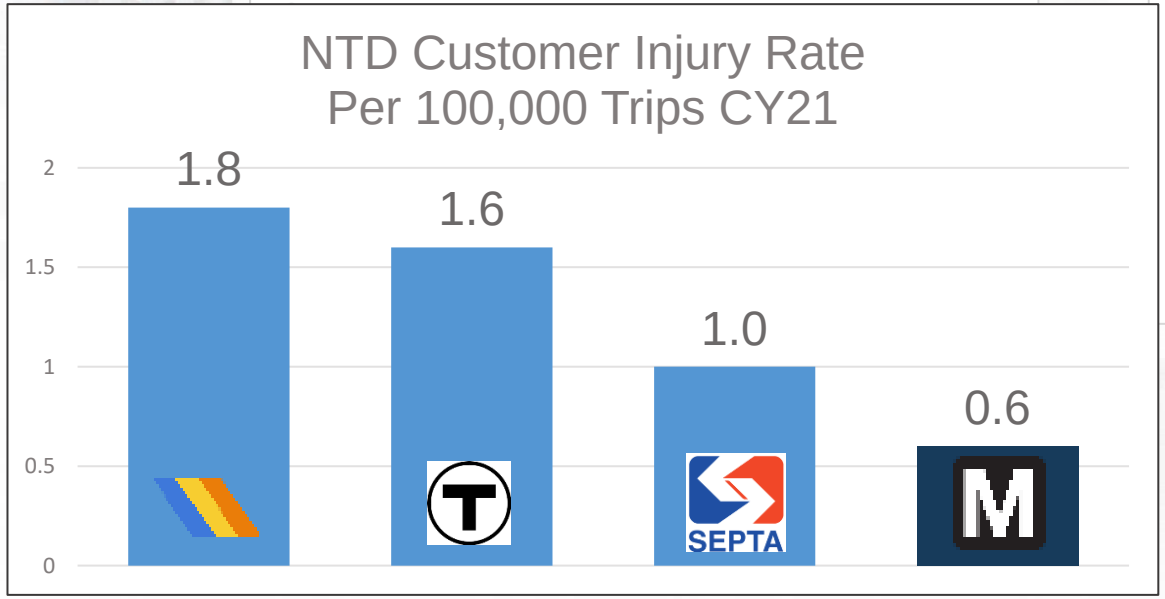


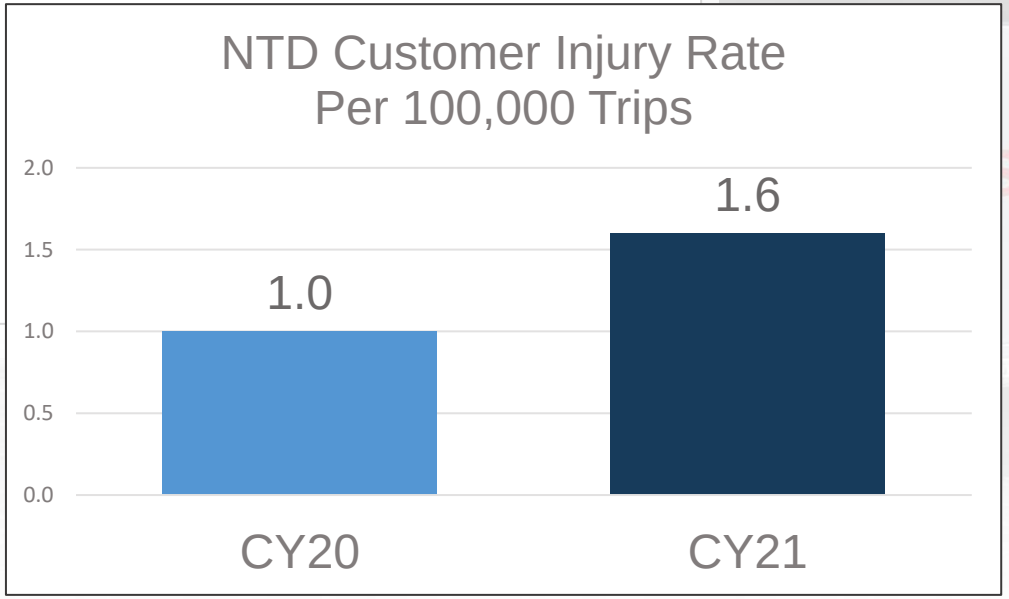
MetroAccess Performance & Benchmarking





MetroAccess Performance & Benchmarking





MetroAccess Safety Initiatives

- Align WMATA and contractor safety committees
- Continue psychological safety campaign, “Safety is No Accident”
- Improve data collection and analysis to proactively manage risks
- Continue tactical safety campaign targeting collisions
- Standardize and increase wheelchair/scooter securement training