



Customer Service, Operations and Security Committee

Information Item III-C

June 8, 2017

**SafeTrack and FY18 Preventive
Maintenance and Major Capital Projects**

Washington Metropolitan Area Transit Authority

Board Action/Information Summary

☐ Action ☒ Information

MEAD Number:
201879

Resolution:
☐ Yes ☒ No

TITLE:

SafeTrack Achievements & FY18 Maintenance Plan

PRESENTATION SUMMARY:

SafeTrack is the most aggressive track renewal program in Metro's history, a comprehensive maintenance effort that accelerated three years' worth of work into one year. The final report will show the actual results through Surge 14 and estimates for the final two surges. To sustain the gains made under SafeTrack, staff will engage in more preventive maintenance and a robust capital program.

PURPOSE:

To update the Board on completion of the SafeTrack program and share WMATA's new, more robust, preventative maintenance and capital programs for FY18 that will drive sustained improvements to reliability of the Metrorail infrastructure.

DESCRIPTION:

SafeTrack program is almost complete and has achieved its goal of rehabilitating the track and structures infrastructure. Six preventive maintenance programs have been defined, with targets set for reduction of incidents by FY19. In addition, the FY18 Rail Infrastructure Capital Program has been developed and highlights will be reviewed with the Board prior to being made public.

Key Highlights:

- SafeTrack work is on schedule and productivity rates have met or exceeded planned
- 14 of the 16 Safety Surges have been completed
- Over 50,000 ties will have been replaced, more than past three years combined
- Six preventive maintenance programs that will be carried out during non-passenger service hours overnight

- FY18 Rail Infrastructure Capital Program highlights, including three extended shutdowns
- Improvements to work planning and track access allocation

Background and History:

SafeTrack was developed to expedite critical track work needed to replace failed track components. It was developed in spring 2016, finalized on May 19, following input from the Federal Transit Administration (FTA) and local jurisdictions and started on June 3. The SafeTrack program significantly expanded maintenance time on weekends, weeknights and midday hours and included 15 "Safety Surges" – long-duration track outages for major projects in key parts of the system. The jurisdictions and the public have been supportive of the focused, sustained effort to repair the tracks despite the severe impacts to service.

In October 2016 the Board reviewed the need for an increase in the time allocated for maintenance crews nightly work window. It was determined that in order to meet the maintenance needs of the organization to improve rail service reliability, available work windows needed to increase, allowing for a more productive work window. The increase in the maintenance work windows coupled with the generation of six new preventive maintenance programs will sustainably improve service reliability.

The new Maintenance of Way Engineering (MOWE) department has been established to design and support the execution of WMATA's new preventive maintenance program, presented to the Board in November 2016. MOWE has also been working to improve WMATA's annual capital program planning with the intent of maximizing usage of the non-passenger windows, extended with the service change effective June 25, 2017, and weekend track outages to ensure more efficient and comprehensive coordination of major programs requiring track access.

Discussion:

SafeTrack: Overall, the SafeTrack program has been very successful in terms of the safety performance, the work completed and the schedule achieved. The past year has been the most aggressive renewal program of WMATA's history and it was achieved through tremendous hard work and cooperation across the region – from our employees, our riders and our stakeholders. The sustained cooperation and long duration outages enabled the work crews to significantly improve productivity, in both schedule and cost. In particular, the team focused energy on improving the way we work to achieve better quality and higher productivity than ever before achieved. WMATA executed 3.7x the normal amount of track work at a cost of ~2.4x of the typical annual budget, resulting in ~50

percent improvement in cost efficiency. Work was also completed safely, with a cumulative Employee Injury Rate (EIR) of 2.4, less than half of the WMATA overall EIR for the same time period.

The most important lesson of all from SafeTrack is how vital it is to maintain a proactive capital renewal and maintenance program. In order to sustain the gains made, we are making changes to our procedures and our organization, and most importantly to how we plan and manage work to keep the system safe and reliable. Using many of these procedures and new processes, WMATA will increase efficiency within the newly expanded maintenance windows, decrease the impact to customers due to infrastructure defects and strategically plan maintenance and capital programs to maximize efficient allocation of track access.

New Preventive Maintenance Programs (PM): The six PM programs that Metro will initiate after SafeTrack were largely presented to the Board in November 2016. During the development of the programs, there were some changes made and the new list of defined PM programs is:

- Traction Power Cable Meggering
- Earth to Ground Stray Current Testing
- Switch Maintenance (previously called Interlocking Component Maintenance)
- Torqueing (new program, not previously presented to the board)
- Track Geometry (previously called Systemwide Tamping and Surfacing)
- Trackbed Cleaning (new program, not previously presented to the board)

Note: Mechanical Joint Maintenance was incorporated into the Track Geometry and Torqueing programs, to increase efficiency of the crews and reduce resources required to execute the PM program. Joints on ballasted track were incorporated into Track Geometry and joints in direct fixation track were incorporated into the Torqueing program.

These PM programs are planned for non-passenger service hours (the overnight maintenance window). Weekend single-tracking operations, weekend shutdowns and weeknight early outs on line segments will be primarily focused on capital work that involves the replacement or rehabilitation of wayside components and infrastructure. A robust and well-resourced PM program is critical to ensure the long-term safety and reliability of Metro's aging infrastructure.

Details for each new PM program are noted below.

Traction Power Cable Meggering: This PM program is intended to identify high voltage cables that no longer maintain the ability to adequately insulate electrical current. A majority of traction power cables are not visible as they are carried in conduit. As such, defective cables cannot be

identified through visual inspection. Meggering a traction power cable is a time-intensive effort, as it requires manually disabling all of the breakers that provide power to the cable being tested, and then disconnecting the cable from the breaker housing and its point of connection along the wayside. Degraded traction power cables are a significant risk and the program is designed to identify those cables prior to failure.

The program is based on meggering cables seven years after installation and then every four years thereafter. In FY18, WMATA plans to megger 3024 cables. It will take approximately three years to complete one full pass of the system. The goal of the program is to get to zero cable fires per year; in the last two years (FY16 and FY17), we have experienced seven cable fires.

Earth to Ground Stray Current Testing: This PM program is intended to identify defective components within the negative side (return circuit, which carries the electrical current from the running rails back to the negative switch board in the traction power substation) of the traction power circuit. Particularly in wet areas of the tunnel system, stray current is the root cause of many defects that negatively impact safe and reliable service. Stray current significantly accelerates the degradation of track components to include direct fixation fasteners, the rail clips which secure the rail to the direct fixation fastener and the anchor bolts which secure the direct fixation fastener to the tunnel floor. Stray current is also a primary cause of track circuit failures and direct fixation fastener fires. Similar to meggering a traction power cable, this time-intensive PM program entails manually disabling all power in the area and further disassembling rail joints within the track so test voltage can be inducted into the circuit in order to identify where the current is not following its intended path.

The program is based on a 4-5 year testing cycle, with testing conducted bi-weekly and corrective repairs made based on the results within 90 days and then re-testing the area to confirm electrical isolation. In FY18, WMATA plans to test 25 areas, defined as an interlocking and an adjacent mainline track segment (to the next interlocking). It will take approximately four years to complete one full pass of the system. The goal of the program is to get to zero stray current incidents per year; in the last two years (FY16 and FY17), we have experienced seven incidents (e.g. arcing stud bolts).

Switch Maintenance: This PM program primarily consists of switch point grinding and frog grinding and welding to ensure these high impact track components remain in a state of good repair. Regular grinding of frog will prolong the useful life of the component and reduce the risk of cracked and condemned frogs. Weld repairs will improve the running profile over the wheel transfer areas reducing the impact loading on the frog and track

components (such as frog bolts) which in turn reduces the risk of broken bolts, broken fastenings or rail defects within the turnout. In addition to the grinding and welding, ATC will also use the time scheduled under this program to do more thorough inspection and cleaning of the ATC components in the interlocking, further reducing likelihood of incidents limiting use of the interlocking.

In FY18, WMATA will grind and weld the most critical switches, located at the terminals and the junctions where lines merge. In addition, detailed inspections will be carried out for all mainline switches. Based on initial estimates, it will require over six years to complete one pass of the system; the data from the first round of detailed inspection by welding crew, combined with productivity information from first six months of the program will be used to determine if six years is adequate frequency or if additional resources are needed.

Torqueing: Torqueing involves tightening the nuts and bolts that hold the rail fasteners in place in direct fixation track. Tightening the connection reduces movement and vibration within the track components, which will extend the useful life of the track components (particularly fasteners and grout pads), and enable better track geometry.

In addition, this program includes joint maintenance for rail joints on direct fixation track. Maintaining a smooth running-surface between the two rails will help ensure good track geometry, minimize the vertical distortion and rail end battering. Increased levels of vibration at rail joints due to poor track geometry or the discontinuity of running surface will cause the rails and fastening system to deteriorate more quickly.

The program is based on torqueing all direct fixation track annually, with additional quarterly torqueing of tight curves.

Track Geometry: This PM is intended to improve track geometry (horizontal and vertical alignment of the rails) which will improve ride quality and extend the life of ties through tamping and surfacing (T&S). T&S is the most fundamental and critical PM activity for ballasted track. T&S entails using a piece of computerized track equipment to adjust the vertical (profile) and horizontal (alignment) geometry of the track to restore the track to its as-built geometry. The tamping equipment lifts the track and vibrates ballast under the tie to ensure adequate tie support. Sound tie support extends the life of the tie and further reduces rail breaks as the rail is less prone to severe bending stress. While using the tamping equipment, ballast is often added to the track to attain the proper vertical (profile) geometry and to ensure the tie is properly supported on all sides. Metro maintains 99 miles of ballasted track. In addition to mainline track, all ballasted switches in mainline track would be tamped and surfaced to ensure proper support

of the switch area. A primary cause of track circuit failures in ballasted switches is poor ballast support. If the switch is not properly supported (from the insulated joint leading up to the point of switch through the crossing), it is probable that the track circuit will fail because the track circuit is reliant on the proper alignment of the many components of a railroad switch. Metro maintains 314 mainline switches, of which approximately 200 are in ballasted track.

In addition, this program includes joint maintenance for rail joints on ballasted track. Maintaining a smooth-running surface between the two rails will help ensure good track geometry, minimize the vertical distortion and rail end battering. Increased levels of vibration at rail joints due to poor track geometry or the discontinuity of running surface will cause the ties and rails to deteriorate more quickly.

In FY18, WMATA plans to tamp all 99 miles of ballasted track, including all ballasted special trackwork. WMATA will also collect more data on the stability of the track geometry after tamping to confirm frequency for FY19 and beyond.

Trackbed Cleaning: WMATA plans to continue the focused cleaning crew started under SafeTrack on the Red Line, which is necessary to reduce risk of fires from arcing insulators and debris. This program will focus on the continuous cleaning of the underground portions of the Red Line and cleaning areas in advance of stray current testing to improve accuracy of the results.

FY18 Rail Infrastructure Capital Program: In order to ensure the system does not require another emergency program of the scope or scale of SafeTrack, it is necessary to establish a robust capital program, one that is more aggressive than what was executed pre-SafeTrack. Annual track access needs vary depending upon the nature and volume of the work required that year, particularly for specific replacement projects and their physical constraints, such as the structural repairs to Rhode Island Avenue station or the replacement of an interlocking. WMATA is finalizing the capital plan for FY18 and has scheduled the capital work based upon:

1. Fencing-off high passenger volume times, such as Cherry Blossom Festival
2. Maximizing weekend work to take advantage of longer work windows and avoid disrupting rush-hour commutes
3. Reducing the number of track outages necessary by coordinating work within the same outage ("piggy-backing") where safe and efficient

4. Limiting daytime work done during the week, including midday work (10am-2pm) and evening single-tracking (8pm)
5. Planning strategic extended outages, where benefits gained in terms of efficiency or quality of the work warrant extended track time beyond a 3-day weekend.

In total, the FY18 plan has approximately 120 weekend trackwork events, 30% of which include piggy-backed work crews. In addition, three extended outages are planned to address critical work, and are scheduled when ridership is at its lowest points during the year.

The three projects have been scheduled during times of the year when ridership is lowest.

1. Summer: Rebuild interlocking and grout pads outside Branch Avenue

- Date: August 5-20, 2017
- Area Affected: Branch Avenue and Suitland stations will be closed. Green Line service will operate normally from Naylor Road to Greenbelt

2. Fall: Rebuild interlocking outside Takoma Station & replace ties Ft. Totten to Takoma

- Date: November 25-December 10, 2017 (10 commuting days)
- Area Affected: Takoma station will be closed. During rush hours, Red Line service will run every eight minutes between Glenmont and Silver Spring, every eight minutes between Shady Grove and Fort Totten, and every four minutes between Grosvenor & NoMa-Gallaudet

3. Late Spring: Rebuild interlocking and grout pads outside Huntington

- Date: May 12-27, 2017 (10 commuting days)
- Area Affected: Huntington and Eisenhower Avenue stations will be closed. Yellow Line service will operate at regular peak-hour intervals between Franconia-Springfield and Mt Vernon Square

FUNDING IMPACT:

SafeTrack activities discussed in this information item are included in the current year's budget. The total annual program cost of the preventive maintenance and capital

programs to drive sustained improvements is \$21,492,596 in FY18 in both capital and operating costs.

Capital

- Cable meggering (WMATA and contractor) — \$3.6M
- Stray current (contractor) — \$7.6M
- Switch maintenance (WMATA) — \$0.7M

Operating

- Torqueing (WMATA) — \$2.0M
- Track geometry (WMATA) — \$1.4M
- Trackbed cleaning (WMATA) — \$3.0M

There is some risk that the first pass of the system could create additional corrective maintenance, triggering additional costs.

Project Manager:	Laura Mason
Project Department/Office:	Maintenance of Way Engineering (MOWE)

TIMELINE:

Previous Actions	<p>June 2016 – SafeTrack Communications and Outreach Information Item</p> <p>September 2016 – Approval of Public Hearing for Proposed Changes to Metrorail Hours of Service</p> <p>October 2016 – SafeTrack Midway Progress Report Information Item</p> <p>November 2016 – Overnight Maintenance Window Information Item</p> <p>December 2016 – Approval of Metrorail Span of Service</p>
Anticipated actions after presentation	<p>November 2017 – First quarterly performance report</p> <p>Ongoing – Continue and complete SafeTrack surge activities and commence funded preventive maintenance and capital activities</p>



Washington Metropolitan Area Transit Authority

SafeTrack and FY18 Preventive Maintenance and Major Capital Projects

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June 8, 2017



SafeTrack Overview



- 1 year expanded maintenance windows
- 16 Safety Surges
- 14 non-surge areas



3 years worth of work
386 days in SafeTrack
307 days of Surging
1.5M hours worked in Surges



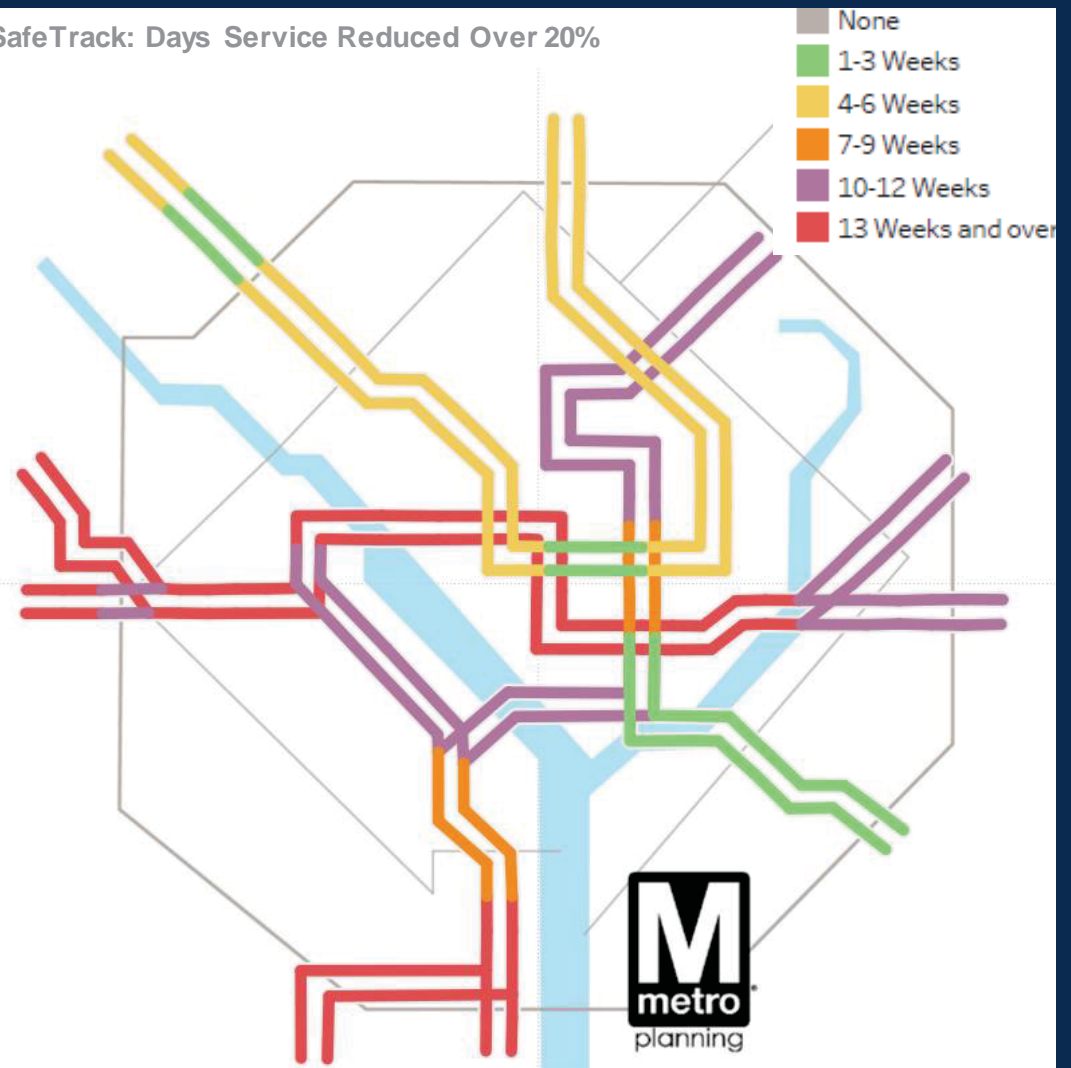
Collective, Regional Effort

*Customer Time Invested:
5,800 of 7,000
service hours affected by
SafeTrack*

*“This plan is going to take
some sacrifice from all of us.
But it is clear that the current
approach is not working,
more aggressive action is
necessary.”*

– GM Wiedefeld
6 May 2016

SafeTrack: Days Service Reduced Over 20%





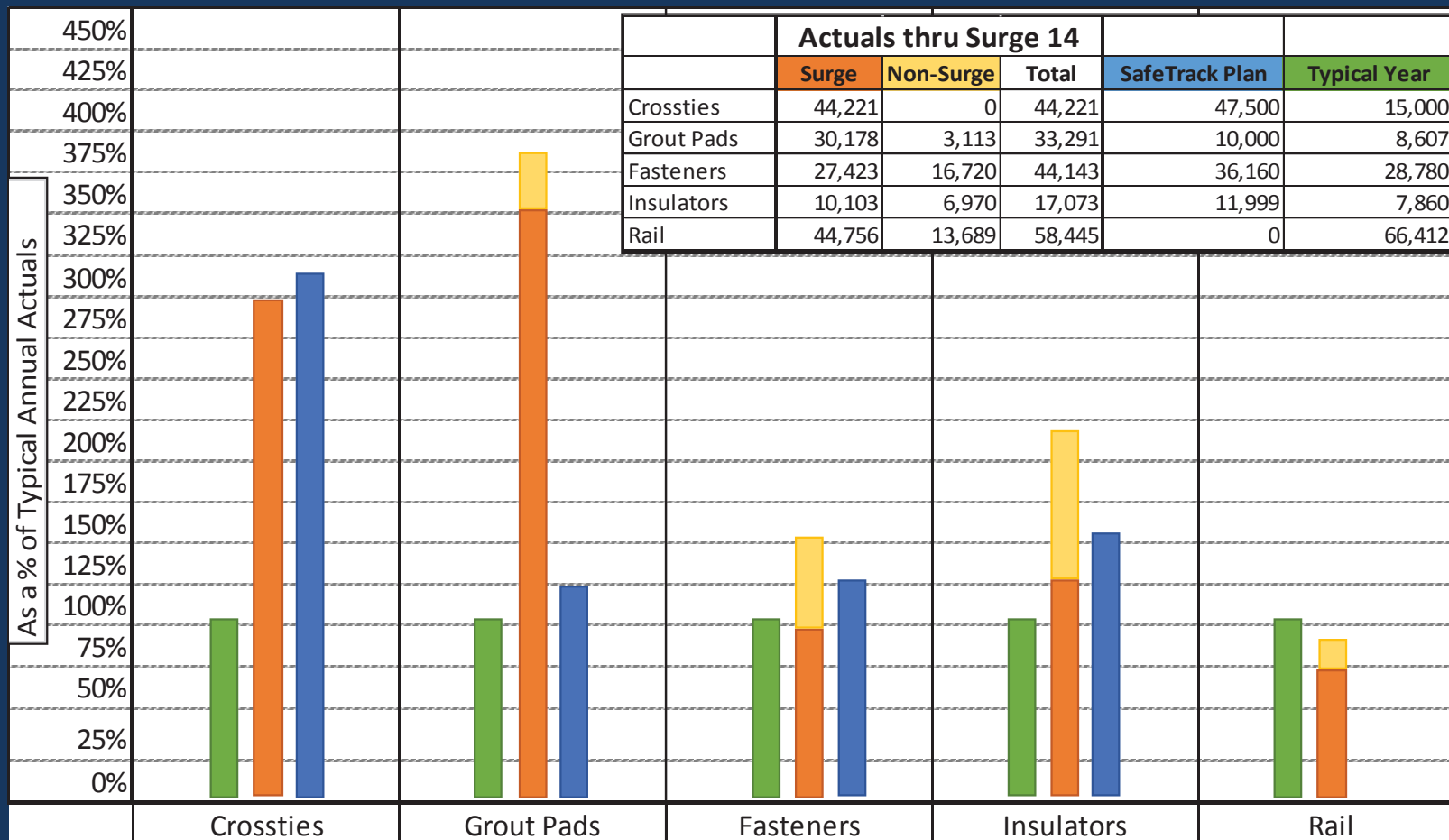
Time Invested, Time Saved

- Renewed 1/3 of system Track Structures
 - Reduced defective wood ties from 22% to 2%
 - Noticeably smoother, quieter ride
- Reduced Smoke/Fire Incidents Systemwide
 - 16% reduction in # of incidents
 - 32% reduction in hours
- Reduced Rail Service Interruptions
 - 32% reduction in # of emergency bus bridges
 - 45% reduction in hours





Accomplishments By the Numbers



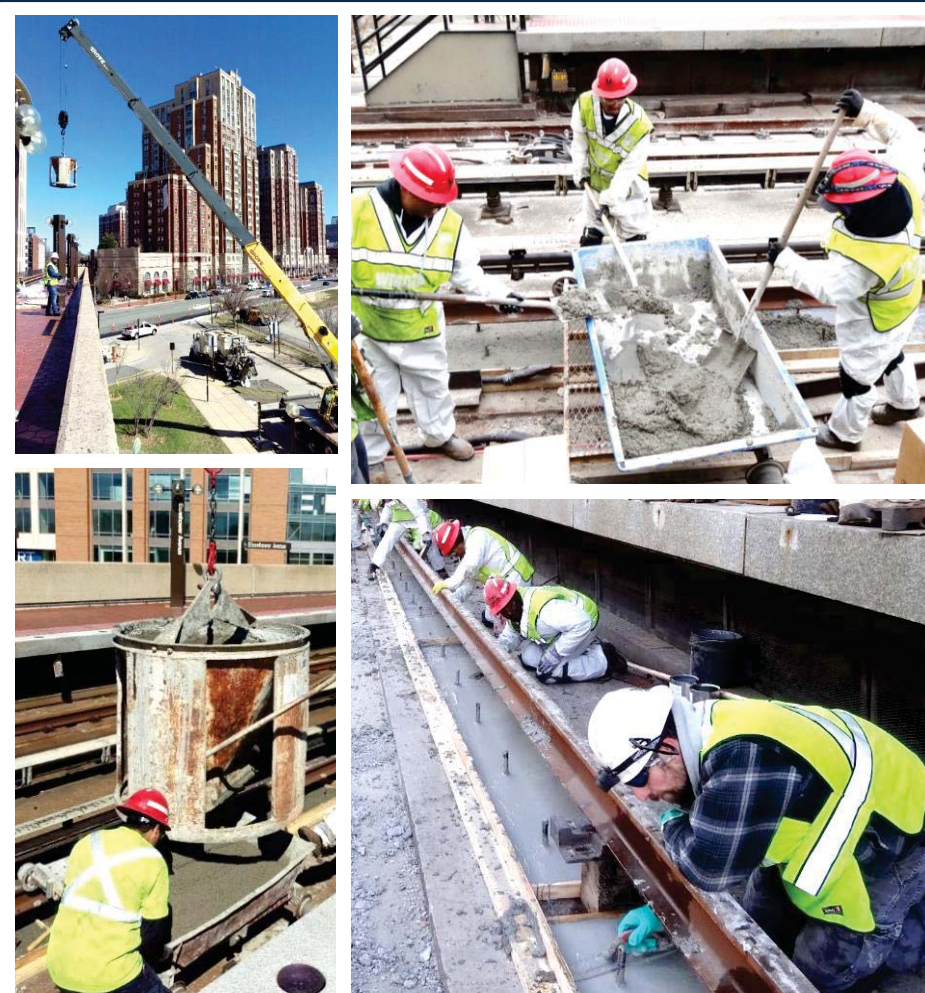
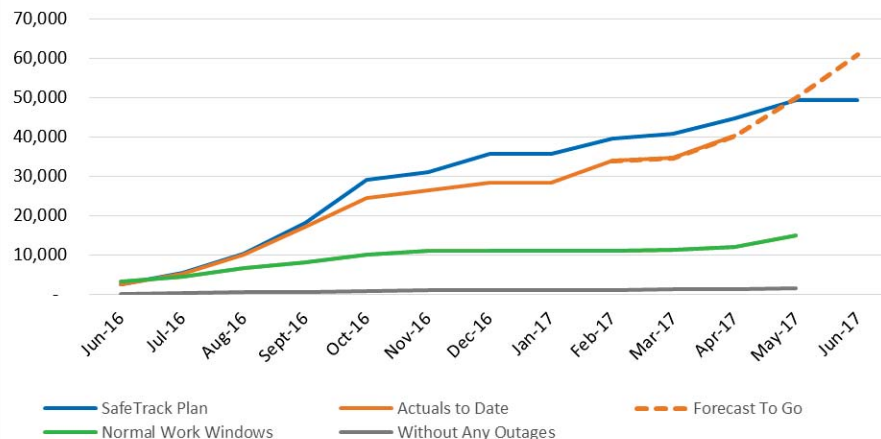
- 14 surges completed; 2 to go
- Program on track to deliver over 3 years worth of work



Focus On: Ties & Grout Pads

- Crossties: 3x more production
 - *Pre-SafeTrack: ~300 ties per week*
 - *1 week surge: 1,000 ties per crew*
- Grout Pads: 3x more production
 - *Pre-SafeTrack: 400 LF per week*
 - *1 week surge: 2,000 LF*

Crosstie Replacements
Actual Data through Surge 14 + Forecast To Go



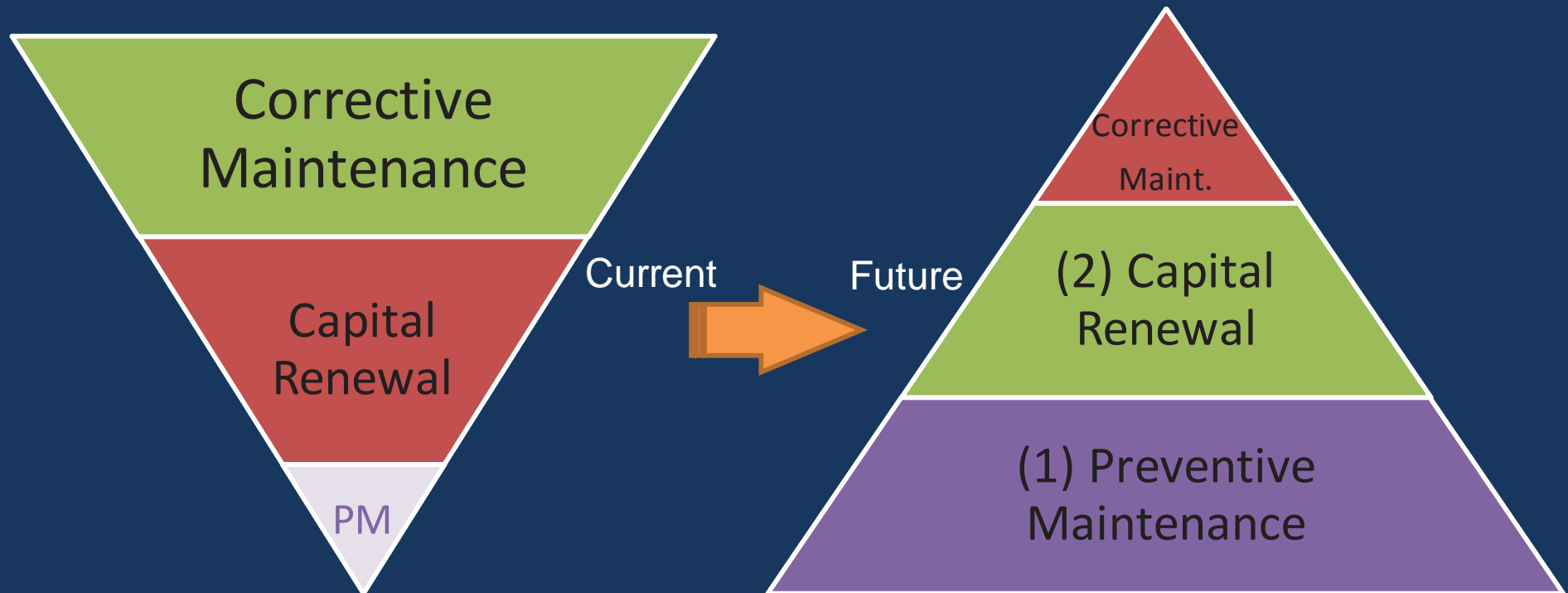


Learning from SafeTrack

- Most aggressive track renewal program in WMATA's history
 - Tremendous hard work and cooperation of employees, riders, and stakeholders
- Major changes to how WMATA operates
 - New Track Inspection Manual
 - Created new Maintenance of Way Engineering department
 - Revised Standard Operating Procedures (SOP) around Track Access
- Most important lesson is the need to maintain proactive and sustained maintenance program



SafeTrack 2.0 Is Preventable



To prevent SafeTrack 2.0, we need 2 things:

1. Preventive Maintenance → Increased work hours
2. Robust Capital Program → More track time required

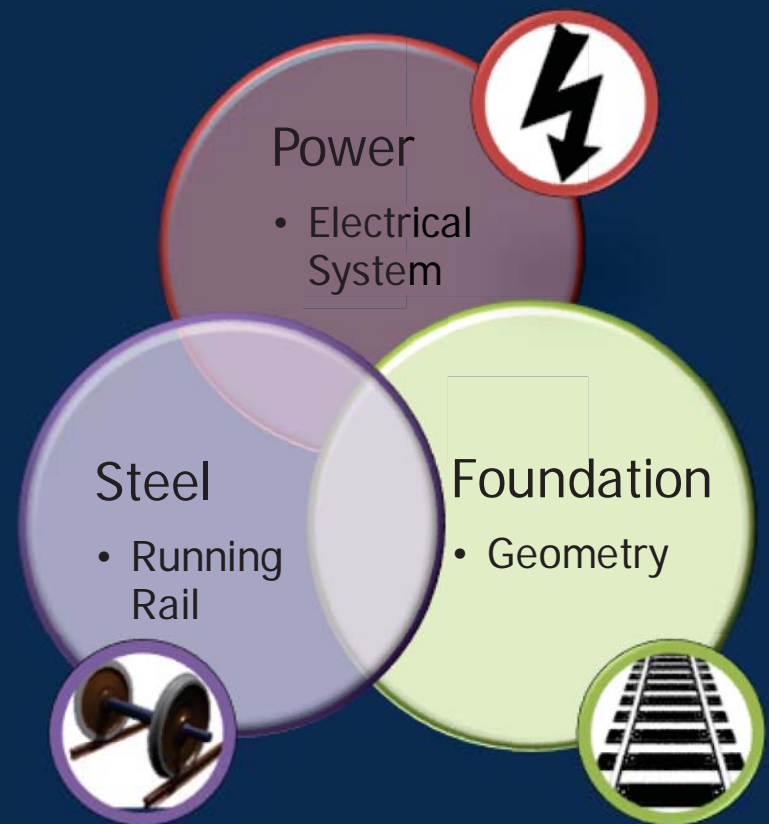
Purpose of Preventive Maintenance

Reduce Delays by Catching Failures Before They Happen

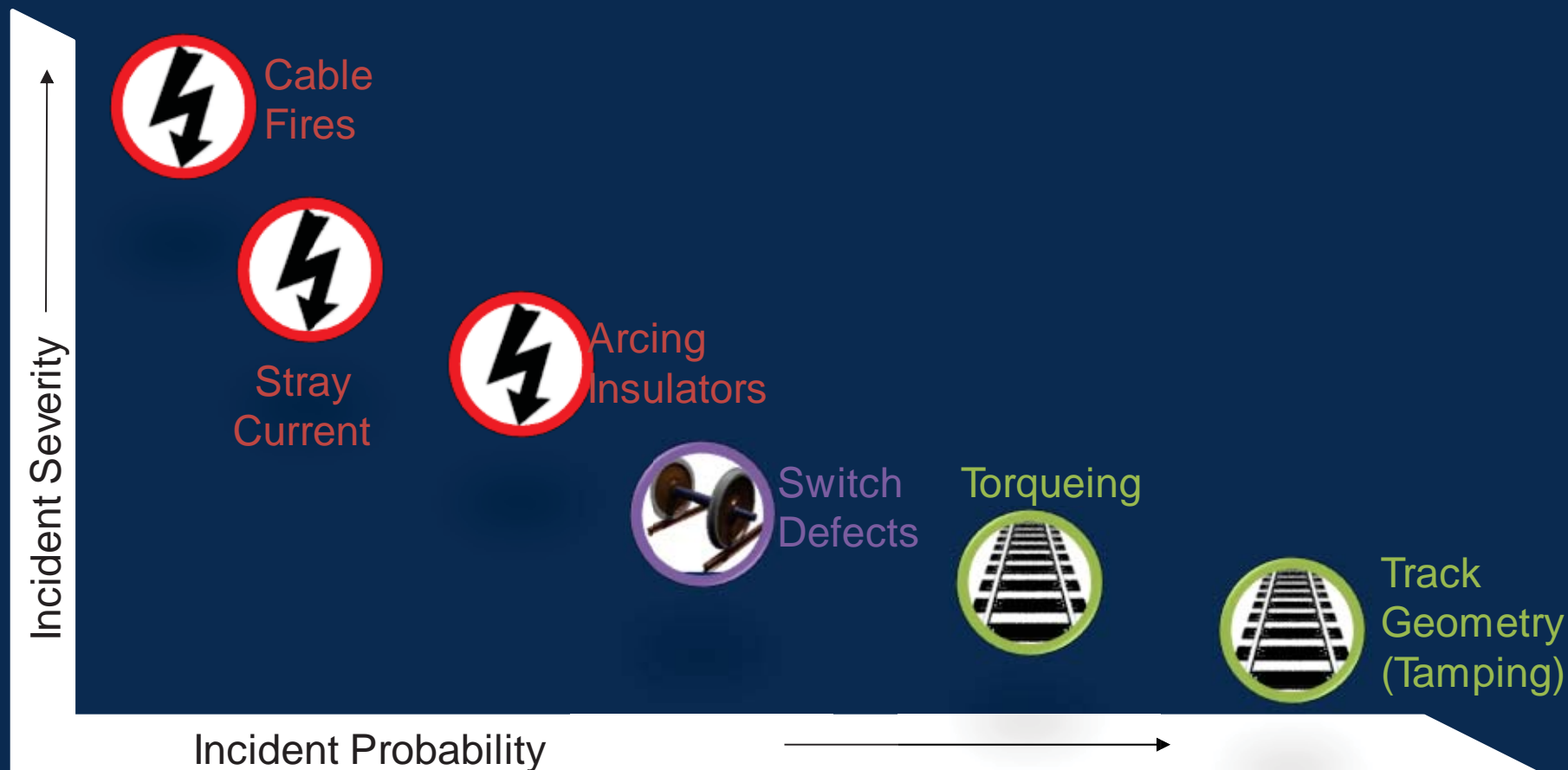
- Improve safety
- Improve reliability
- Extend useful life of assets
- Save money (more cost effective)

Types of failures:

1. Power (Smoke & Fire) → *Target: 0*
2. Track → *Target: Reduce by 50%*
 - Steel → Keep wheels on rails
 - Geometry → Hold rails together



Allocating Track Time by Risk



Safety + Reliability + Fiscal Responsibility



Track Geometry



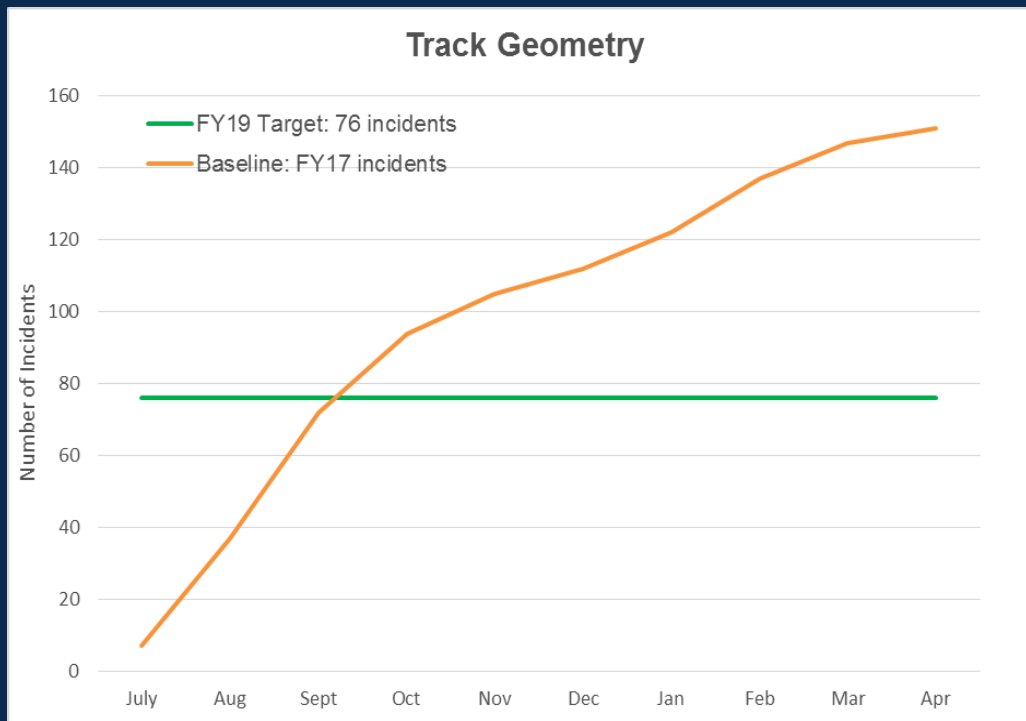
*Track Geometry
(Tamping & Surfacing)*

Task: Lift and line rails; vibrate and consolidate rock

Purpose: Stabilize track structure and correct alignment

Frequency: Mainline biannually; switches annually

FY18 Plan: 100 miles (whole system)





Need for Robust Capital Program

- Annual cyclical programs: components “age out”
 - Crossties
 - Fasteners
- Major facilities / Specialty components as needed
 - Station platforms
 - Tunnel leak mitigation
- Annual track access needs depend on numerous factors
 - Specific physical constraints
 - Nature of the work
 - Volume of work required



FY18 Capital Planning Process

- Fence-off high passenger volume times
- Maximize weekend work
 - Take advantage of longer work windows
 - One work zone per line; up to 3 events per weekend
- Coordinate “piggy-backing” to reduce track time needed
- Limit daytime work
 - Midday work
 - 8PM single-tracking (early outs)
- Plan strategic extended outages
 - Cost/Benefit analysis



FY18 Rail Infrastructure Capital Program

Major Capital Projects

- Facilities
 - Rhode Island Ave structural repairs
 - White Flint canopy repair
 - West Hyattsville canopy repair
 - Drainage pumping station repairs
- Right of Way
 - Radio program
 - Orange/Blue rehabilitation project
 - Traction Power Substation (TPSS) cable pulls
- Lighting rehabilitation
- Red Line leak mitigation pilot

Annual Track Renewal

- Ties
 - Branch to Naylor
 - Fort Totten to Silver Spring
 - Medical Center to Twinbrook
 - Addison Road to Largo
- Grout Pads and Fasteners:
 - L Line Bridge (Pentagon to L'Enfant)
 - National Airport
 - Foggy Bottom-Rosslyn
- Interlocking
 - Branch Avenue
 - Takoma
 - Huntington



Summer: Branch Ave to Naylor Road

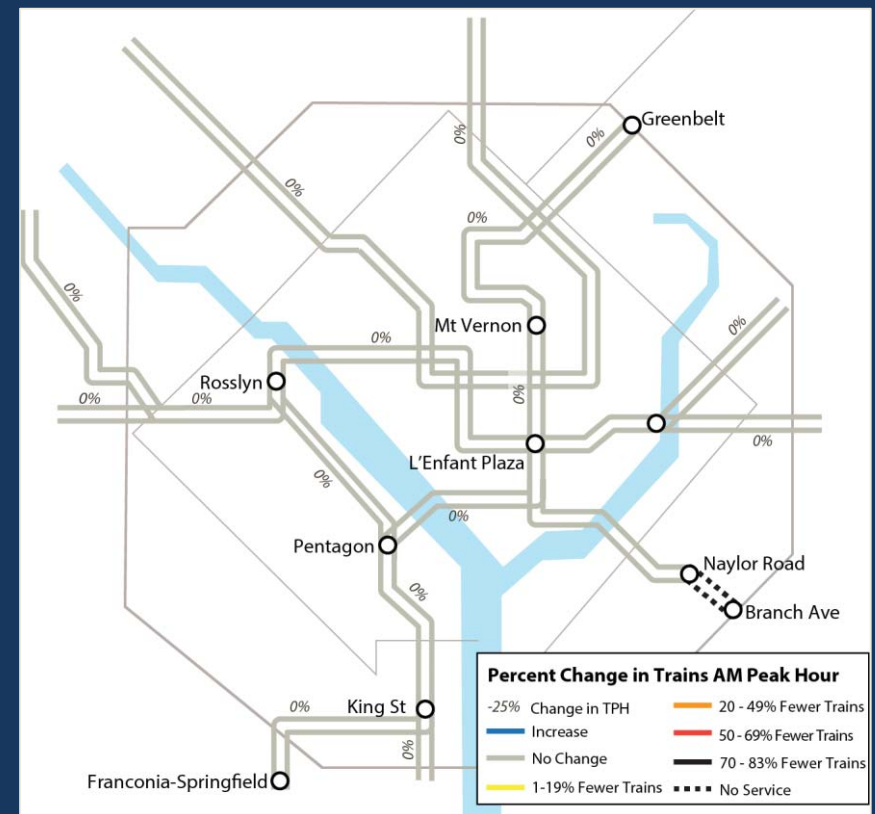
Timing: August 5 – 20, 2107

Station Closures: Branch Ave & Suitland
(extend to Naylor Rd weekends only)

Purpose:

- Rebuild interlocking and grout pads
- Tie replacement (~3,500)
- Joint elimination
- ATC switch upgrade
- Station structural rehab

Tentative Service Plan: Near normal
beyond closed stations





Fall: Silver Spring to Fort Totten

Timing: November 25 – December 10, 2017

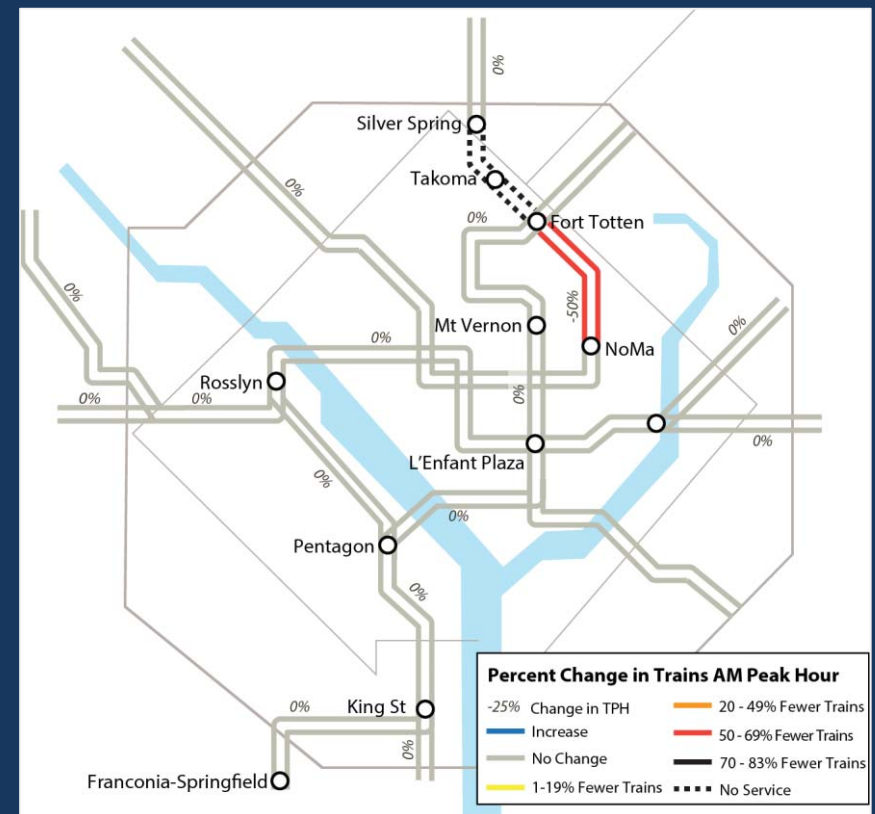
Station Closures: Takoma

Purpose:

- Rebuild interlocking
- Tie replacement (~4,000)
- Joint elimination

Tentative Service Plan:

- 8 minutes (Shady Grove – Fort Totten) and average 4 minutes (Grosvenor-Strathmore to NoMa-Gallaudet U)
- 8 minutes Glenmont to Silver Spring





Late Spring: Huntington to King St-Old Town

Timing: May 12 – 27, 2018

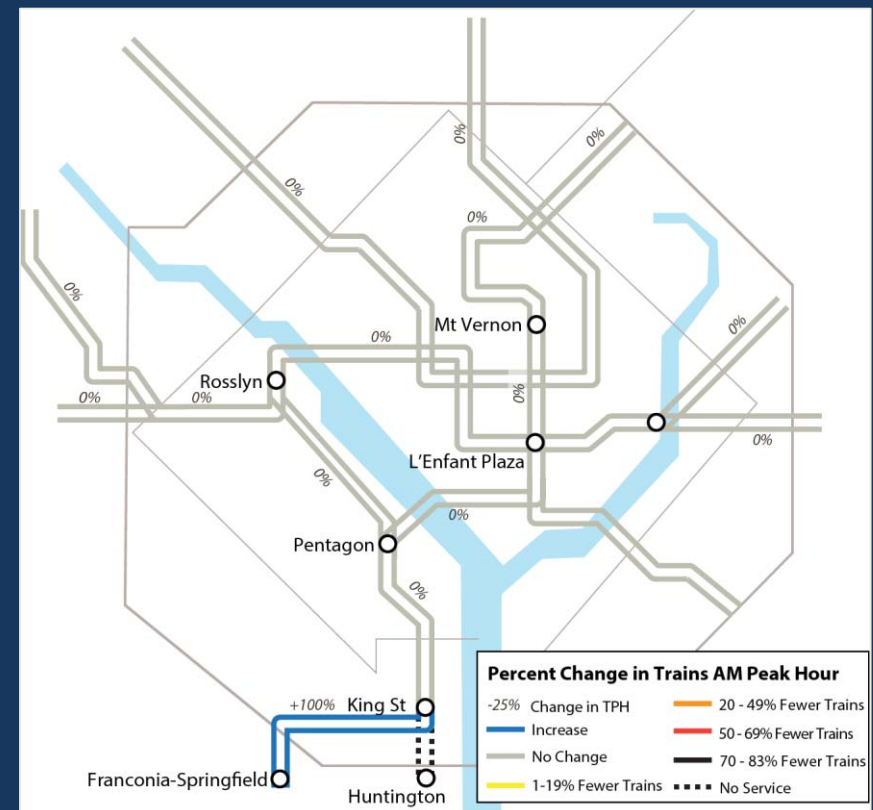
Station Closures: Huntington and
Eisenhower Ave

Purpose:

- Rebuild interlocking and grout pads
- Joint elimination
- Leak mitigation
- ATC switch upgrade

Tentative Service Plan:

8 minutes with Yellow Line running
Franconia-Springfield to Mt. Vernon Sq





Next Steps

- June 25:
 - SafeTrack ends
 - Preventive maintenance program launches
- November: First quarterly performance report
 - Using new metrics: On-Time Performance (OTP) and Track Availability
 - Progress updates on the PM programs



Appendix: Slides from November Board Meeting

1. Cable Meggering
 - FY18 Plan
 - Program Definition from November 3, 2016 Board Presentation
2. Stray Current Testing
 - FY18 Plan
 - Program Definition from November 3, 2016 Board Presentation
3. Trackbed Cleaning
 - FY18 Plan
4. Switch Maintenance
 - FY18 Plan
 - Program Definition from November 3, 2016 Board Presentation
5. Torqueing
 - FY18 Plan
6. Track Geometry (Tamping & Surfacing)
 - FY18 Plan
 - Program Definition from November 3, 2016 Board Presentation



1) Cable Meggering



**Cable
Fires**

Task: Reduce number of power cable faults

Purpose: Prevent fires or smoke incidents

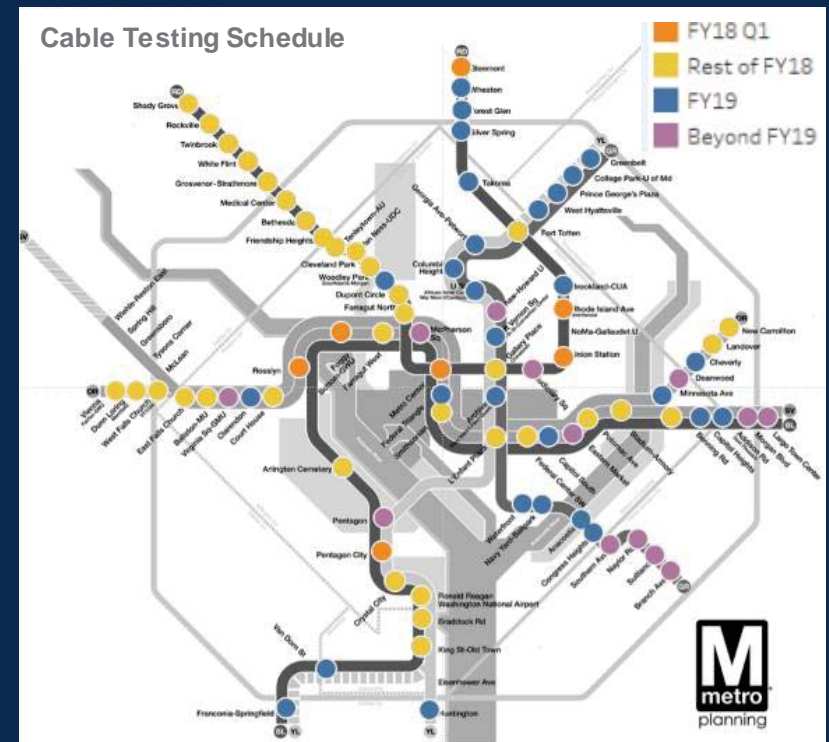
Frequency: Test 7 years after install & every 4 years after

FY18 Plan: 2,767 cables

Baseline & Target:

- Baseline: FY16+17 = 7 fires
- Target: 0 Cable Fires**

** Need ~3 years to complete one pass



1) Cable Meggering

- **Benefits**

- Prevent fire or smoke incidents (L'Enfant Plaza, McPherson Square, & Metro Center)

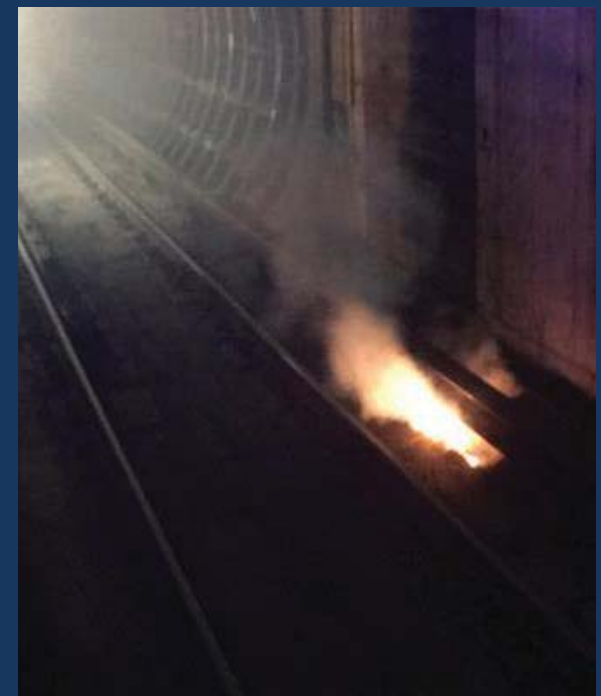
- **Program Description**

- Long duration, systemic program to test cables that can't be visually inspected
- Test the insulation of high voltage cables to monitor & trend condition of cable and replace cables with poor insulation (FTA SMI R-5-35-d)
- 13,529 cables to be tested every 4 years

- **Requirements**

- Two crews to disconnect every cable from the breaker to megger individually
- Requires 19 work hours per week

5 related incidents
2016 year to date





2) Stray Current Testing



*Smoking
Stray Current*

Task: Improve reliability of track circuits

Purpose: Reduce risk of fire on infrastructure

Frequency: 4-5 years

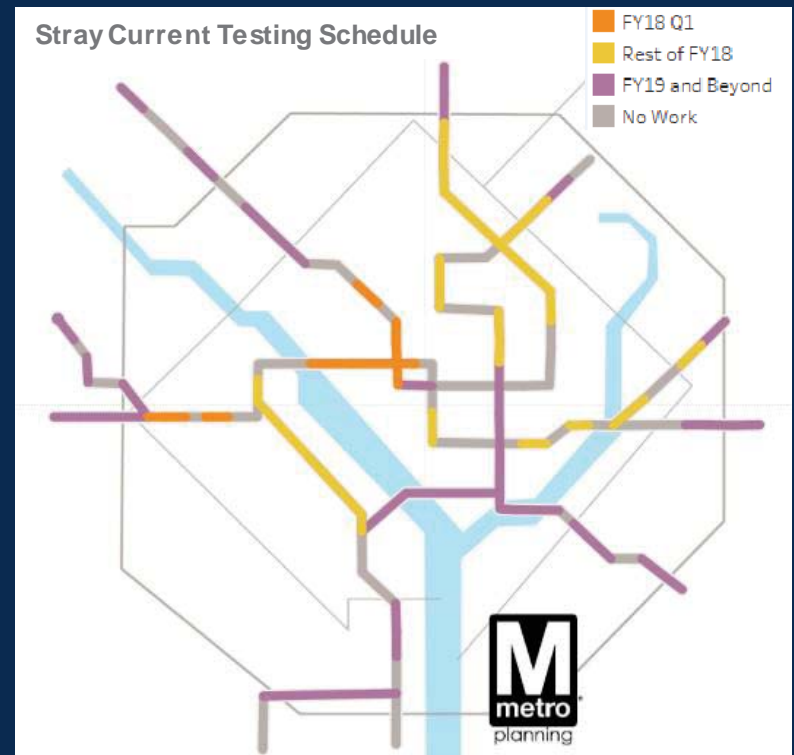
FY18 Plan: 35 miles; 20 segments tested



Baseline & Target:

- Baseline: FY16+17 = 7 incidents
- Target: 0 incidents*

** Need ~4 years to
complete one pass



2) Stray Current Testing

- **Benefits**

- Prolong life expectancy of rail, track and structures
- Reduce risk of fires
- Improves track circuit stability (smoother and faster ride)

- **Program Description**

- Shut down all power and send a test voltage into the tracks to find where there are weaknesses in the electrical insulation
- Test every 4-5 years

- **Requirements**

- Four 3+ hour work windows per area to set-up, test and investigate results

83 related incidents
2016 year to date





3) Trackbed Cleaning



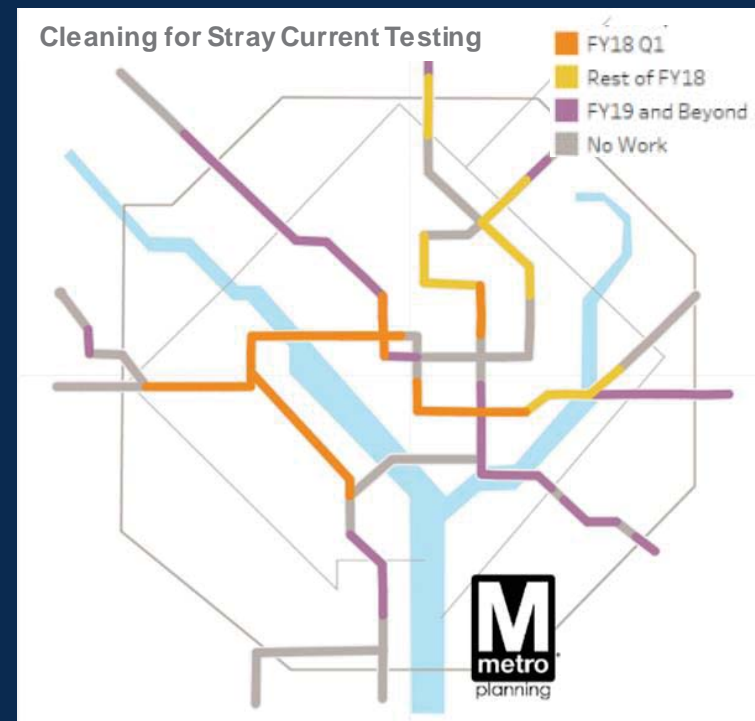
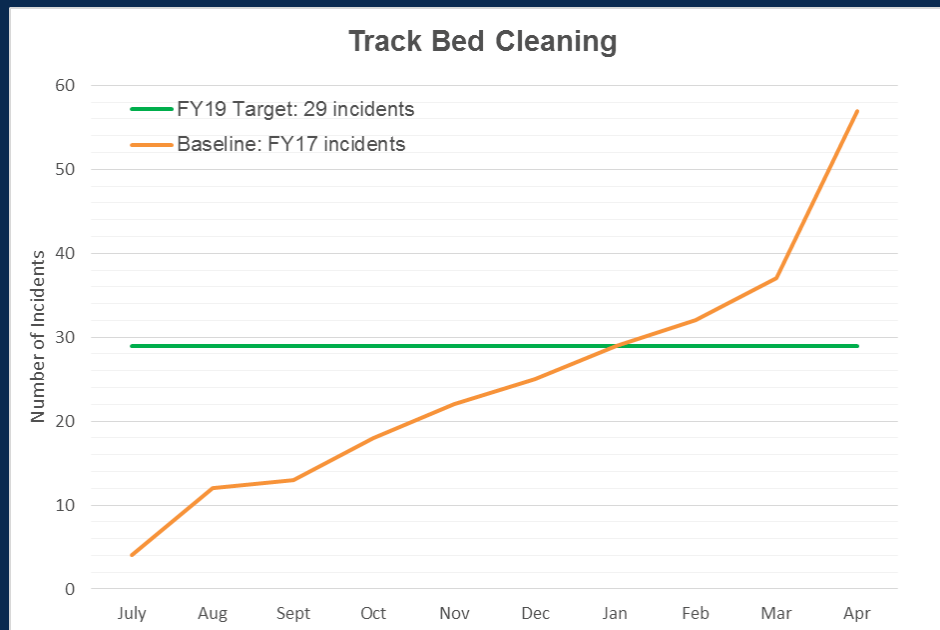
*Arcing
Insulators*

Task : Clean tunnels; Remove debris; Clear drains

Purpose: Reduces fire risk & deterioration caused by water

Frequency: Line dependent → 1 - 4 years

FY18 Plan: Red Line + Support to Stray Current Testing





4) Switch Maintenance



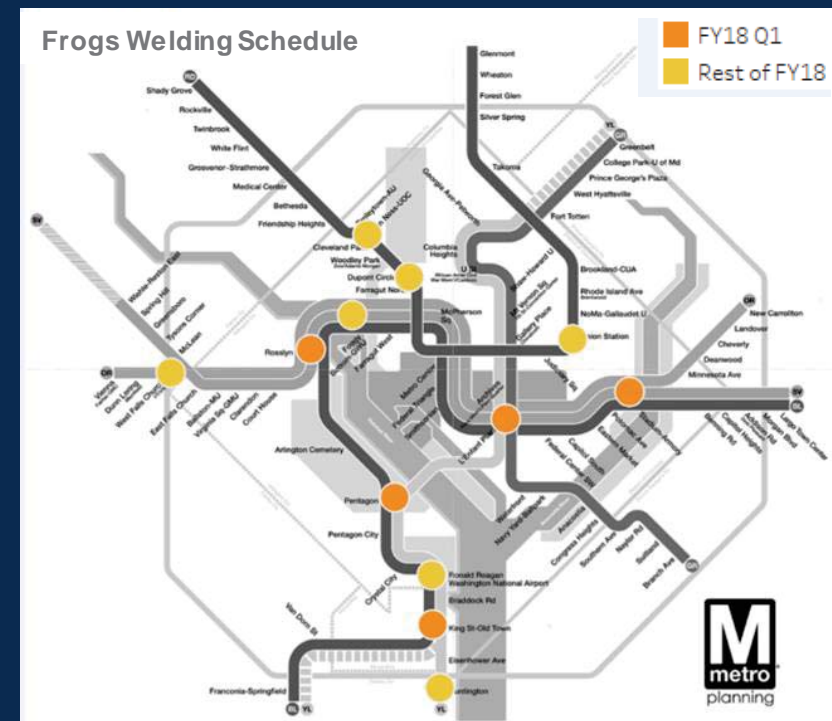
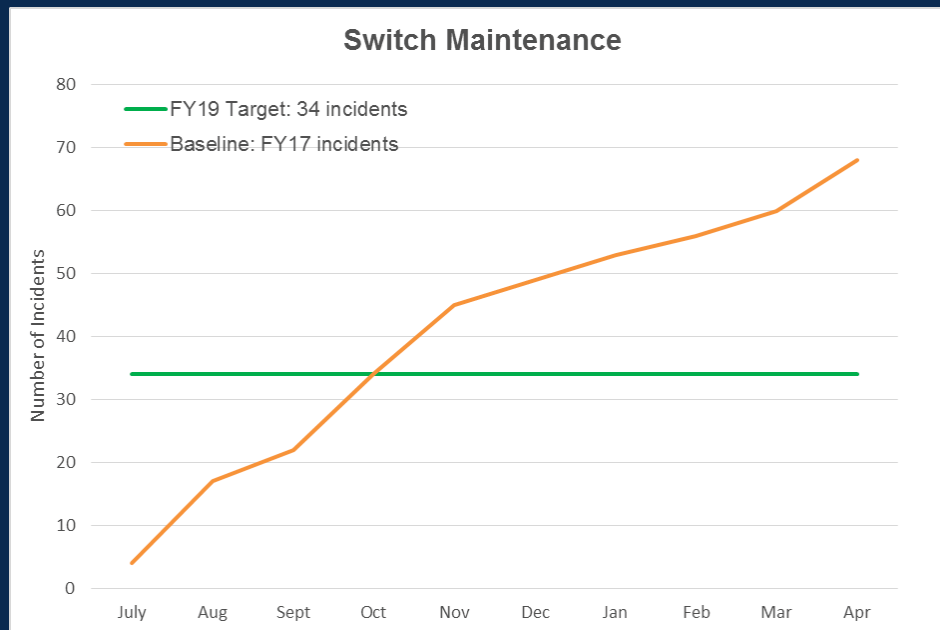
*Switch
Defects*

Task: Inspect, weld & grind interlocking components

Purpose: Maintain proper wheel/rail interface

Frequency: Every 4-5 years

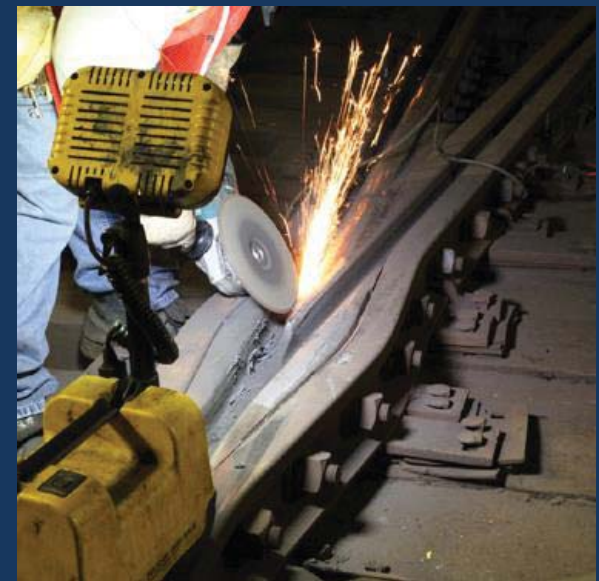
FY18 Plan: 88 of 499 mainline frogs + System-wide inspections



4) Switch Welding & Grinding

- **Benefits**
 - Reduce noise and vibration
 - Improve service by keeping all interlocking operable to mitigate other delays
 - Reduce length of single-tracking events
- **Program Description**
 - Switch point grinding and frog grinding & welding to ensure proper wheel/rail interface
 - ATC Component cleaning
- **Requirements**
 - Longer windows (4+ hours)

80 related incidents
2016 year to date





5) Torqueing



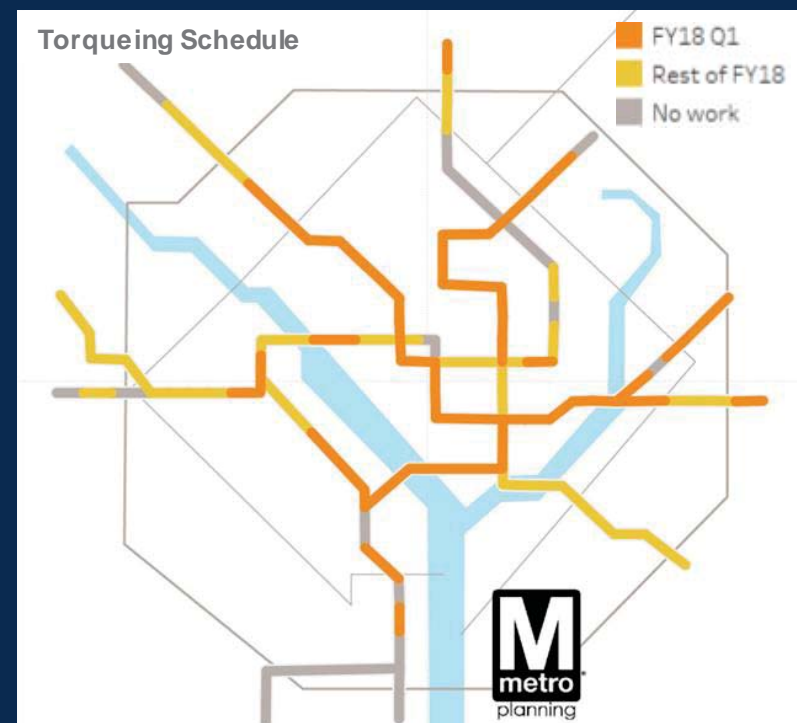
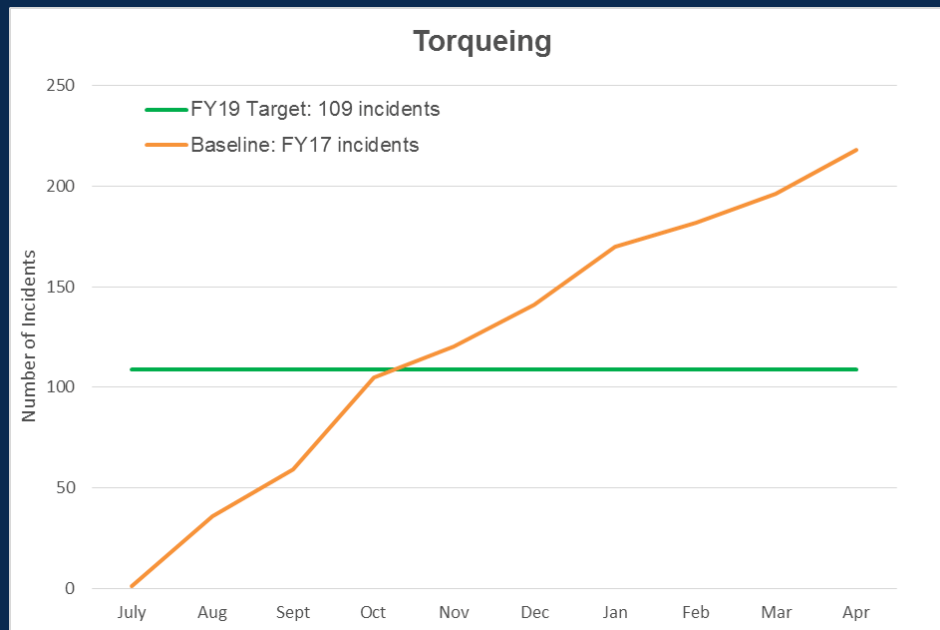
Torqueing

Task: Tighten fastener and joint nuts & bolts

Purpose: Eliminate excessive strain on the fasteners and studs

Frequency: Whole system annually; tight curves quarterly

FY18 Plan: 142 miles





6) Track Geometry



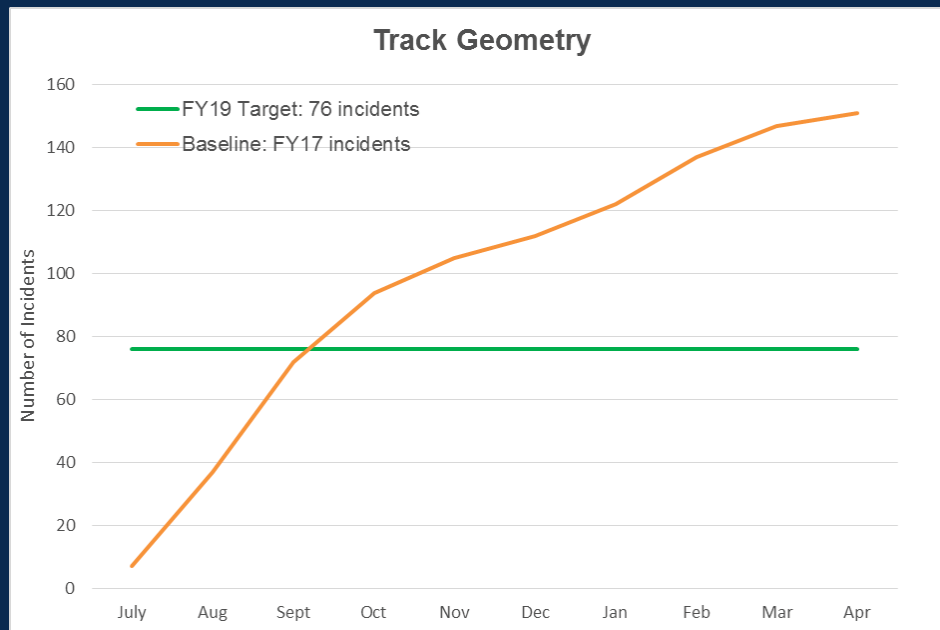
*Track Geometry
(Tamping & Surfacing)*

Task: Lift and line rails; vibrate and consolidate rock

Purpose: Stabilize track structure and correct alignment

Frequency: Mainline biannually; switches annually

FY18 Plan: 100 miles (whole system)



3) Tamping & Surfacing

- **Benefits**
 - Improves ride quality, minimizing bumps
 - Preserves the track by eliminating excessive strain on the rails & ties and stability of track circuits
- **Program Description**
 - Maintenance program to correct the alignment of rails and improve track stability
 - Mainline biannually; switches annually
- **Requirements**
 - Computerized track equipment that lifts track & vibrates ballast to ensure adequate tie support and add ballast where needed
 - Requires 20 work hours per week

117 related incidents
2016 year to date

