

# Making the Best of it: Maintenance<sup>1</sup> Productivity During the Pandemic



**Gregory Shivy**  
Principal Track Engineer  
Maintenance & Engineering



RAIL TRANSIT SEMINAR • OCTOBER 18, 2021



**WRI** 2021

# Agenda

- **System Overview**
- **Revenue Service Reduction**
- **Rail Relay**
- **Direct Fixation Fastener Replacement**
- **Rail Re-profiling**
- **Accelerated Capital Projects**
- **A65 Interlocking Replacement**
- **A75 Interlocking Replacement**
- **Q/A**



# System Overview

- 126 Route Miles
- 430,000 daily riders (Pre-covid)
- 80mph Max Speed
- Automatic Train Operation
- 66 in. Track Gauge
- 23% Aerial DF, 24% Subway DF
- 53% at Grade Ballasted Concrete Tie



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# Revenue Service Reduction

Service Reduction between Mar 21<sup>st</sup> 2020 and Aug 2<sup>nd</sup> 2021)

	Pre-Covid-19	During Service Reduction
Daily Ridership	430,000	11% of normal
Weekday service	5am – 1 am	5am – 9pm
Weekend service	6am – 1am	8am – 9pm
Headway	15 mins	30 mins
Maint. Work Window	4 hr	8 hr



# Rail Relay

- 50-year-old legacy rail nearing end of useful life
- Predominant wear on high rail
- Short term goal to replace 50 miles

## Pre-Covid-19

- 7.1 linear miles (two-year average)

## During Service Reduction

- 13.3 linear miles (15 months)
- 51% increase



# DF Fastener Replacement

- 50-year-old fasteners nearing end of life
- Replaced legacy threaded fasteners with elastic fasteners
- Replaced 120k out of 345k fasteners



## Pre-Covid-19

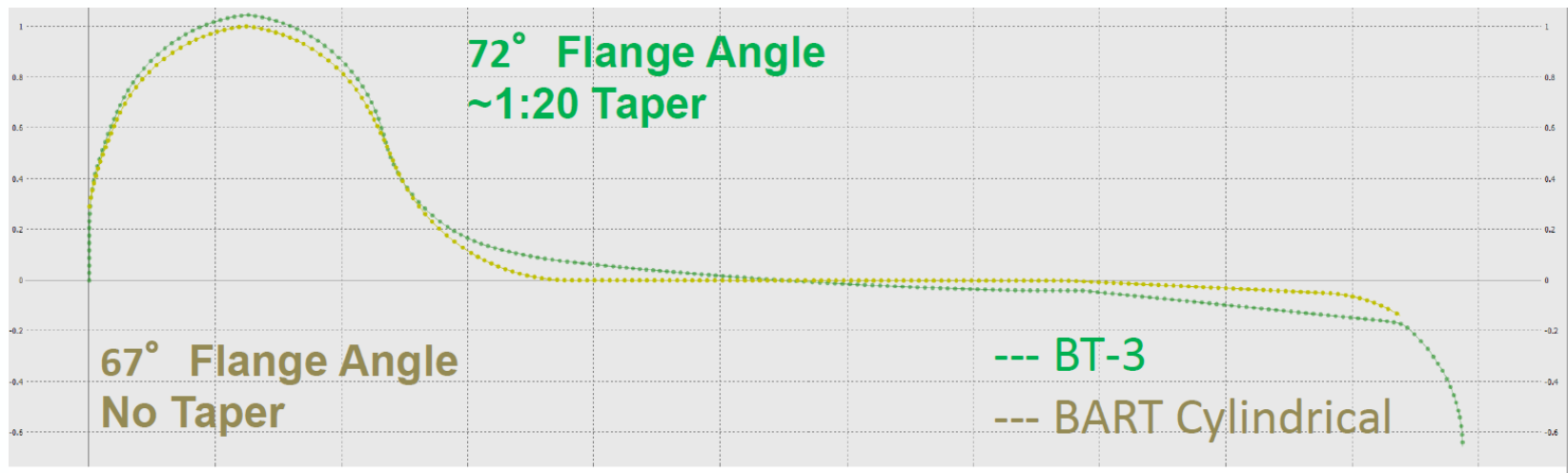
- 12,672 EA (two-year average)

## During Service Reduction

- 20,236 EA (15 months)
- 60% increase



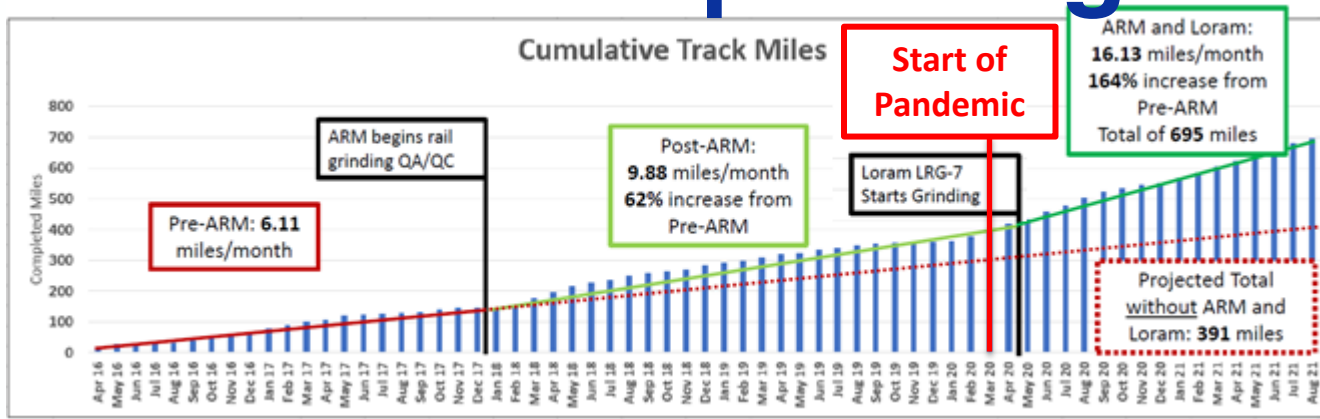
# Rail Re-profiling



- Transition from cylindrical to conical wheel (BT-3 wheel)
- ARM/NRC designed matching rail templates



# Rail Re-profiling



- BT-3 wheel implementation began Jul 2017
- Two-phase rail profile implementation began Jan 2018
- Loram grinder production began Apr 2020
- % complete for phase 1 (93%) and phase 2 (76%)

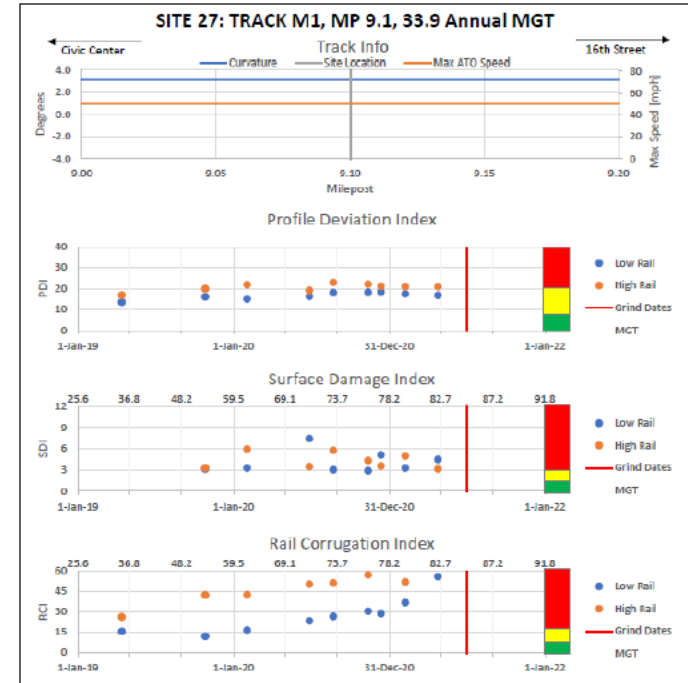
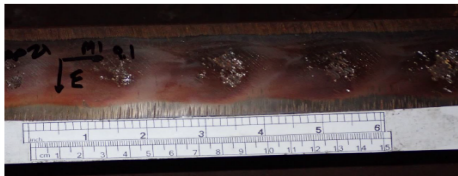




# Rail Re-profiling

## 50 locations for rail conditions trending

- Based on curvature, speed, traffic volume, grade, etc
- Performed by ARM
- Profile Deviation Index
- Surface Damage Index
- Rail Corrugation Index



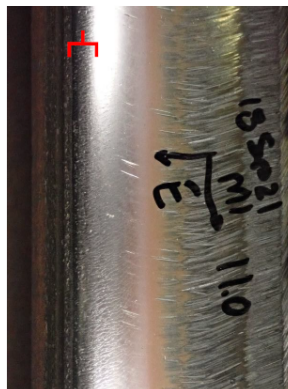
# Rail Re-profiling

Site 23: M1 11.0, 3.6° curve

Running band looks very good

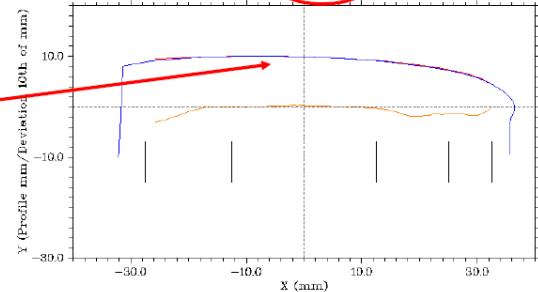


Ground 23JUN21  
Passes: 4W, 5E  
Light GCC

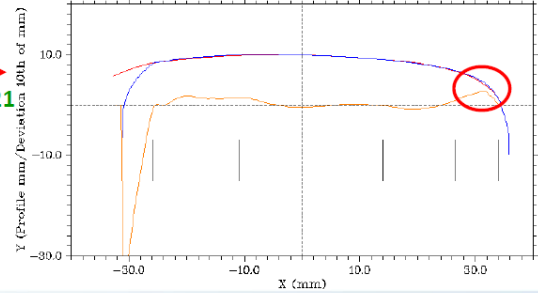


Low-int

BART | LINE M | TRACK M1 | RIGHT RAIL | West Rail | LOW RAIL | TEMPLATE: BART\_LOW\_INT  
CRV M-124 | MP 10.78 TO 11.06 | @ MP 11.000 | RADIUS 1500 FT | GROUND AS SHOWN  
SUPERELEV 0 | MAX ATO SPEED 88 MPH | STRUCTURE ds | Crown = 6.0 inch  
FIELD PQ1 = 16.3 Thou, PQ2 = 3.3, ARMSMA = 100 GAUGE



BART | LINE M | TRACK M1 | LEFT RAIL | East Rail | High Rail | TEMPLATE: BART\_HR\_2021\_TPI  
CRV M-124 | MP 10.78 TO 11.06 | @ MP 11.000 | RADIUS 1500 FT | GROUND AS SHOWN  
SUPERELEV 0 | MAX ATO SPEED 88 MPH | STRUCTURE ds | Crown = 12.8 inch  
FIELD PQ1 = 20.1 Thou, PQ2 = 7, ARMSMA = 100 GAUGE

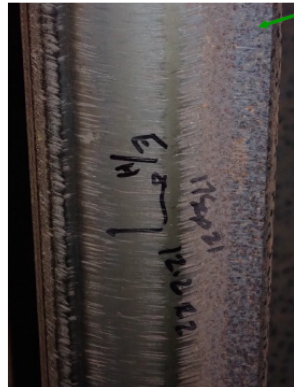
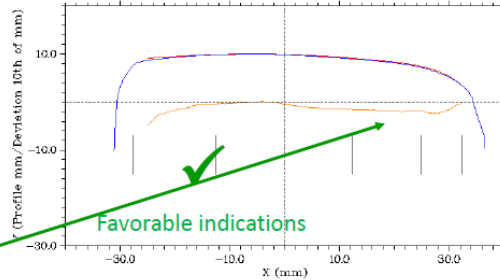


# Rail Re-profiling

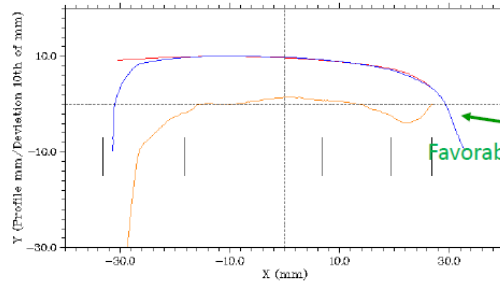
Site 38: R2  
12.2, CPG as  
high rail

R1 12.2, CPG  
as high rail

BART | LINE R | TRACK R2 | LEFT RAIL | West Rail | High Rail | TEMPLATE: BART\_CPG-45  
CRV R-224 | MP 12.01 TO 12.25 | @ MP 12.200 | RADIUS 2015 FT | GROUND AS MODERATE  
SUPERSEL 0.5 | MAX ATG SPEED na MPH | STRUCTURE: na | Crown = 5.6 inch  
FIELD PQI = 23.6 Thou, PDI = 9, AREMA = 100 GAUGE



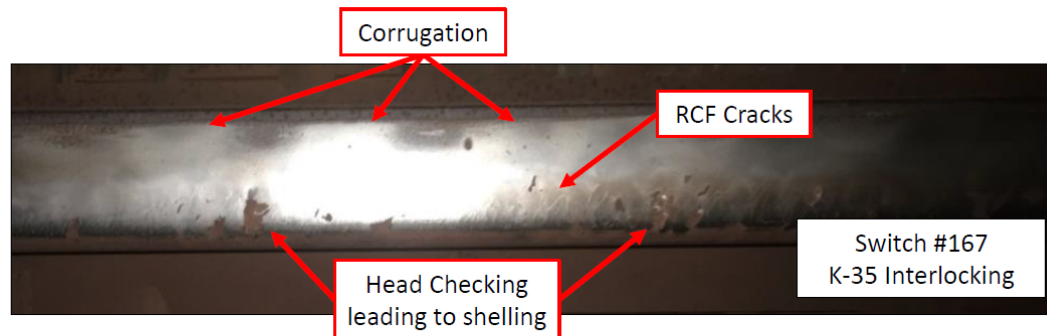
BART | LINE R | TRACK R1 | LEFT RAIL | West Rail | High Rail | TEMPLATE: BART\_CPG-45  
CRV R-124 | MP 12.11 TO 12.23 | @ MP 12.200 | RADIUS 3000 FT | GROUND AS MODERATE  
SUPERSEL 0.5 | MAX ATG SPEED na MPH | STRUCTURE: na | Crown = 4.6 inch  
FIELD PQI = 31.0 Thou, PDI = 10, AREMA = 95 GAUGE



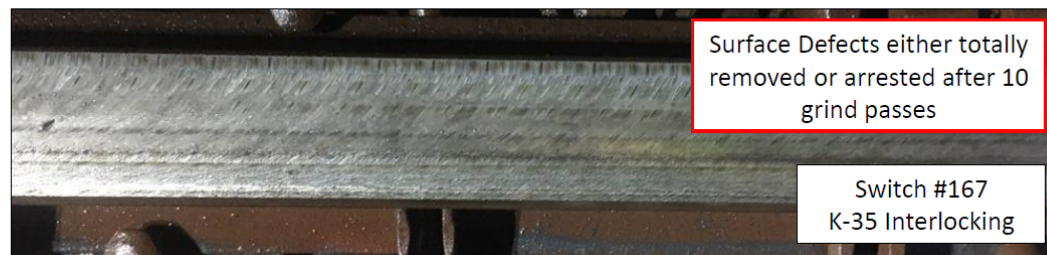
# Rail Re-profiling

- Defect Removal in Switch

Pre-Grind



Post-Grind



# Accelerated Capital Projects

- Contractor accelerated production rates due to longer maintenance windows
- Reduced agency support costs
- Reduced Planned weekend outages bus bridge cost



Photo credit: Martin Chandrawinata, Prescience



# A65 Interlocking Replacement

- Hayward Station
- Two No. 10 Concrete Tie Crossovers
- New Traction Power Contact Rail, Coverboard, and Cables



Photo credit: Martin Chandrawinata, Prescience



# A75 Interlocking Replacement

- North Hayward Yard
- One No. 15 Concrete Tie Crossover and Two No. 15 Concrete Tie Turnouts
- New Traction Power Contact Rail, Coverboard, and Cables



Photo credit: Martin Chandrawinata, Prescience



# Q/A

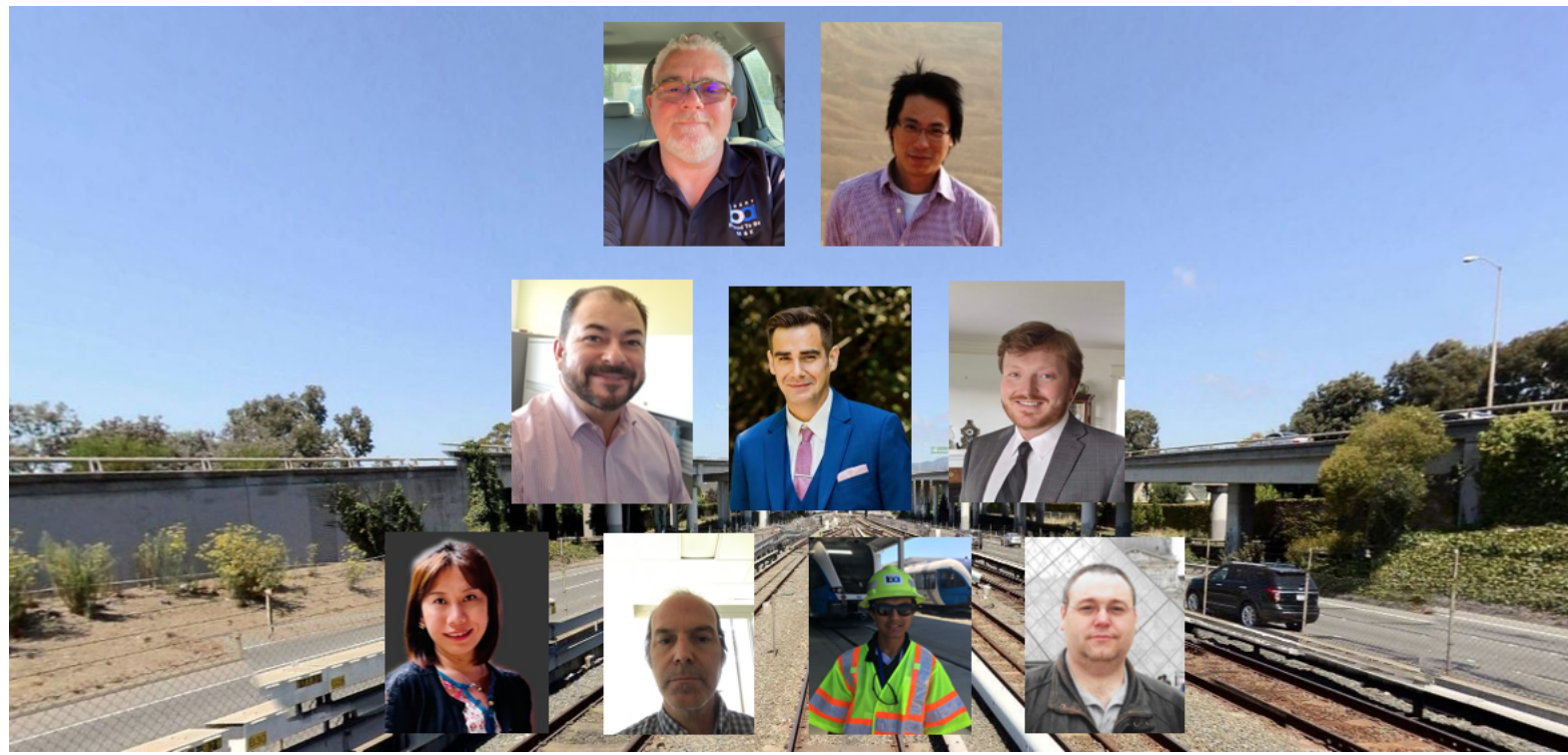


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