



2026 FTA STATE SAFETY OVERSIGHT AND RAIL TRANSIT AGENCY SAFETY WORKSHOP

March 25–27, 2026 | Arlington, VA



Session 13

Risk-Based Inspection: Data Analysis

Cyrell R. McLemore, PMP®, TSSP

Senior Inspection Specialist, Office of Safety Oversight and Compliance

Federal Transit Administration

Panelists



Arizona

Department of
Transportation (ADOT)

Brian Brinkley

Data Analysis
with the Help of AI



Minnesota

Department of
Public Safety (MnDPS)

Jon Wolfgram

Data Analysis



Maryland

Department
of Transportation (MDOT)

**Dale Green-Worrell
& Max Smith**

Data Analysis,
Visualization &
Prioritization



Oklahoma

Department of
Transportation (ODOT)

**Stephanie Davis
& Ed Elam**

Data Analysis,
Prioritization &
Reports



2026 FTA State Safety Oversight and Rail Transit Agency Safety Workshop

RBI Data Analysis with the help of AI

Presented by

Brian Brinkley, State Safety Oversight Program Manager, Arizona Department of Transportation

March 26, 2026

OVERVIEW AND CONTEXT

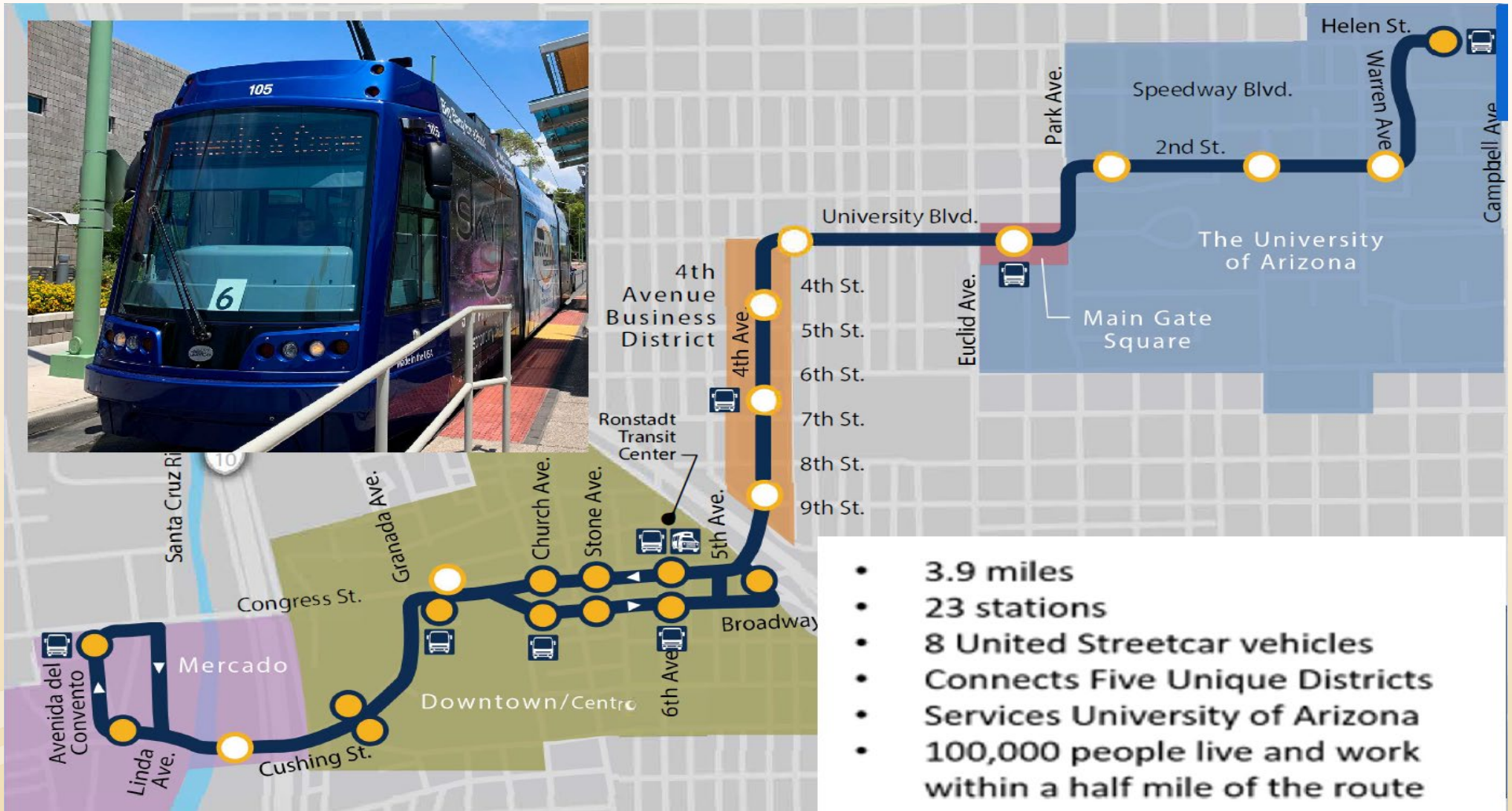
Throughout this PowerPoint, we will discuss several sections as it pertains to the topic of ADOT's approach on RBI Data Analysis with the help of AI. Within these, it will be broken down into subsections covering the following:

- **Rail Transit Systems Overseen by ADOT**
- **SSO vs RTA on Data Review**
- **Current DATA Collected by ADOT From the RTAs**
- **Data Broken down by Pages**
- **AI Models that have been used during this process**
- **How we use it to assist us**
- **What we end up with afterwards**
- **Key Takeaways ADOT Learned**

Rail Transit Systems Overseen by ADOT

Sun Link Streetcar

Est. 2014
Tucson,
AZ



Rail Transit Systems Overseen by ADOT (Cont.)

Valley Metro Light Rail

- Est. 2008
- Phoenix, Mesa and Tempe, AZ
- Two-line system (A&B)
- 51 Stations
- 48 Kinkisharyo Vehicles
- 25 Siemens Vehicles

Valley Metro Streetcar

- Est. 2022
- Tempe, AZ
- 3 miles
- 14 Stations
- 1/3 Off-Wire
- Services Arizona State University
- 2 Light Rail Connection Points



SSO vs RTA on Data Review

SSO Data Review

- Monthly
- Quarter
- Annually
- Bi-Annually
- As Needed

ADOT reviews data from an outside looking in and in bulk.

RTA Data Review

- Daily (Most often)
- Monthly (Depends on department)
- As Needed or Requested

Our RTAs do not use the same risk-based approach as ADOT. They have a transit agency to run so there is a big focus on what is happening in the now.

Current Data Collected From Sun Link

Table 1.6.2 Required Risk-Based Inspection Data Sources for Sun Link Streetcar

Number	Data Source Category	Data Source Name	Frequency of Collection
1	Safety and Security Event Investigations	SLS Logs_Hazard-CAP-Accident-Incident-Occurrence-Security-Injury	Quarterly
2	Safety and Security Event Investigations	Event Reports	Within 30 days of reportable event
3	Hazards and Security Risks	SLS Logs_Hazard-CAP-Accident-Incident-Occurrence-Security-Injury	Quarterly
4	Hazards and Security Risks	Unacceptable Hazard Investigation Reports	Within 30 days of reportable unacceptable hazard notification
5	Corrective Action Plans	SLS Logs_Hazard-CAP-Accident-Incident-Occurrence-Security-Injury	Quarterly
6	Employee Safety Reporting Program	SLS Logs_Hazard-CAP-Accident-Incident-Occurrence-Security-Injury	Quarterly
7	Operations Data	Operations Supervisor Logs Export	Monthly (Export of full previous calendar month)
8	Maintenance Records and Reports	Sun Link Comebacks Export	Monthly (Export of full previous calendar month)
9	Maintenance Records and Reports	Enterprise Asset Management Maintenance Summary Export	Quarterly (Export of flat file of work orders for previous three calendar months)
10	Maintenance Records and Reports	Transit Asset Management / State of Good Repair Asset Inventory	Annual
11	Inspection Records and Reports	Bridge Reports from City of Tucson	As available, biannually

Current Data Collected From Valley Metro

Number	Data Source Category	Data Source Name	Frequency of Collection
1	Safety and Security Event Investigations	Safety Tracking Log	Quarterly
2	Safety and Security Event Investigations	Security Rail Incident Tracking Log	Quarterly
3	Safety and Security Event Investigations	Event Reports	Within 30 days of reportable event
4	Hazards and Security Risks	Safety Hazard Tracking Log	Quarterly
5	Hazards and Security Risks	Unacceptable Hazard Investigation Reports	Within 30 days of reportable unacceptable hazard notification
6	Corrective Action Plans	Safety Tracking Log, Safety Hazard Tracking Log, ISSA Safety CAP Tracking Log, ISSA Security CAP Tracking Log	Quarterly
7	Employee Safety Reporting Program	VM Safety Concerns Tracking Log	Quarterly
8	Operations Data	Daily Operator's Log Export	Monthly (Export of full previous calendar month)
9	Maintenance Records and Reports	Maintenance KPI and PM Compliance Reporting	Quarterly
10	Maintenance Records and Reports	Transit Asset Management / State of Good Repair Asset Inventory	Annual
11	Inspection Records and Reports	Bridge Reports from City of Phoenix	As available, biannually

Maintenance Data Samples by the Pages

PM Compliance

Shop Location(s): FMMESA, FMR

FMR - FACILITIES RAIL

On Time: **804** Pct On Time: **99.38%**
Late: **5** Pct Late: **0.62%**

Compliance: **ON-TIME**

Page 20 of 96
Report Date: 12/15/2025

PM Compliance

 Trapeze
Enterprise Asset Management

PM Performed Date Range: 11/1/2025 to 11/30/2025
Time Late if over: 0
Distance Late if over: 0
Shop Location(s): SIGCOM, TP, TRACK
All PM Tasks

SIGCOM - SIGNALS AND COMMUNICATIONS

On Time: **500** Pct On Time: **98.23%**
Late: **9** Pct Late: **1.77%**

Page 1 of 111
Report Date: 12/15/2025

PM Compliance

 Trapeze
Enterprise Asset Management

PM Performed Date Range: 11/1/2025 to 11/30/2025
Time Late if over: 999999
Distance Late if over: 999999
Shop Location(s): MOEVM
PM Task(s): INP.001, INP.002, INP.003, INP.004, INP.013, INP.014, INP.15Y, INP.16Y

MOEVM - MOE VEHICLE MAINTENANCE

On Time: **2,347** Pct On Time: **98.57%**
Late: **34** Pct Late: **1.43%**

Page 1 of 160
Report Date: 12/15/2025

Maintenance Data by the Pages (Cont.)

Sample of what each page looks like from VMR in these reports.

Shown here as a sample are OCS Inspections.

Compliance: ON-TIME										
Asset/ Task	Work Order	Meter 1			Meter 2			Dates		
		Due	Performed	Early/Late	Due	Performed	Early/Late	Due	Performed	Early/Late
COL-B-LS1-SB1 - CATENARY - BASELINE - SHERMAN TP0040 - MONTHLY VISUAL OCS INSPECTION/PM	TP-2026-1720	0	0		0	0		11/15/2025	11/09/2025	6
COL-B-LS2-NB2 - CATENARY - SHERMAN - MCDOWELL TP0040 - MONTHLY VISUAL OCS INSPECTION/PM	TP-2026-1721	0	0		0	0		11/15/2025	11/08/2025	7
COL-B-LS2-SB1 - CATENARY - SHERMAN - MCDOWELL TP0040 - MONTHLY VISUAL OCS INSPECTION/PM	TP-2026-1722	0	0		0	0		11/15/2025	11/08/2025	7
COL-B-LS3-NB2 - CATENARY - MCDOWELL - MONTEBELLO TP0040 - MONTHLY VISUAL OCS INSPECTION/PM	TP-2026-1723	0	0		0	0		11/15/2025	11/09/2025	6
COL-B-LS3-SB1 - CATENARY - MCDOWELL - MONTEBELLO TP0040 - MONTHLY VISUAL OCS INSPECTION/PM	TP-2026-1724	0	0		0	0		11/15/2025	11/11/2025	4
COL-B-LS4-NB2 - CATENARY - MONTEBELLO-METRO CENTER TP0040 - MONTHLY VISUAL OCS INSPECTION/PM	TP-2026-1725	0	0		0	0		11/15/2025	11/13/2025	2
COL-B-LS4-SB1 - CATENARY - MONTEBELLO-METRO CENTER TP0040 - MONTHLY VISUAL OCS INSPECTION/PM	TP-2026-1726	0	0		0	0		11/15/2025	11/12/2025	3
CSB001-TP EQUIPMENT - TRACTION POWER EQUIPMENT TP0067 - MONTHLY SUBSTATION PM/INSPECTION	TP-2026-1673	0	0		0	0		11/15/2025	11/04/2025	11
CSB002-TP EQUIPMENT - TRACTION POWER EQUIPMENT TP0067 - MONTHLY SUBSTATION PM/INSPECTION	TP-2026-1674	0	0		0	0		11/15/2025	11/05/2025	10

Location: TP continues on next page...

Operations Data by the Pages

**Rail Operations Daily
Activity Log**

Date: 10/01/2025- 10/31/2025

SERVICE	LOCATION	REPORTED BY	Description	Resolution	SYSTEM	NOTIFIED	
10/1/25	Station	derves	@1132 Train 3212 delayed due to light cycle at TOCN	Train departed MTCR SB to BACN	Signals		
TIME	MTCR	OP ID			SUBSYSTEM		
12:02 pm		244			Bar Signal	DELAY	TRIP
LRV	TRACK/DIR	TRAIN ID			Predicted Priority	252538	
129 101 0	Orange T2 NB	3212 DELETED NO			Time: 9		
10/1/25	Station	derves	@1103 Train 3101 delayed due to late departure from HUS.	Train departed GIMN WB to HUN	Operations		
TIME	GIMN	OP ID			SUBSYSTEM		
12:02 pm		Jones (616)			Comfort Stop	DELAY	TRIP
LRV	TRACK/DIR	TRAIN ID			Comfort Stop	252507	
201 209 0	Blue T1 EB	201 DELETED NO			Time: 23		
10/1/25	Station	amoffatt	Train 3102 received an incomplete trip eastbound due to schedule recovery and switch 7 at the YDE was out of correspondence and train 3102 was held at 44WA. Train 3102 was turned back westbound at MEMN.	Train 3102 continued westbound as normal from MEMN.	Operations		
TIME	MEMN	OP ID			SUBSYSTEM		
12:09 pm		ary Short (4€			OTHER	DELAY	TRIP
LRV	TRACK/DIR	TRAIN ID			Incomplete	252507	
214 204 0	Blue T1 EB	3102 DELETED NO			Time: 24		

Page 7 of 1026

These logs range between 950 to 1,400 pages every month from each RTA.

Shown here is data from VMR. SLS data is of very similar format.

AI Models Used During This Process



How we use it to assist us (Prompts)

A complete prompt you can copy
and paste each month that specifies
all required elements:

Top 25 delays

All maintenance callouts (300, 400, 500 series units)

All train removals from service

All accidents and incidents (major and minor)

Top 15 operators with detailed call logs

Safety-related events

Operational metrics

Infrastructure issues

Report Structure Guide

15 major sections covering:

Executive summary

Operational overview

Delay analysis

Maintenance logs

Accident reports

Operator performance

Safety concerns

Data Extraction Checklist

A comprehensive checklist with 25+

data points to ensure nothing is missed, including:

Event counts and categories

Operator details with timestamps

Maintenance callouts

Safety incidents

All red signal overruns (RSO)s

Equipment failures

Quality Assurance Criteria

Standards to verify your report includes:

Complete documentation

How we use it to assist us (Prompts) Cont.

Proper detail level with dates/times

Professional formatting

Analytical insights

Actionable recommendations

Example Formats

Sample tables and logs showing proper formatting for:

Operator call tables including Maintenance logs and Accident reports

This is only one prompt (all three pieces together make one) used for one RTA on daily activity logs.

This prompt can vary depending on what data set is being sorted and which RTA it is from.

What we end up with afterwards

ADOT ANALYSIS OF VMR OCTOBER 2025 RAIL OPERATIONS COMPREHENSIVE SAFETY AND OPERATIONS LOG

Executive Summary

This report provides a comprehensive analysis of rail operations for October 2025, documenting extensive operational events across all categories including delays, accidents, maintenance interventions, and safety incidents. The analysis reveals continuing systematic operational challenges primarily related to signal infrastructure with bar signal restrictions dominating delay causation, accounting for approximately 62% of all documented delays. Critical safety incidents during October included three major train-vehicle collisions (hit-and-run at Police Station Access Road-Apache on October 5, Price-Loop 101 SB-Apache on October 16, Rio Salado-Hayden Ferry streetcar on October 25), two streetcar accidents at 5th-Ash on October 17 and October 25, major YDE Switch 7A failure on October 1 affecting 12+ trains for over 4 hours, GUT Switch 3A chronic failures on October 17, extensive comfort stop delays (70+ documented), and multiple train removals for propulsion and brake system failures.¹

I. OPERATIONAL OVERVIEW

Total Events Summary

Category	Count	Primary Impact
Delays	700+	Bar signal restrictions, light cycle timing
Accidents	5	3 train vs. vehicle (1 hit-and-run), 2 streetcar
Switch Issues	Extensive	YDE 7A, GUT 3A, MTV 1A, DOR 5A chronic failures
Signal Trouble	Extensive	False RSOs, 5ST false occupancy, switch troubles
Blockages	8+	High centered vehicles, ROW obstructions
Comfort Stops	70+	Extended operator breaks (highest monthly total)
Passenger Incidents	15+	Disturbances, security holds, medical emergencies

IV. TRAIN REMOVALS FROM SERVICE

Complete Log of Train Removals

- 1. October 1, 2025 - 5:53 PM** - Train 3109 (LRV 107-138) removed from service at HUS for active speed restriction and Motor Current Discrepancy in 107-A; train returned to yard 6:20 PM; incomplete trip 50WA-GIMN; Work Order MOEVM-2026-9223¹
- 2. October 5, 2025 - 12:13 AM** - Train 3143 (LRV 210-220) removed from service following hit-and-run collision with Black Buick Verano at Police Station Access Road-Apache; front bumper knocked off; train cleared by LRVM/PD, moved OOS as Train 3180 to yard 1:05 AM; incomplete trip; removed LRV 210-220¹
- 3. October 6, 2025 - 12:29 PM** - Train 3106 (LRV 138-122) swapped at 44WA due to Outer Motor Temp Motor Warning fault; replaced with LRV 107-123; LRV 138-122 returned to yard on C2; 16-minute delay¹
- 4. October 6, 2025 - 12:26 PM** - SC-3301 (LRV 181) removed from service for TCU A Car Aux Power Supply Failure, ESS failure, not charging; returned OOS to yard; Work Order MOEVM 2026-9602¹
- 5. October 16, 2025 - 9:04 PM** - Train 3107 (LRV 131-147) removed from service following collision with Grey Honda at Price-Loop 101 SB-Apache; front bumper and right side damage; train cleared by LRVM/PD, moved OOS as Train 3180 to yard 10:16 PM; incomplete trip; removed LRV 131-147¹
- 6. October 17, 2025 - 10:55 AM** - SC-3304 (LRV 185) removed from service following collision at 5th-Ash; moved OOS to YDE 11:38 AM; replaced with LRV 180; Work Order ACCMOE202630; removed LRV 185¹

Key Takeaways

- Always double check AI's work or sources (it can and will make mistakes)
- It is a tool, not an employee, and can make mistakes
- AI is not our Subject Matter Expert
- Do not let it decide what is and what is not an issue

Key Takeaways, cont.

- It takes time to mold; it does not do what you want right out of the gate
- Analysis is only as good as your prompts - ask for little, get little back
- Expect time (weeks to months) to get your prompts perfected
- It is best to keep the data you feed it separate (Maintenance, Inspections, Operations, Logs, etc.)
- Keep your data organized and consistent!



Contact Information

Brian Brinkley

Arizona Department of Transportation

State Safety & Security Oversight

1611 W. Jackson, MD310B

Phoenix, AZ 85007

(602) 712-8798

BBrinkley3@azdot.gov

MINNESOTA RBI ANALYSIS & PRIORITIZATION

Jon Wolfgram P.E. – Director

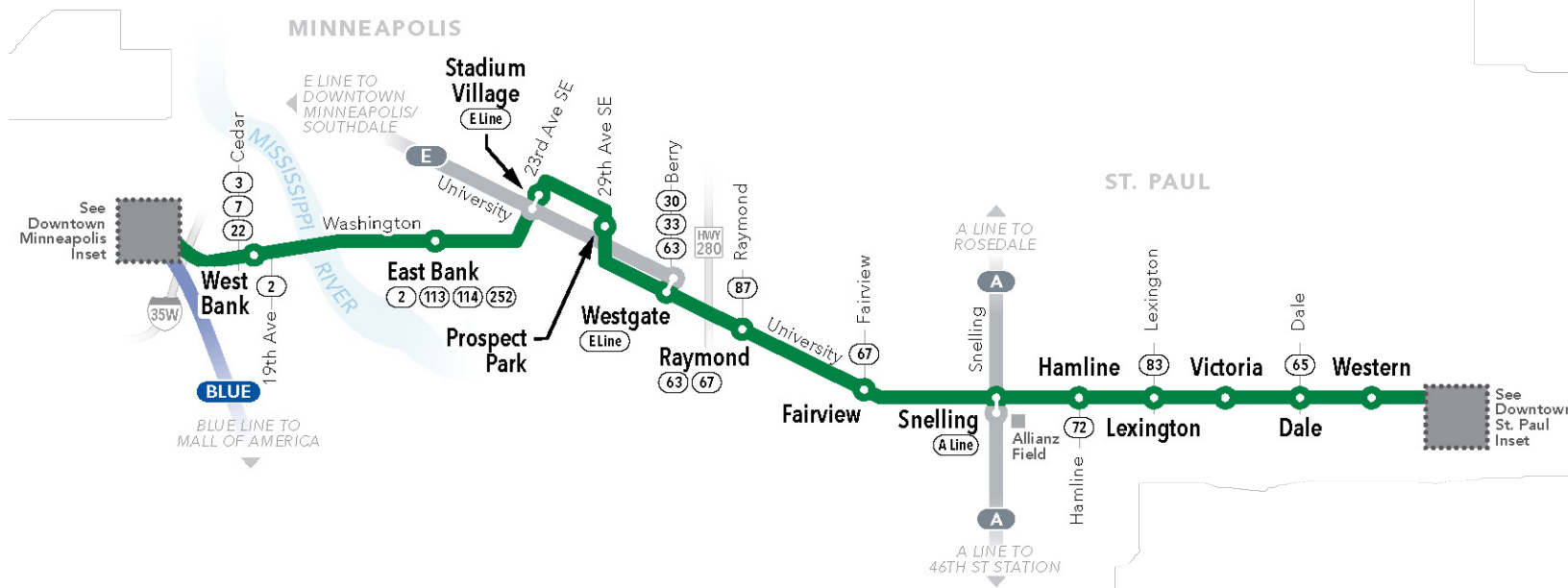


AGENDA

- Minnesota Infrastructure
- Process Overview
- Review of Data Analysis
- Prioritization of Inspections
- Documentation
- Questions

INFRASTRUCTURE

- (1) RTA System In Minnesota
- 2004 and 2014 vintage
- 23 total miles (14.5-mile expansion project)
- 91 LRVs (27 more for expansion project)
- 37 Stations (16 more for expansion project)




MN PROCESS

- Inspection Process
 - ✓ Announced or unannounced
 - ✓ Communication throughout the process
 - ✓ Data-driven
- Data Sharing
 - ✓ Real-time via Teams Dashboards (*safety & maintenance data*)
 - ✓ Monthly
- Documentation
 - ✓ Data / analysis
 - ✓ Inspection casework

ANALYSIS - DATA

- Safety Data
 - ✓ NTD Data (*collisions, derailments, etc.*)
 - ✓ Special Situation Reports (*signal overruns, workzone overruns, etc.*)
- Maintenance Data
- Inspection Data
- Factors assigned for:
 - ✓ Consequence
 - ✓ Likelihood
 - ✓ Awareness of Event
- Data Organized by Location

ANALYSIS - DATA – TEAMS CHANNEL

MT **General** Posts Shared **Dashboards** ▾ Work Order Inquires Overruns 

File ▾ Share ▾ Export ▾ ...

Overview of Vehicle Inspection Intervals

Work Order	Vehicle	Inspections	Life Type	Inspection Date	Previous Insp Date	Life at Insp	Life at Previous Insp	Miles/ Days Between Insp	Compliance Interval	Miles/Days Difference	Compliance
0007392924	LRV228	LRV_SAFE	Miles	02/09/2026	12/08/2025	599,029	593,365	5,664	5500	164	1
0007392923	LRV228	LRVA	Miles	02/09/2026	04/09/2025	599,029	572,746	26,283	25000	1,283	1
0007378562	lrv244	LRV_SAFE	Miles	02/09/2026	12/16/2025	548,442	542,529	5,913	5500	413	1
0007455035	LRV2MT026	LRVTM	Days	02/09/2026	08/09/2024	339	4,084	-3,745	365	-4,110	1
0007392912	LRV215	LRV_SAFE	Miles	02/07/2026	12/26/2025	701,541	696,634	4,907	5500	-593	1
0007277210	LRV113	LRV_SAFE	Miles	02/06/2026	12/21/2025	1,324,173	1,318,697	5,476	5500	-24	1
0007407055	LRV123	LRV_SAFE	Miles	02/06/2026	12/12/2025	1,295,687	1,290,540	5,147	5500	-353	1
0007203058	LRV210	LRV_SAFE	Miles	02/06/2026	12/02/2025	656,968	651,196	5,772	5500	272	1
0007364853	LRV243	LRV_SAFE	Miles	02/06/2026	11/18/2025	561,668	556,366	5,302	5500	-198	1
0007407073	LRV257	LRV_SAFE	Miles	02/06/2026	12/17/2025	547,008	541,228	5,780	5500	280	1
0007392890	LRV104	LRV_SAFE	Miles	02/05/2026	11/21/2025	1,259,658	1,254,816	4,842	5500	-658	1

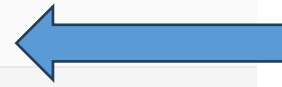
Maintenance Data available in real-time via RTA hosted Teams Channel:

- ✓ LRVs
- ✓ Track
- ✓ Traction Power
- ✓ Signals
- ✓ Comms

ANALYSIS - DATA – TEAMS CHANNEL

MT **General** Posts Shared Dashboards Work Order Inquires **Overruns** ▾

File ▾ Export ▾ Share Get insights ...



Overrun Data (Safety Data) also available

- ✓ Location
- ✓ LRV
- ✓ Operator

All Metro Transit LR Overrun Events - Txbase

Overrun ID	SSR #	Overrun Date	Violation Code	Corridor	Signal	LRV_1	LRV_2	LRV_3	Operator ID	Name	Overrun Time	Track Num	Direction
10001866	1458653	03/01/2026	201A	Green	C146	303	213				8:00:35 AM	MT2	W
10001865	1458438	02/27/2026	111B	Blue		116	110				8:18:24 AM	MT1	
10001864	1457445	02/23/2026	209A	Blue		320	322				11:27:55 AM	MT2	S
10001863	1455697	02/15/2026		Downtown Territory		317	261				9:37:45 AM	MT1	N
10001862	1455622	02/14/2026	209A	Blue		111	119				6:51:02 AM	MT1	N
10001861	145509	02/14/2026	200A	Blue	132	303					5:49:01 AM	MT2	N
10001860	1454712	02/09/2026		Green		247	257				6:10:44 AM	MT2	E
10001859	1454614	02/09/2026	213A	Green		261	219				6:34:59 AM	MT2	E
10001858	1454574	02/08/2026	209A	Blue		124	125	109			6:26:04 AM	MT1	N
10001855	1453972	02/05/2026		Downtown Territory		237	203				4:57:26 AM	MT2	E
10001856	1453995	02/05/2026	201A	Blue	82	263	262				4:06:50 AM	MT1	N
10001854	1453825	02/04/2026	200A	Downtown Territory		252	235				8:19:18 AM	IC Tail	W
10001853	1453489	02/03/2026	201A	Blue	106	115	111				10:14:46 AM	MT1	N
10001852	1452125	01/27/2026		Blue		110	115				12:00:00 PM	MT2	S

Overrun ID	Overrun Date	Overrun Description	AO	RSO	SO	Viol	WZO	Violation Code	Violation Description	Signals	Personnel	Sup in Charge
10001749	07/17/2025		N	Y	N	Y	N	201A	Red signal overrun	03707		72389

ANALYSIS & PRIORITIZATION

- Analysis is further refined to scope out the RBI:
- Utilize Maintenance & Additional Safety Data From Dashboards
 - ✓ Location
 - ✓ Equipment
 - ✓ Operator
- Data is compiled and documented with an inspection planning spreadsheet.

ANALYSIS – MNOSSO ANALYSIS

Fatality Consequence Factor	Fatality Consequence Score	Injury Consequence Factor	Injury Consequence Score	Property Damage Factor	Property Damage Consequence Score	Cumulative Consequence Score	Likelihood Count	Analysis Date	Duration Since Event	Year	Time Elapsed Score	Risk Score	Prioritization Points
0	0	100	100	0	0	100	1	12/5/2025	3.433333333	2025	10	1000	17
0	0	0	0	0	0	0	1	12/5/2025	3.3	2025	10	0	25



NTD Safety Data is imported into a spreadsheet to conduct risk calculations:

- ✓ Consequence Score
- ✓ Likelihood Scores

A similar analysis is used for Red Signal or Work Zone Overrun Data

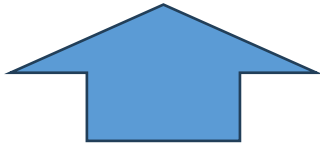
ANALYSIS – MNOSSO ANALYSIS

Awareness Score	CAP?	Awareness Score Notes	InspectionScore_1.1	InspectionScore_1.2	InspectionScore_1.3	InspectionScore_2.1	InspectionScore_2.2	InspectionScore_2.3	InspectionScore_3.1	InspectionScore_3.2	InspectionScore_3.3	InspectionScore_4.1	InspectionScore_4.2	InspectionScore_4.3	InspectionScore_4.3	InspectionScore_5.1	InspectionScore_5.2	InspectionScore_5.3	InspectionScore_5.4	InspectionScore_6.1	InspectionScore_6.2	InspectionScore_6.3	InspectionScore_6.4	InspectionScore_7.1	InspectionScore_7.2	InspectionScore_7.3	InspectionScore_7.4	InspectionScore_7.5
20		Potential risk already identified/known, no new information presented	43	43	43	43	43	43	43	43	43	39	39	39	39	39	39	39	39	47	47	47	47	47	47	47	47	47
20		Potential risk already identified/known, no new information presented	51	51	51	51	51	51	51	51	51	47	47	47	47	47	47	47	47	55	55	55	55	55	55	55	55	55



ANALYSIS & PRIORITIZATION

Row Labels	Count of ID	Risk Score	Risk Rank	Average of Duration Since Event	Max of Year	Min of InspectionScore_1.1	Min of InspectionScore_1.2	Min of InspectionScore_1.3	Min of InspectionScore_2.1	Min of InspectionScore_2.2	Min of InspectionScore_2.3	Min of InspectionScore_3.1	Min of InspectionScore_3.2	Min of InspectionScore_3.3	Min of InspectionScore_4.1	Min of InspectionScore_4.2	Min of InspectionScore_4.3	Min of InspectionScore_4.32
Collision																		
OTHER	31.0	3920.7	1.0	112.8	2025	43	43	43	43	43	43	43	43	43	39	39	39	39
42nd St	9.0	3510.0	2.0	150.1	2025	20	20	20	20	20	20	20	20	20	16	16	16	16
46th St	9.0	3305.7	3.0	175.9	2024	50	50	50	50	50	50	50	50	50	46	46	46	46
26th St	8.0	3200.7	4.0	160.2	2025	41	41	41	41	41	41	41	41	41	37	37	37	37
Rice St.	17.0	2337.5	5.0	92.6	2025	46	46	46	46	46	46	46	46	46	42	42	42	42
32nd St	4.0	2100.0	6.0	62.9	2023	51	51	51	51	51	51	51	51	51	47	47	47	47



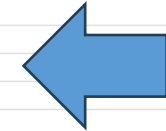
Risk based inspection prioritization:

- ✓ Safety Data
- ✓ Inspection Data

ANALYSIS & PRIORITIZATION

	A	B	C	D	E	F	G	H
3					Years (DATE_CREATED)	(Multiple Items)		
4					LOCATIONAT	(Multiple Items)	At 42nd Street	
5	Row Labels	42nd St			Row Labels	Count of INCIDENT_REPORT_ID		
6	Count of ID	9.0			▾ LRT Service Perf Report	1		
7	Risk Score	3510.0			(blank)	1		
8	Risk Rank	2.0			▾ LRT Sys TX Report	25		
9	Average of Duration Since Event	150.1			(blank)	25		
10	Max of Year	2025	Applicable Section For Event & RBI		▾ LRV Mech TX Report	2		
11	Min of InspectionScore_1.1	20	N		(blank)	2		
12	Min of InspectionScore_1.2	20	N		▾ RCC SSR	41		
13	Min of InspectionScore_1.3	20	N		ACCIDENT PD	1		
14	Min of InspectionScore_2.1	20	N		ACCIDENT PDHR	1		
15	Min of InspectionScore_2.2	20	N		ACCIDENT PERSON	1		
16	Min of InspectionScore_2.3	20	N		ACCIDENT PI	1		
17	Min of InspectionScore_3.1	20	N		CHECK WELFARE	1		
18	Min of InspectionScore_3.2	20	N		DAMAGE TO PROPERTY	1		
19	Min of InspectionScore_3.3	20	N		INFORMATIONAL REPORT	4		
20	Min of InspectionScore_4.1	16	Y		LRT GENERAL	12		
21	Min of InspectionScore_4.2	16	Y		LRTROW ENCROACH-PER	10		
22	Min of InspectionScore_4.3	16	Y		LRTROW ENCROACH-VEH	4		
23	Min of InspectionScore_4.32	16	Y		LRV HANDLING	5		
24	Min of InspectionScore_5.1	16	Y		Grand Total	69		
25	Min of InspectionScore_5.3	16	Y					
26	Min of InspectionScore_5.2	16	Y					
27	Min of InspectionScore_5.4	16	Y					
28	Min of InspectionScore_6.1	24	N		DATE_CREATED	INCIDENT_REPORT_ID	INCIDENT_ID	INCIDENT_SUBTYPE
29	Min of InspectionScore_6.2	24	N		11/12/2020	1082005	RCC SSR	LRTROW ENCROACH-PER
30	Min of InspectionScore_6.3	24	N		8/10/2022	1195022	RCC SSR	LRTROW ENCROACH-PER
31	Min of InspectionScore_6.4	24	N		8/28/2022	1198411	RCC SSR	LRTROW ENCROACH-PER
32	Min of InspectionScore_7.1	24	N		11/10/2022	1212577	RCC SSR	LRTROW ENCROACH-PER
33	Min of InspectionScore_7.2	24	N		11/15/2022	1213542	RCC SSR	LRTROW ENCROACH-PER
34	Min of InspectionScore_7.3	24	N		8/11/2023	1264677	RCC SSR	LRTROW ENCROACH-PER
35	Min of InspectionScore_7.4	24	N		12/30/2023	1292099	RCC SSR	LRTROW ENCROACH-PER
36	Min of InspectionScore_7.5	24	N		2/14/2025	1372575	RCC SSR	LRTROW ENCROACH-PER
37	Min of InspectionScore_8a.1	24	N		8/15/2025	1414783	RCC SSR	LRTROW ENCROACH-PER
38	Min of InspectionScore_8a.2	24	N		10/8/2025	1428133	RCC SSR	LRTROW ENCROACH-PER
39	Min of InspectionScore_8a.3	24	N					

Additional Safety Data & Inspection History Included in Analysis



ANALYSIS & PRIORITIZATION

B	C	D	E	F	G	H	I	J	K	L	M	N																																																																																																																																																																																																																																								
42nd St	SCXG42																																																																																																																																																																																																																																																			
<table border="1"> <thead> <tr> <th>Count of Compliance</th> <th>Column L</th> <th>Column M</th> <th>Grand Total</th> </tr> </thead> <tbody> <tr> <td>Row Labels</td> <td>0</td> <td>1</td> <td>Grand Total</td> </tr> <tr> <td>SCXG42</td> <td>3</td> <td>24</td> <td>27</td> </tr> <tr> <td>SCINS10YR</td> <td>1</td> <td></td> <td>1</td> </tr> <tr> <td>2011</td> <td>1</td> <td></td> <td>1</td> </tr> <tr> <td>SCRLY4YR</td> <td></td> <td>1</td> <td>1</td> </tr> <tr> <td>2021</td> <td></td> <td>1</td> <td>1</td> </tr> <tr> <td>SCXG01</td> <td></td> <td>1</td> <td>1</td> </tr> <tr> <td>2024</td> <td></td> <td>1</td> <td>1</td> </tr> <tr> <td>SCXG03</td> <td>1</td> <td>4</td> <td>5</td> </tr> <tr> <td>2024</td> <td></td> <td>1</td> <td>1</td> </tr> <tr> <td>2025</td> <td>1</td> <td>3</td> <td>4</td> </tr> <tr> <td>SCXG06</td> <td></td> <td>2</td> <td>2</td> </tr> <tr> <td>2024</td> <td></td> <td>1</td> <td>1</td> </tr> <tr> <td>2025</td> <td></td> <td>1</td> <td>1</td> </tr> <tr> <td>SCXG12</td> <td>1</td> <td>14</td> <td>15</td> </tr> <tr> <td>2024</td> <td></td> <td>1</td> <td>1</td> </tr> <tr> <td>2025</td> <td>1</td> <td>13</td> <td>14</td> </tr> <tr> <td>SCXGS01</td> <td></td> <td>1</td> <td>1</td> </tr> <tr> <td>2024</td> <td></td> <td>1</td> <td>1</td> </tr> <tr> <td>SCXGW01</td> <td></td> <td>1</td> <td>1</td> </tr> <tr> <td>2024</td> <td></td> <td>1</td> <td>1</td> </tr> <tr> <td>Grand Total</td> <td>3</td> <td>24</td> <td>27</td> </tr> </tbody> </table>				Count of Compliance	Column L	Column M	Grand Total	Row Labels	0	1	Grand Total	SCXG42	3	24	27	SCINS10YR	1		1	2011	1		1	SCRLY4YR		1	1	2021		1	1	SCXG01		1	1	2024		1	1	SCXG03	1	4	5	2024		1	1	2025	1	3	4	SCXG06		2	2	2024		1	1	2025		1	1	SCXG12	1	14	15	2024		1	1	2025	1	13	14	SCXGS01		1	1	2024		1	1	SCXGW01		1	1	2024		1	1	Grand Total	3	24	27	<table border="1"> <thead> <tr> <th>Years (Previous Insp Date)</th> <th>2025</th> <th></th> <th></th> </tr> </thead> <tbody> <tr> <td colspan="4"> <table border="1"> <thead> <tr> <th>Count of Compliance</th> <th>Column L</th> <th>Column M</th> <th>Grand Total</th> </tr> </thead> <tbody> <tr> <td>Row Labels</td> <td>0</td> <td>1</td> <td>Grand Total</td> </tr> <tr> <td>SCXG11</td> <td>2</td> <td>14</td> <td>16</td> </tr> <tr> <td>2/27/2025</td> <td>1</td> <td></td> <td>1</td> </tr> <tr> <td>2/28/2025</td> <td></td> <td>1</td> <td>1</td> </tr> <tr> <td>3/23/2025</td> <td></td> <td>1</td> <td>1</td> </tr> <tr> <td>4/25/2025</td> <td></td> <td>1</td> <td>1</td> </tr> <tr> <td>5/25/2025</td> <td></td> <td>3</td> <td>3</td> </tr> <tr> <td>6/27/2025</td> <td></td> <td>1</td> <td>1</td> </tr> <tr> <td>7/25/2025</td> <td></td> <td>1</td> <td>1</td> </tr> <tr> <td>8/23/2025</td> <td></td> <td>2</td> <td>2</td> </tr> <tr> <td>9/28/2025</td> <td>1</td> <td></td> <td>1</td> </tr> <tr> <td>10/18/2025</td> <td></td> <td>2</td> <td>2</td> </tr> <tr> <td>11/20/2025</td> <td></td> <td>2</td> <td>2</td> </tr> <tr> <td>SCXG15</td> <td>5</td> <td>11</td> <td>16</td> </tr> <tr> <td>1/11/2025</td> <td></td> <td>1</td> <td>1</td> </tr> <tr> <td>2/15/2025</td> <td>1</td> <td></td> <td>1</td> </tr> <tr> <td>3/17/2025</td> <td></td> <td>1</td> <td>1</td> </tr> <tr> <td>4/28/2025</td> <td>2</td> <td></td> <td>2</td> </tr> <tr> <td>5/20/2025</td> <td></td> <td>1</td> <td>1</td> </tr> <tr> <td>6/17/2025</td> <td></td> <td>1</td> <td>1</td> </tr> <tr> <td>7/14/2025</td> <td></td> <td>1</td> <td>1</td> </tr> <tr> <td>7/15/2025</td> <td></td> <td>2</td> <td>2</td> </tr> <tr> <td>8/11/2025</td> <td></td> <td>1</td> <td>1</td> </tr> <tr> <td>9/20/2025</td> <td>1</td> <td>1</td> <td>2</td> </tr> <tr> <td>10/18/2025</td> <td></td> <td>2</td> <td>2</td> </tr> <tr> <td>11/22/2025</td> <td>1</td> <td></td> <td>1</td> </tr> <tr> <td>SCXG24</td> <td>1</td> <td>13</td> <td>14</td> </tr> <tr> <td>2/22/2025</td> <td></td> <td>1</td> <td>1</td> </tr> <tr> <td>3/25/2025</td> <td></td> <td>1</td> <td>1</td> </tr> <tr> <td>4/22/2025</td> <td></td> <td>1</td> <td>1</td> </tr> </tbody> </table> </td> </tr> <tr> <td colspan="4">Non-Compliant Work Orders</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>				Years (Previous Insp Date)	2025			<table border="1"> <thead> <tr> <th>Count of Compliance</th> <th>Column L</th> <th>Column M</th> <th>Grand Total</th> </tr> </thead> <tbody> <tr> <td>Row Labels</td> <td>0</td> <td>1</td> <td>Grand Total</td> </tr> <tr> <td>SCXG11</td> <td>2</td> <td>14</td> <td>16</td> </tr> <tr> <td>2/27/2025</td> <td>1</td> <td></td> <td>1</td> </tr> <tr> <td>2/28/2025</td> <td></td> <td>1</td> <td>1</td> </tr> <tr> <td>3/23/2025</td> <td></td> <td>1</td> <td>1</td> </tr> <tr> <td>4/25/2025</td> <td></td> <td>1</td> <td>1</td> </tr> <tr> <td>5/25/2025</td> <td></td> <td>3</td> <td>3</td> </tr> <tr> <td>6/27/2025</td> <td></td> <td>1</td> <td>1</td> </tr> <tr> <td>7/25/2025</td> <td></td> <td>1</td> <td>1</td> </tr> <tr> <td>8/23/2025</td> <td></td> <td>2</td> <td>2</td> </tr> <tr> <td>9/28/2025</td> <td>1</td> <td></td> <td>1</td> </tr> <tr> <td>10/18/2025</td> <td></td> <td>2</td> <td>2</td> </tr> <tr> <td>11/20/2025</td> <td></td> <td>2</td> <td>2</td> </tr> <tr> <td>SCXG15</td> <td>5</td> <td>11</td> <td>16</td> </tr> <tr> <td>1/11/2025</td> <td></td> <td>1</td> <td>1</td> </tr> <tr> <td>2/15/2025</td> <td>1</td> <td></td> <td>1</td> </tr> <tr> <td>3/17/2025</td> <td></td> <td>1</td> <td>1</td> </tr> <tr> <td>4/28/2025</td> <td>2</td> <td></td> <td>2</td> </tr> <tr> <td>5/20/2025</td> <td></td> <td>1</td> <td>1</td> </tr> <tr> <td>6/17/2025</td> <td></td> <td>1</td> <td>1</td> </tr> <tr> <td>7/14/2025</td> <td></td> <td>1</td> <td>1</td> </tr> <tr> <td>7/15/2025</td> <td></td> <td>2</td> <td>2</td> </tr> <tr> <td>8/11/2025</td> <td></td> <td>1</td> <td>1</td> </tr> <tr> <td>9/20/2025</td> <td>1</td> <td>1</td> <td>2</td> </tr> <tr> <td>10/18/2025</td> <td></td> <td>2</td> <td>2</td> </tr> <tr> <td>11/22/2025</td> <td>1</td> <td></td> <td>1</td> </tr> <tr> <td>SCXG24</td> <td>1</td> <td>13</td> <td>14</td> </tr> <tr> <td>2/22/2025</td> <td></td> <td>1</td> <td>1</td> </tr> <tr> <td>3/25/2025</td> <td></td> <td>1</td> <td>1</td> </tr> <tr> <td>4/22/2025</td> <td></td> <td>1</td> <td>1</td> </tr> </tbody> </table>				Count of Compliance	Column L	Column M	Grand Total	Row Labels	0	1	Grand Total	SCXG11	2	14	16	2/27/2025	1		1	2/28/2025		1	1	3/23/2025		1	1	4/25/2025		1	1	5/25/2025		3	3	6/27/2025		1	1	7/25/2025		1	1	8/23/2025		2	2	9/28/2025	1		1	10/18/2025		2	2	11/20/2025		2	2	SCXG15	5	11	16	1/11/2025		1	1	2/15/2025	1		1	3/17/2025		1	1	4/28/2025	2		2	5/20/2025		1	1	6/17/2025		1	1	7/14/2025		1	1	7/15/2025		2	2	8/11/2025		1	1	9/20/2025	1	1	2	10/18/2025		2	2	11/22/2025	1		1	SCXG24	1	13	14	2/22/2025		1	1	3/25/2025		1	1	4/22/2025		1	1	Non-Compliant Work Orders												
Count of Compliance	Column L	Column M	Grand Total																																																																																																																																																																																																																																																	
Row Labels	0	1	Grand Total																																																																																																																																																																																																																																																	
SCXG42	3	24	27																																																																																																																																																																																																																																																	
SCINS10YR	1		1																																																																																																																																																																																																																																																	
2011	1		1																																																																																																																																																																																																																																																	
SCRLY4YR		1	1																																																																																																																																																																																																																																																	
2021		1	1																																																																																																																																																																																																																																																	
SCXG01		1	1																																																																																																																																																																																																																																																	
2024		1	1																																																																																																																																																																																																																																																	
SCXG03	1	4	5																																																																																																																																																																																																																																																	
2024		1	1																																																																																																																																																																																																																																																	
2025	1	3	4																																																																																																																																																																																																																																																	
SCXG06		2	2																																																																																																																																																																																																																																																	
2024		1	1																																																																																																																																																																																																																																																	
2025		1	1																																																																																																																																																																																																																																																	
SCXG12	1	14	15																																																																																																																																																																																																																																																	
2024		1	1																																																																																																																																																																																																																																																	
2025	1	13	14																																																																																																																																																																																																																																																	
SCXGS01		1	1																																																																																																																																																																																																																																																	
2024		1	1																																																																																																																																																																																																																																																	
SCXGW01		1	1																																																																																																																																																																																																																																																	
2024		1	1																																																																																																																																																																																																																																																	
Grand Total	3	24	27																																																																																																																																																																																																																																																	
Years (Previous Insp Date)	2025																																																																																																																																																																																																																																																			
<table border="1"> <thead> <tr> <th>Count of Compliance</th> <th>Column L</th> <th>Column M</th> <th>Grand Total</th> </tr> </thead> <tbody> <tr> <td>Row Labels</td> <td>0</td> <td>1</td> <td>Grand Total</td> </tr> <tr> <td>SCXG11</td> <td>2</td> <td>14</td> <td>16</td> </tr> <tr> <td>2/27/2025</td> <td>1</td> <td></td> <td>1</td> </tr> <tr> <td>2/28/2025</td> <td></td> <td>1</td> <td>1</td> </tr> <tr> <td>3/23/2025</td> <td></td> <td>1</td> <td>1</td> </tr> <tr> <td>4/25/2025</td> <td></td> <td>1</td> <td>1</td> </tr> <tr> <td>5/25/2025</td> <td></td> <td>3</td> <td>3</td> </tr> <tr> <td>6/27/2025</td> <td></td> <td>1</td> <td>1</td> </tr> <tr> <td>7/25/2025</td> <td></td> <td>1</td> <td>1</td> </tr> <tr> <td>8/23/2025</td> <td></td> <td>2</td> <td>2</td> </tr> <tr> <td>9/28/2025</td> <td>1</td> <td></td> <td>1</td> </tr> <tr> <td>10/18/2025</td> <td></td> <td>2</td> <td>2</td> </tr> <tr> <td>11/20/2025</td> <td></td> <td>2</td> <td>2</td> </tr> <tr> <td>SCXG15</td> <td>5</td> <td>11</td> <td>16</td> </tr> <tr> <td>1/11/2025</td> <td></td> <td>1</td> <td>1</td> </tr> <tr> <td>2/15/2025</td> <td>1</td> <td></td> <td>1</td> </tr> <tr> <td>3/17/2025</td> <td></td> <td>1</td> <td>1</td> </tr> <tr> <td>4/28/2025</td> <td>2</td> <td></td> <td>2</td> </tr> <tr> <td>5/20/2025</td> <td></td> <td>1</td> <td>1</td> </tr> <tr> <td>6/17/2025</td> <td></td> <td>1</td> <td>1</td> </tr> <tr> <td>7/14/2025</td> <td></td> <td>1</td> <td>1</td> </tr> <tr> <td>7/15/2025</td> <td></td> <td>2</td> <td>2</td> </tr> <tr> <td>8/11/2025</td> <td></td> <td>1</td> <td>1</td> </tr> <tr> <td>9/20/2025</td> <td>1</td> <td>1</td> <td>2</td> </tr> <tr> <td>10/18/2025</td> <td></td> <td>2</td> <td>2</td> </tr> <tr> <td>11/22/2025</td> <td>1</td> <td></td> <td>1</td> </tr> <tr> <td>SCXG24</td> <td>1</td> <td>13</td> <td>14</td> </tr> <tr> <td>2/22/2025</td> <td></td> <td>1</td> <td>1</td> </tr> <tr> <td>3/25/2025</td> <td></td> <td>1</td> <td>1</td> </tr> <tr> <td>4/22/2025</td> <td></td> <td>1</td> <td>1</td> </tr> </tbody> </table>				Count of Compliance	Column L	Column M	Grand Total	Row Labels	0	1	Grand Total	SCXG11	2	14	16	2/27/2025	1		1	2/28/2025		1	1	3/23/2025		1	1	4/25/2025		1	1	5/25/2025		3	3	6/27/2025		1	1	7/25/2025		1	1	8/23/2025		2	2	9/28/2025	1		1	10/18/2025		2	2	11/20/2025		2	2	SCXG15	5	11	16	1/11/2025		1	1	2/15/2025	1		1	3/17/2025		1	1	4/28/2025	2		2	5/20/2025		1	1	6/17/2025		1	1	7/14/2025		1	1	7/15/2025		2	2	8/11/2025		1	1	9/20/2025	1	1	2	10/18/2025		2	2	11/22/2025	1		1	SCXG24	1	13	14	2/22/2025		1	1	3/25/2025		1	1	4/22/2025		1	1																																																																																																																					
Count of Compliance	Column L	Column M	Grand Total																																																																																																																																																																																																																																																	
Row Labels	0	1	Grand Total																																																																																																																																																																																																																																																	
SCXG11	2	14	16																																																																																																																																																																																																																																																	
2/27/2025	1		1																																																																																																																																																																																																																																																	
2/28/2025		1	1																																																																																																																																																																																																																																																	
3/23/2025		1	1																																																																																																																																																																																																																																																	
4/25/2025		1	1																																																																																																																																																																																																																																																	
5/25/2025		3	3																																																																																																																																																																																																																																																	
6/27/2025		1	1																																																																																																																																																																																																																																																	
7/25/2025		1	1																																																																																																																																																																																																																																																	
8/23/2025		2	2																																																																																																																																																																																																																																																	
9/28/2025	1		1																																																																																																																																																																																																																																																	
10/18/2025		2	2																																																																																																																																																																																																																																																	
11/20/2025		2	2																																																																																																																																																																																																																																																	
SCXG15	5	11	16																																																																																																																																																																																																																																																	
1/11/2025		1	1																																																																																																																																																																																																																																																	
2/15/2025	1		1																																																																																																																																																																																																																																																	
3/17/2025		1	1																																																																																																																																																																																																																																																	
4/28/2025	2		2																																																																																																																																																																																																																																																	
5/20/2025		1	1																																																																																																																																																																																																																																																	
6/17/2025		1	1																																																																																																																																																																																																																																																	
7/14/2025		1	1																																																																																																																																																																																																																																																	
7/15/2025		2	2																																																																																																																																																																																																																																																	
8/11/2025		1	1																																																																																																																																																																																																																																																	
9/20/2025	1	1	2																																																																																																																																																																																																																																																	
10/18/2025		2	2																																																																																																																																																																																																																																																	
11/22/2025	1		1																																																																																																																																																																																																																																																	
SCXG24	1	13	14																																																																																																																																																																																																																																																	
2/22/2025		1	1																																																																																																																																																																																																																																																	
3/25/2025		1	1																																																																																																																																																																																																																																																	
4/22/2025		1	1																																																																																																																																																																																																																																																	
Non-Compliant Work Orders																																																																																																																																																																																																																																																				

Maintenance Data is analyzed and included to be incorporated into the inspection as necessary:

- ✓ Location
- ✓ Equipment
- ✓ LRV
- ✓ Operator



SUMMARY

1. Safety data is used to develop risk scores (Likelihood x Consequence)
2. Inspection data incorporated to prioritize inspection focus
3. Spreadsheets are utilized to document the following:
 - ✓ Data pulled for analysis (Safety & Maintenance Data)
 - ✓ Prioritization calculations (Risk & Inspection Based)
 - ✓ The scope of the RBI inspection to take place
4. A Database is used to store the analysis and inspection deliverables associated with the RBI
5. This is a work in progress and refinement will occur over time

CONTACT INFORMATION

Jon Wolfgram P.E. – Director

Email: jonathan.wolfgram@state.mn.us

Phone: 651-201-7234



Maryland DOT SSOA Risk-Based Inspection Program

Data analysis, visualization, & prioritization
March 28, 2026

Dale Green-Worrell, PTSCPT-TSSP
Max Smith, PTSCPT-TSSP



RTA Size & Complexity

- Maryland Transit Administration (MTA)
- Baltimore-area active systems:
 - Light Rail
 - 33 stations, 30 miles
 - 2 yards
 - 52 LRVs
 - Metro Subway (heavy rail)
 - 14 stations, 15 miles
 - 1 yard
 - 78 new vehicles replacing existing legacy fleet
- Purple Line (under construction outside D.C.)
 - Light Rail
 - 21 stations, 16 miles
 - 2 yards
 - 28 LRVs



Data-driven Decision Cycle

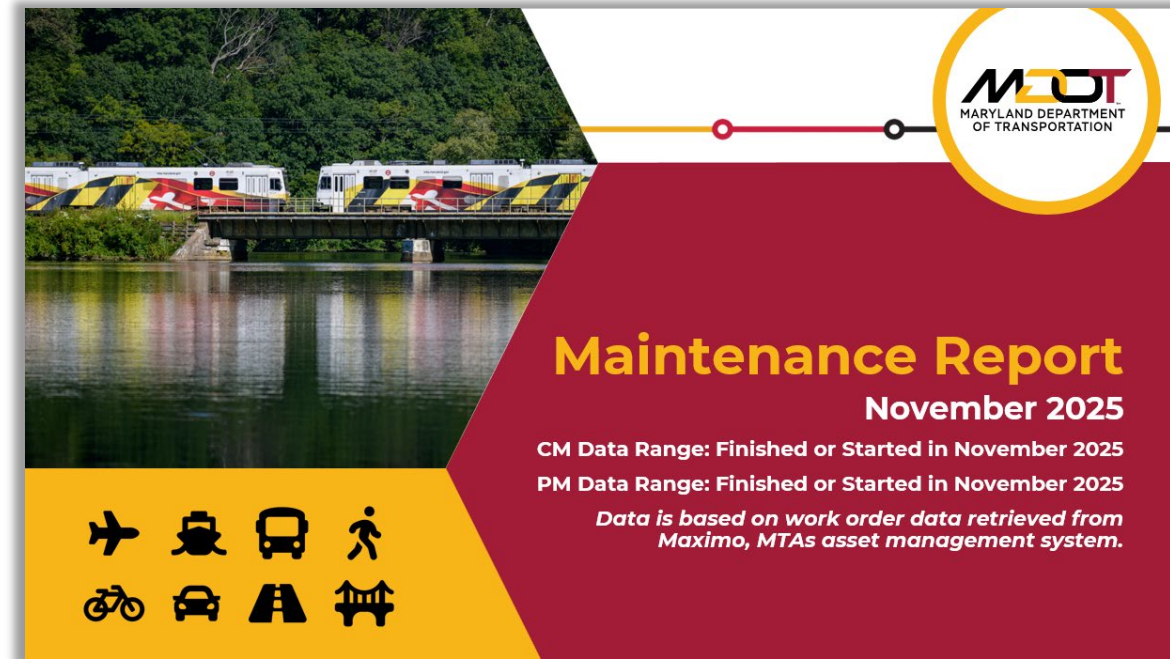
- Dataset identification
- Data analysis
- Risk prioritization
- Risk-Based Inspections



On-track inspection

Dataset identification

- What does the RTA have?
 - Existing systems/logs
 - Opportunity for direct/automatic access
- What is relevant & feasible?
- Maintenance, safety, operations data
 - Separate SSOA analysis & visualization reports monthly
 - Analysis from the reports can be combined to identify and rate risks



Monthly report example

Required Resources

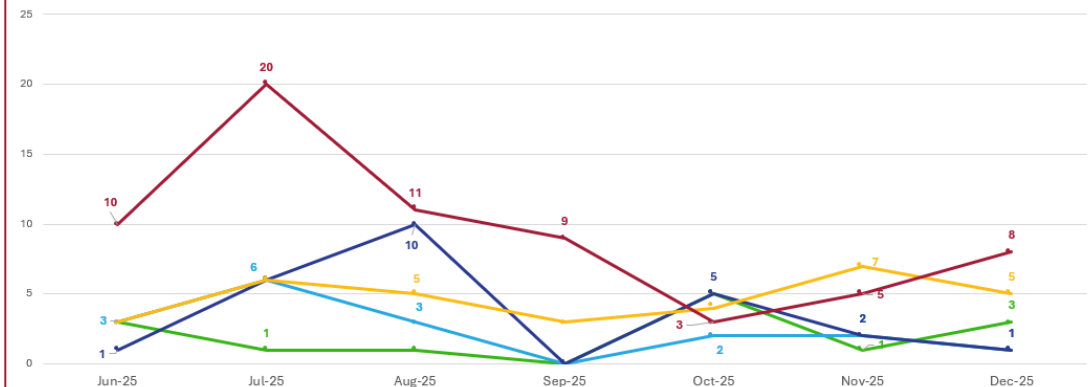
- Assigned analyst
 - Approximately 20 hours per month
- Data analysis & visualization identify potential risks
 - Formulas, pivot tables
 - Visualization slide decks shared with team
- Team review
 - SSOA knowledge, expertise, and RTA context
 - Visualizations and analysis notes drive discussion
 - Executive leadership
- Supports effective use of resources & safety improvement



Monthly report visualization packages

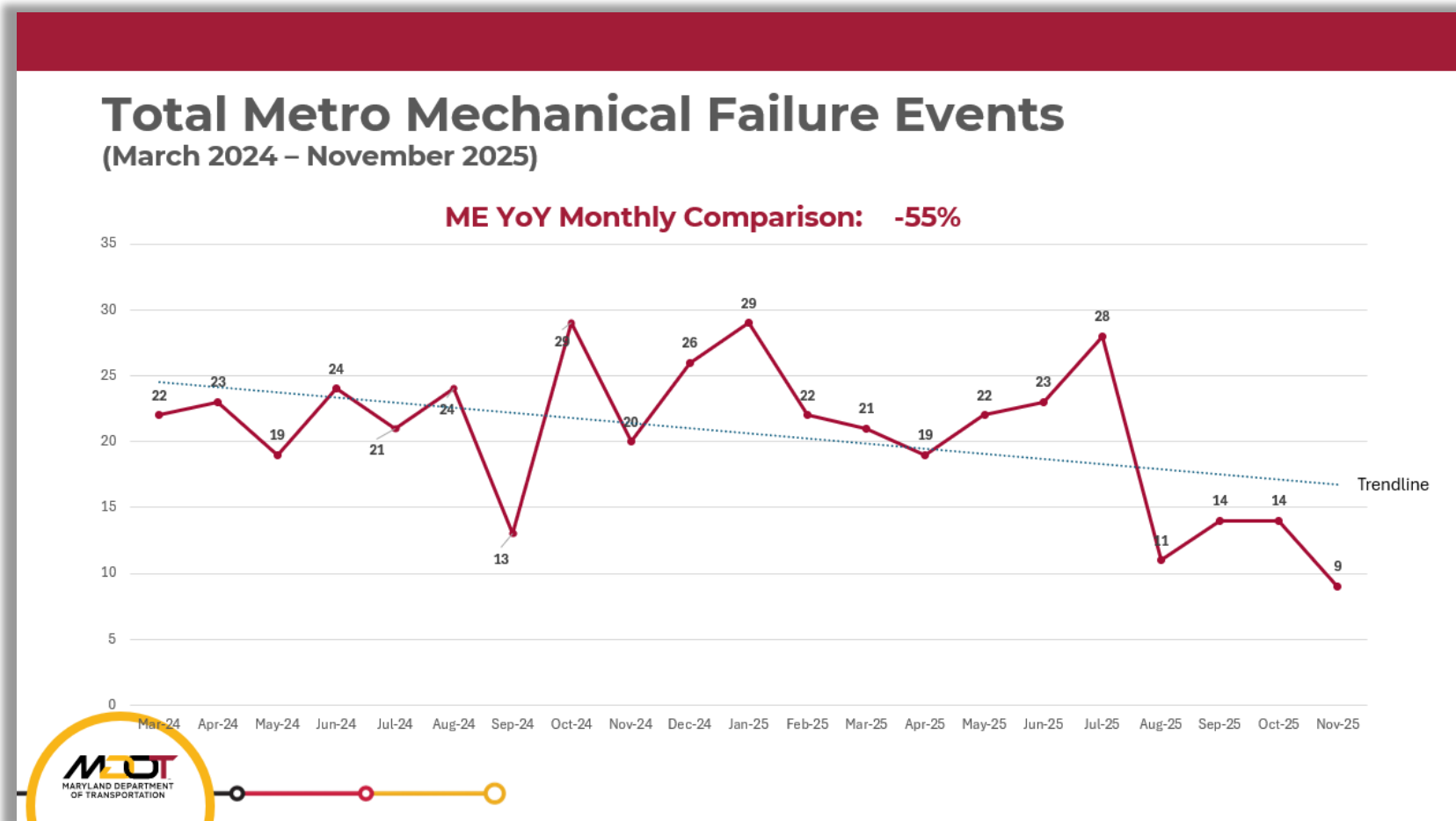
Maintenance of Way Problem Code* Trendline

(*Top 5 Problem Codes, June 2025 - December 2025)



Monthly Analysis

- Monthly datasets
 - Work order trends
 - OCC alerts
 - Vehicle availability
 - Safety performance evaluation system
- Helps SSOA drive safety improvements
- Continuous improvement of SSOA analysis



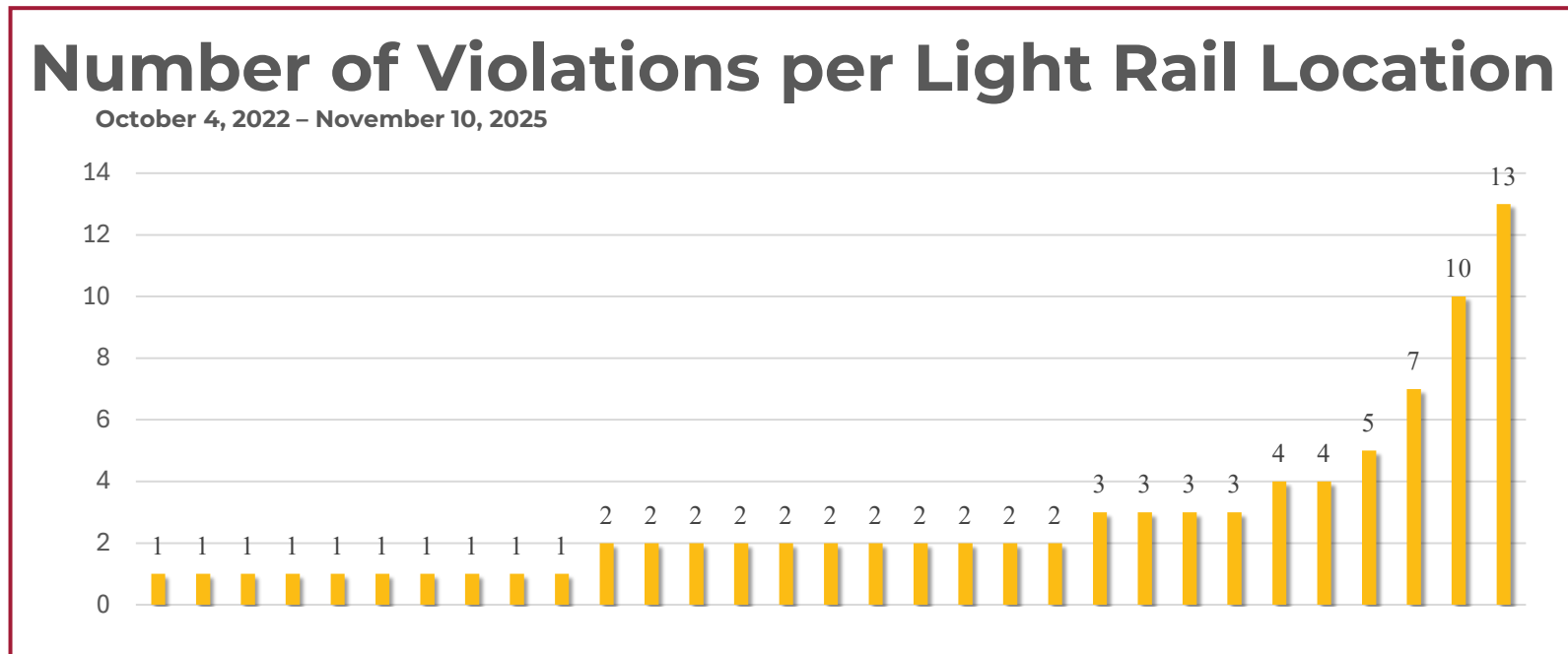
SSOA Analysis Visualizations

- **Long-Term Analysis**

- Examples: Preventive maintenance (PM) compliance, location trends

- **Short-Term Analysis**

- Newly identified patterns
- Temporary/Seasonal



Risk Prioritization

- SSOA team discusses & refines risk identified in data analysis
- Risk prioritization inputs defined in our RBI program
- Evaluation entered in SSOA data management system
 - Automatic risk score & next step

Prioritization Scoring

Select Factors below to help determine the Inspection Score, Action & Timeline.

Factor 1: Potential Safety Risk Severity/Likelihood

18 Low (III D)

Factor 1 Score

18

Factor 2: Time Elapsed

10-12 months

Factor 2 Score

4

Factor 3: Awareness

New potential risk identified, some information known (...)

Factor 3 Score

10

RBI Action

RBI Recommended

Total Risk Score

32

RBI Timeline

Conduct RBI, prioritized by score

Risk Prioritization Form

- Form used to enter risk detail
- System provides prioritized list

The image shows a screenshot of a web application interface. On the left is a table titled 'RBI Prioritization Log - Risks Identified In Past Year (See data layer for prior risks)'. The table has columns for 'RBI ID', 'Score', 'RBI Action', and 'RBI Timeline'. The rows show various risk entries with their respective scores and actions. On the right is a modal form titled 'Add Identified Risk for RBI Consideration'. The form contains several sections for data entry, including 'RBI ID', 'RBI Subject Summary/Risk Description', 'Risk Source', 'Places and Departments', 'Date Identified', 'Related CAP To Identified Risk', 'Related Event Investigation', 'Related Audit, Inspection, Hazard, Assessment or Other Report', 'Related Prior Findings & Observations', 'Factor 1: Potential Safety Risk Severity/Likelihood', 'Factor 2: Time Elapsed Since Last Topic Area Inspection/Audit', 'Factor 3: Risk Awareness', and 'Other Risk Documentation'. The form also includes a file upload area and buttons for 'Clear form' and 'Create'.

RBI ID	Score	RBI Action	RBI Timeline
25-3	11	RBI Required	Conduct RBI within 60 c
25-7	25	RBI Recommended	Conduct RBI, prioritized score
25-4	27	RBI Recommended	Conduct RBI, prioritized score
25-6	27	RBI Recommended	Conduct RBI, prioritized score
25-2	32	RBI Recommended	Conduct RBI, prioritized score
25-5	32	RBI Recommended	Conduct RBI, prioritized score
25-12	32	RBI Recommended	Conduct RBI, prioritized score
26-1	32	RBI Recommended	Conduct RBI, prioritized score
25-13	34	No Action Required	No action required, but priority inspection may
25-8	37	No Action Required	No action required, but priority inspection may
25-11	37	No Action Required	No action required, but priority inspection may
25-9	41	No Action Required	No action required, but priority inspection may
25-10	43	No Action Required	No action required, but priority inspection may

RBI Prioritization Log

- SSOA data management system provides easy tracking and prioritization of risks pending inspection
- Identify inspection team & schedule inspection for top risk(s)
- Links among risks, inspections, and responses track risk lifecycle

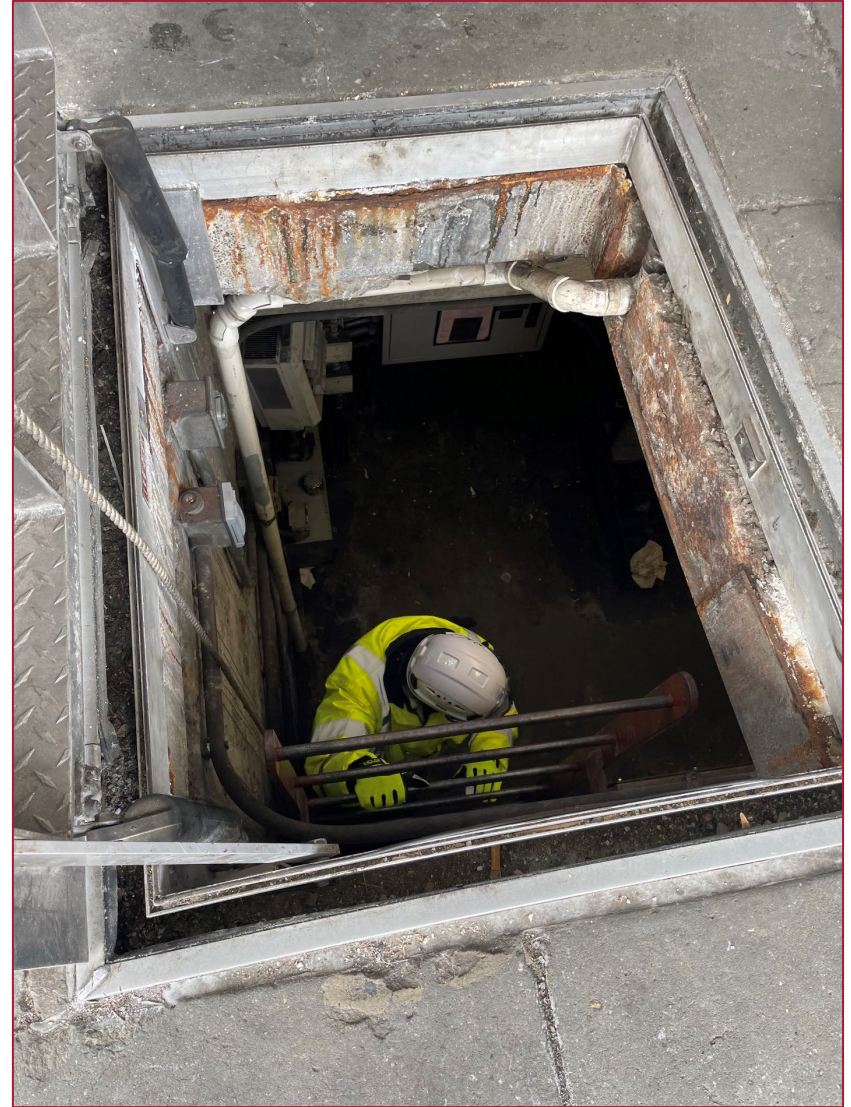
RBI Prioritization, Inspections, Findings/Observations > **RBI Prioritization Log**

No Linked Inspection Report **Linked Inspection Report** Risks ID'd In Past Year

RBI... ↑ ⓘ	Sc. ↑ ⓘ	RBI Action ⓘ	RBI Timeline ⓘ
25-3	11	RBI Required	Conduct RBI within 60 days
24-11	16	RBI Recommended	Conduct RBI, prioritized by score
24-07	23	RBI Recommended	Conduct RBI, prioritized by score

Risk-Based Inspections

- The top priority identified risks lead to inspections
- Report, observations, and responses tracked in data management system
- Risk automatically moves off dashboard of potential pending inspections
 - If data indicate similar risk in future, that new data-driven risk is added and rated



Facilities inspection

Takeaways



- Scale to size, complexity, and data of RTA(s)
- Identify and periodically review datasets
- Assigned data analyst produces monthly visualizations & risk identification
- Data analysis & team feedback fuels risk prioritization process
- Data management system supports prioritization & management

The background features a semi-transparent blue overlay over a photograph of a bus with 'DOWNTOWN' written on its front. To the right, there are several abstract, 3D-style geometric shapes in various colors including blue, orange, and green, arranged in a cluster.

OKLAHOMA DEPARTMENT OF TRANSPORTATION

**Risk-Based Inspection Data Analysis
Practices, Procedures, and Lessons Learned**

Agenda



1. Overview of ODOT and EMBARK
2. ODOT's approach to RBI
3. Safety Data Collected
4. Data Analysis Process
5. Inspection Prioritization
6. Inspection Reports

Overview of ODOT



"The mission of the Oklahoma Department of Transportation is to provide a safe, economical and effective transportation network for the people, commerce and communities of Oklahoma."

- State Safety Oversight resides in ODOT's Multimodal & Planning Division
- Full time SSO Project Manager
- Three additional staff which support SSO
- Contract support provides slightly less than one FTE

Overview of EMBARK

EMBARC operates the OKC Streetcar, which began service in Dec. 2018 and features:

- 5.1 miles of track
- 7 streetcars
- 22 platform stops
- 1 Streetcar Maintenance Facility



ODOT's Approach to the RBI Process

- Quarterly data requests
- Analysis of data using pre-defined metrics
- Quarterly Inspection Prioritization Meetings rate items flagged during analysis
- RBIs are scheduled based on risk ratings
- Four inspections minimum per calendar year



Data Collection

Safety Program Data

- Events (including near misses)
- Hazards
- Risk mitigations and corrective actions

Maintenance Data

- Preventative and corrective maintenance records across vehicles, facilities, and infrastructure
- Records of failures and defects

Inspection Data

- Inspection records across vehicles, facilities, and infrastructure
- Brake testing data

Other Data

- Capital projects and financial records (annual)
- Training records (especially to support other areas of oversight e.g., RWP)



RTA Data Submission to SSO SharePoint

Home

Conversations

Documents

Notebook

Pages

ODOT SSO

Site contents

Recycle bin

Edit

+ New | Page details | Preview | Analytics

ODOT SSO > EMBARK RBI > 2. Maintenance Data > Rail Vehicle Maintenance Records > 2025 Q4

+ New | Upload | Edit in grid view | Share | Copy link | Download | Export to Excel | Sync

Name

801 non-schedule

802 non-schedule

803 non-schedule

804 non-schedule

805 non-schedule

806 non-schedule

807 non-schedule

Copy of QUARTER REPORT (002).xls

Data Collection

- **Coordination with RTA**
 - Up front – when developing the program
 - Ongoing – on data exports (formatting, organization, content)
- **Lessons learned**
 - Continued collaboration with RTA for maintenance data
 - Focus on vetting data which best serves as leading indicators for system safety



Data Analysis

- **Initial data *review***

- Verify data completeness
- Follow up with RTA – questions, requests for additional data
- Flag safety critical items requiring time-sensitive inspection activities

- **Prepare for analysis**

- Clean datasets to ensure consistent formatting quarter over quarter
- Import into Excel workbook used for analysis

Tab	Tab Content
1	Priority Metrics for Risk-Based Inspection Prioritization
2A	Safety Events Analysis
2D	Safety Events Raw Data
3	Hazards and Safety Risk Mitigation
4	Corrective Action Plans
5	Safety Risk Mitigation
6A	Streetcar Maintenance and Inspections Analysis
6D	Streetcar Maintenance and Inspections Raw Data
7A	Other Maintenance and Inspections Analysis
7D	Other Maintenance and Inspections Raw Data
8	Speed Restrictions
9	Capital Projects and Financial Data
10	RWP Training
11	Other as Requested by the SSO



Data Cleaning and Consolidation

2	Vehicle	Data Quar	Date schedul	Date perform	Days Elaps	Type	Miles	Work Order	Unschedul	1k PMI	5k PMI	10k PM	25k PI	150k P	Notes
114	801	2025 Q2	6/24/2025	6/25/2025	1	Unscheduled	149,520		X	X					Replace Contactor
115	807	2025 Q2	6/26/2025	6/26/2025	0	1,000 mi PMI	158,019			X					
116	803	2025 Q2	6/27/2025	6/27/2025	0	Unscheduled	150,459		X						Diagnose Circuit Board, Diagn
117	805	2025 Q3	7/3/2025	7/3/2025	0	10,000 mi PMI	145,417					X			
118	806	2025 Q3	7/3/2025	7/3/2025	0	1,000 mi PMI	168,884			X					
119	807	2025 Q3	7/5/2025	7/5/2025	0	1,000 mi PMI	159,011			X					
120	803	2025 Q3	7/7/2025	7/7/2025	0	Unscheduled	151,244		X						Diagnose assembly
121	802	2025 Q3	7/8/2025	7/8/2025	0	1,000 mi PMI	88,747			X					
122	805	2025 Q3	7/10/2025	7/10/2025	0	Unscheduled	145,822		X						Reset assembly
123	802	2025 Q3	7/11/2025	7/11/2025	0	Unscheduled	88,865		X						Reset PA system, intercom and
124	803	2025 Q3	7/12/2025	7/12/2025	0	1,000 mi PMI	151,449			X					
125	807	2025 Q3	7/12/2025	7/12/2025	0	Unscheduled	159,594		X						Repair ESS
126	805	2025 Q3	7/14/2025	7/14/2025	0	1,000 mi PMI	146,355			X					
127	806	2025 Q3	7/15/2025	7/15/2025	0	1,000 mi PMI	169,891			X					
128	804	2025 Q3	7/19/2025	7/19/2025	0	1,000 mi PMI	156,108			X					
129	802	2025 Q3	7/22/2025	7/22/2025	0	1,000 mi PMI	89,803			X					
130	803	2025 Q3	7/22/2025	7/22/2025	0	1,000 mi PMI	152,500			X					
131	801	2025 Q3	7/25/2025	7/25/2025	0	150,000 mi PM	149,953							X	
132	805	2025 Q3	7/27/2025	7/27/2025	0	1,000 mi PMI	147,418			X					
133	806	2025 Q3	7/28/2025	7/28/2025	0	1,000 mi PMI	170,835			X					
134	803	2025 Q3	7/30/2025	7/30/2025	0	Unscheduled	153,053		X						Replace fan
135	806	2025 Q3	7/30/2025	7/30/2025	0	Unscheduled	170,866		X						Reset assembly
136	802	2025 Q3	8/4/2025	8/4/2025	0	5,000 mi PMI	90,783				X				
137	803	2025 Q3	8/4/2025	8/4/2025	0	1,000 mi PMI	153,382			X					
138	805	2025 Q3	8/5/2025	8/5/2025	0	1,000 mi PMI	148,441			X					
139	804	2025 Q3	8/11/2025	8/11/2025	0	Unscheduled	157,010		X						Diagnose high speed switch
140	806	2025 Q3	8/12/2025	8/12/2025	0	5,000 mi PMI	171,835				X				
141	804	2025 Q3	8/13/2025	8/13/2025	0	5,000 mi PMI	157,092				X				
142	803	2025 Q3	8/14/2025	8/14/2025	0	1,000 mi PMI	154,438			X					
143	805	2025 Q3	8/17/2025	8/17/2025	0	1,000 mi PMI	149,367			X					
144	802	2025 Q3	8/18/2025	8/18/2025	0	1,000 mi PMI	91,706			X					
145	803	2025 Q3	8/19/2025	8/19/2025	0	Unscheduled	154,813		X						Reset Ecu A
146	804	2025 Q3	8/19/2025	8/19/2025	0	Unscheduled	157,211		X						Diagnose high speed switch
147	803	2025 Q3	8/20/2025	8/20/2025	0	Unscheduled	154,919		X						Repair calipher
148	804	2025 Q3	8/20/2025	8/20/2025	0	Unscheduled	157,219		X						Reset ESS
149	805	2025 Q3	8/21/2025	8/21/2025	0	Unscheduled	149,535		X						Diagnose ECU A
150	803	2025 Q3	8/25/2025	8/25/2025	0	Unscheduled	155,324		X						Lubricate bearing / bushing

Data Analysis

Metrics

- Developed in coordination with the RTA
- Based on those in FTA's RBI toolkit
- Listed in the SSO Procedures Manual

13.5.2.1. Safety Data

Events:

- Total count of events
- Safety event category
- Percent of events by type (e.g. adverse vehicle on streetcar)
- Percent of events by location (intersection, track segment, and/or facility)
- Percent of events by time of day
- Percent of events with injury and/or substantial damage

Hazard Records:

- Total count of hazards
- Source (event, audit, inspection, other)
- Percent of hazards by location (intersection, track segment, facility, other location-specific equipment or infrastructure)
- Percent of hazards (that are not immediate life safety risks) with recommended controlling measures assigned within 30 calendar days
- Percent of hazards with assigned owners
- Percent of resolutions implemented on time (by proposed implementation date)

Near Miss Records:

- Total count of near misses
- Percent of near misses by type
- Percent of near misses by location
- Percent of near misses by time of day

Data Analysis using Metrics



OKLAHOMA
Transportation

	A	B	L	M	N	O	P
	Metric	Subcategory	2025 Q2 Count	2025 Q2 % Share	2025 Q2 % Change	2025 Q2 Priority	Notes
1							
14	Percent of inspections deferred or not performed	Vehicles	3	7%	-25%	Medium	<p>As of 6/30/25, the 150k mi benchmark has been passed by 4 vehicles: 803, 804, 806, and 807. Of those 4, only 803 and 807 had records submitted documenting the 150k PMI (using the 25k mi checklist.)</p> <p>In previous quarters, gaps in 1,000 mi PMI records submitted suggested that a PMI occurred but that the WO was not submitted (for example, 1k PMIs were submitted at 149k and 151k but not at 150k). The records in PMIs for those two this quarter:</p> <p>804:1k at 148k, 149k, 150k, 151k, 153k (no WO submitted for 152k; Last 10k PMI record was at 137k; last</p>
15	Percent of inspections performed on schedule	Vehicles	42	93%	12.2%		<p>Of the 45 work orders completed in Q2, 36 were completed within 3 days (80%). 42 were completed within 5 days (93%). Consistent improvement across each quarter</p>
22	Total count of failures and defects	failures	4		-43%		
23	Number and percent by type/equipment	"Failure due to SC B	0				
24		"ESS issues"	0				
25		"camera issues"	0				
26		"Pantograph Issues"	0				
27		"caliper leaking"	0				
28		"BCU fault, control	1	25%			
29		"Charging issues"	1				Note: one failure listed as "charging issues" and "internal leak", same failure (807, 4/16 listed in each field)
30		"leaking fluids"	2	25%			Note: one failure listed as "charging issues" and "internal leak", same failure (807, 4/16 listed in each field)

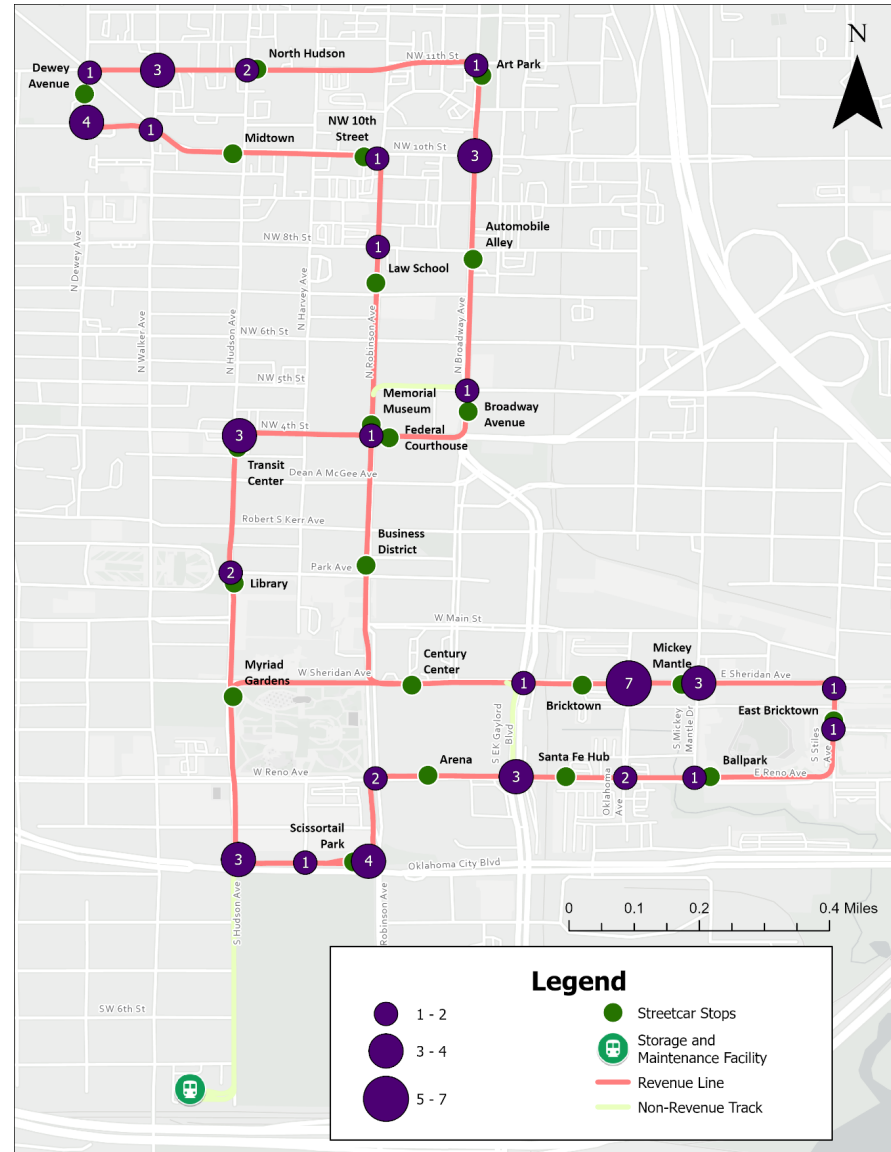
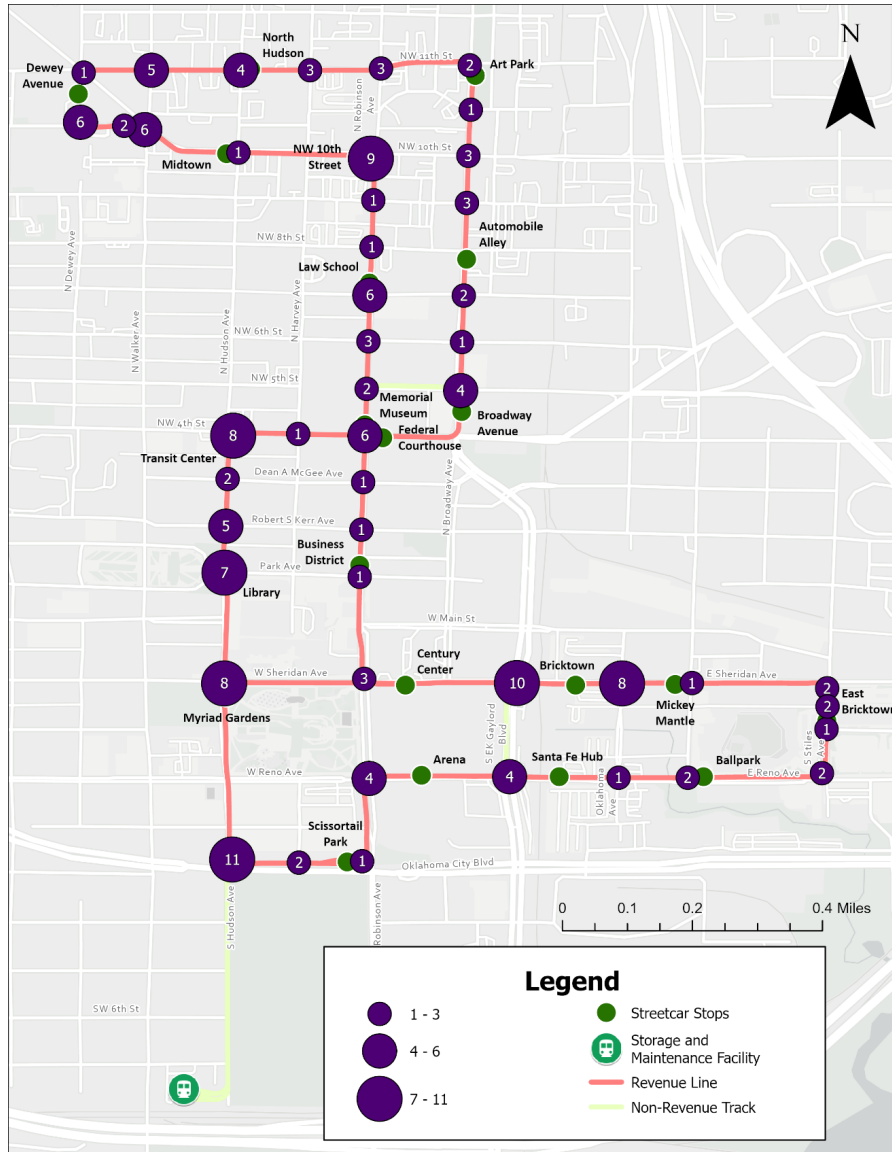
Geospatial Data Analysis



OKLAHOMA
Transportation

2025 Q1 Near Misses

Left: Weekdays
Right: Weekends



Prioritization



- Quarterly inspection prioritization meeting scheduled following data analysis
- Items flagged during analysis presented to SSO staff and contractor leadership
- Typically, 5-15 items using safety program, maintenance, inspection, and other metrics

Prioritization

- Each item is rated using Safety Risk Tolerability Index
- Risk rating determines SSOA RBI Actions:
 - Type of inspection
 - Inspection scheduling

Table 6: Risk Ratings

Severity	Fatality(ies)	Catastrophic	Critical	Marginal	Negligible
Probability	1	2	3	4	5
A - Frequent	1A	2A	3A	4A	5A
B - Probable	1B	2B	3B	4B	5B
C - Occasional	1C	2C	3C	4C	5C
D - Remote	1D	2D	3D	4D	5D
E - Improbable	1E	2E	3E	4E	5E
F - Eliminated	1F	2F	3F	4F	5F

Table 7: Safety Risk Tolerability Index and Risk-Based Inspection Actions

Risk Levels	Acceptance Criteria	SSOA Risk-Based Inspection Actions
High	Unacceptable under the existing circumstances	The SSOA conducts an unannounced inspection as soon as possible.
Serious	Undesirable	The SSOA schedules and conducts an announced inspection within two business days.
Medium	Acceptable with review	The SSOA schedules and conducts an announced inspection by the end of the following business week, or as soon after as schedule availability permits.
Low	Acceptable without review	The SSOA notifies RTA of risk in writing, and the RTA addresses risk through SMS processes.
Eliminated	Eliminated	The SSOA notifies RTA of a perceived eliminated risk in writing; the RTA verifies actions it has taken to eliminate risk and documents this in its SMS processes.

Example Prioritization

- **Metric:** % of streetcar PMIs deferred or not performed
- **Rating:** 3D – critical severity, remote probability – medium risk
- **Inspection Action:** Announced inspection of PMI scheduling and tracking procedures and practices the following week

Metric	Q1 Value	Data Review Memo Notes	6/19 Prioritization Meeting Notes	6/19 Risk Rating
Percent of inspections deferred or not performed	11.4% 300% increase from Q4	At EMBARK, preventative maintenance inspections occur on 1,000 mi, 5,000 mi, 10,000 mi, and 25,000 mi cycles. According to the vehicle work order records uploaded by EMBARK for PMIs, PMIs were <u>missed</u> (or excluded from records) for: <ul style="list-style-type: none"> • Streetcar 801 (5,000 mi PMI at 145,000 mi) • Streetcar 804 (5,000 mi PMI at 147,000 mi and 10,000 mi PMI at 152,000 mi) • Streetcar 806 (5,000 mi PMI at 157,000 mi) <p>These 4 missed or unaccounted for PMIs are 11% of the PMIs scheduled to occur during Q1. This value is potentially an undercount, as no work orders were submitted for 802, in operation for the full quarter.</p>	Work orders are all uploaded for 1,000 mi PMIs (except for 802). Mileage in between these PMIs seem to suggest that the missing 5,000 mi, 10,000 mi PMIs did occur, they were just omitted from the data upload? Streetcar PMI work orders are the only records submitted to the SSO as paper scans, whereas all others are exported in summary format from eWorkOrders. Announced inspection will cover PMI scheduling, tracking, and record keeping procedures and practices.	3D

Severity	Fatality(ies)	Catastrophic	Critical	Marginal	Negligible
Probability	1	2	3	4	5
A - Frequent	1A	2A	3A	4A	5A
B - Probable	1B	2B	3B	4B	5B
C - Occasional	1C	2C	3C	4C	5C
D - Remote	1D	2D	3D	4D	5D
E - Improbable	1E	2E	3E	4E	5E
F - Eliminated	1F	2F	3F	4F	5F

Table 7: Safety Risk Tolerability Index and Risk-Based Inspection Actions

Risk Levels	Acceptance Criteria	SSOA Risk-Based Inspection Actions
High	Unacceptable under the existing circumstances	The SSOA conducts an unannounced inspection as soon as possible.
Serious	Undesirable	The SSOA schedules and conducts an announced inspection within two business days.
Medium	Acceptable with review	The SSOA schedules and conducts an announced inspection by the end of the following business week, or as soon after as schedule availability permits.
Low	Acceptable without review	The SSOA notifies RTA of risk in writing, and the RTA addresses risk through SMS processes.
Eliminated	Eliminated	The SSOA notifies RTA of a perceived eliminated risk in writing; the RTA verifies actions it has taken to eliminate risk and documents this in its SMS processes.

Reports

Inspection reports include:

- The data analysis and prioritization timeline
- Details from the inspection prioritization meeting showing which items were *and weren't* prioritized for inspection

Metric	Q1 Value	Data Review Memo Notes	6/19 Prioritization Meeting Notes	6/19 Risk Rating
Count of Events by Type – Pan Drops	5 67% increase from Q4	Based on the discussion in recent monthly coordination calls, EMBARK expected fewer pan drops to occur after a change in policy on 3/1. However, 3 pan drops occurred in March, following 0 in January and 1 in February. No trends are present in vehicle or time of day. Potential patterns for review in operators and locations are as follows: <ul style="list-style-type: none"> • 2 of 5 occurred on block 3 in Q1 (Reno Ave between the Arena and Santa Fe stops). 3 of 8 pan drops occurred here in Q4 and Q1 combined. • 2 of 5 occurred on block 5 in Q1 (OKC Blvd and Hudson, between the Scissortail and Myriad Gardens stops). None Q4. 	Given EMBARK's policy change didn't result in the outcomes they hoped to see (short term, at least), this is a pattern appropriate for announced inspections. Issue is ongoing, risk rating is medium. The announced inspection will cover: <ul style="list-style-type: none"> - Observation of operations on track segments w/o wire (from Santa Fe Hub platform on Reno to S Robinson to OKC Blvd to S Hudson to Transit Center platform) - Training materials for operators 	4C
Percent of inspections deferred or not performed	11.4% 300% increase from Q4	At EMBARK, preventative maintenance inspections occur on 1,000 mi, 5,000 mi, 10,000 mi, and 25,000 mi cycles. According to the vehicle work order records uploaded by EMBARK for PMIs, PMIs were <u>missed</u> (or excluded from records) for: <ul style="list-style-type: none"> • Streetcar 801 (5,000 mi PMI at 145,000 mi) • Streetcar 804 (5,000 mi PMI at 147,000 mi and 10,000 mi PMI at 152,000 mi) • Streetcar 806 (5,000 mi PMI at 157,00 mi) <p>These 4 missed or unaccounted for PMIs are 11% of the PMIs scheduled to occur during Q1. This value is potentially an undercount, as no work orders were submitted for 802, in operation for the full quarter.</p>	Work orders are all uploaded for 1,000 mi PMIs (except for 802). Mileage in between these PMIs seem to suggest that the missing 5,000 mi, 10,000 mi PMIs did occur, they were just omitted from the data upload? Streetcar PMI work orders are the only records submitted to the SSO as paper scans, whereas all others are exported in summary format from eWorkOrders. Announced inspection will cover PMI scheduling, tracking, and record keeping procedures and practices.	3D
Number and percent of failures by vehicle	See notes	Fleetwide, all vehicles are below the ASP system reliability performance target goal of 10,000 miles mean distance between failures (MDBF) over a 3-year rolling average. The three below are also off target on the <u>1 year</u> rolling average as well. <ul style="list-style-type: none"> • Streetcar 803 – 2 failures in Q1. In last 3 years, 802 has the second worst MDBF (3,780 mi), and it was out from October through January. • Streetcar 804 - 3 failures in Q1 and 3 in Q4. With a MDBF of 6,416 mi over last 3 years, it is also far below performance the target of 10,000 MDBF. 	PMI schedule adherence is more of a leading indicator above and will be prioritized for this round of inspection. MDBF is more of a lagging measure that reflects overall fleet maintenance and conditions.	3D

Conclusion

- Stephanie Davis – ODOT
stephanie.davis@odot.ok.gov
- Ed Elam – DCCM
eelam@dccm.com



Contact Information

Risk-Based Inspection Program
FTA-RBI@dot.gov

Session 14

Risk-Based Inspection: Case Study

Cyrell R. McLemore, PMP®, TSSP

Senior Inspection Specialist, Office of Safety Oversight and Compliance
Federal Transit Administration

RBI Case Study: WSDOT and Sound Transit



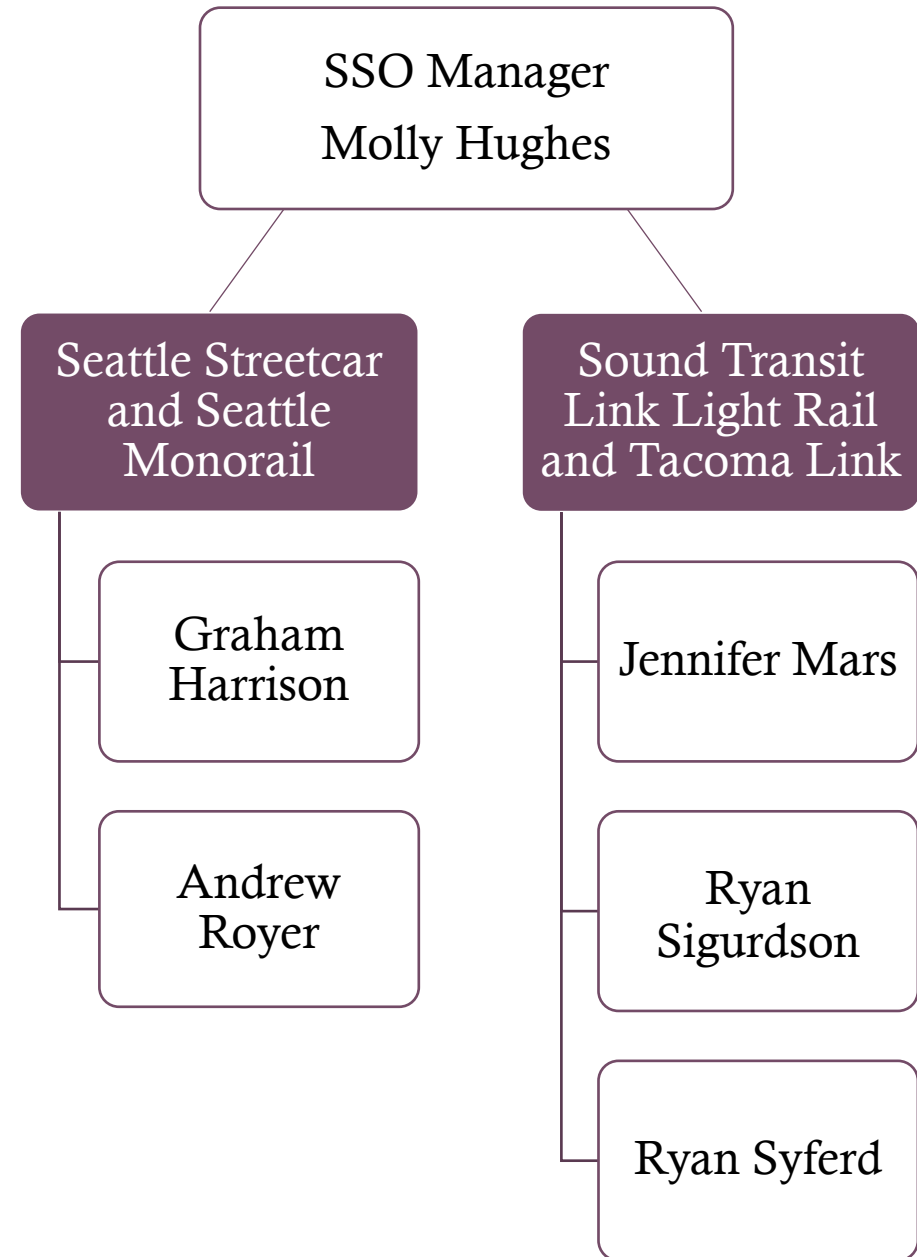
**Washington State
Department of
Transportation
(WSDOT)**

**Ryan Sigurdson
Jennifer Mars**

WASHINGTON STATE SSO RBI PROCESS



WSDOT OVERVIEW



RTA OVERVIEW



Seattle Streetcar

- Track Miles: 3.8 miles.
- Stops: 17
- Vehicles: 10

Seattle Center Monorail

- Track Miles: 0.9 miles
- Stations: 2
- Vehicles: 2

Sound Transit Link Light Rail

- Track Miles: 43 miles. (3/28: +14 miles)
- Stations: 36 (3/28: +10 stations)
- Vehicles: 218

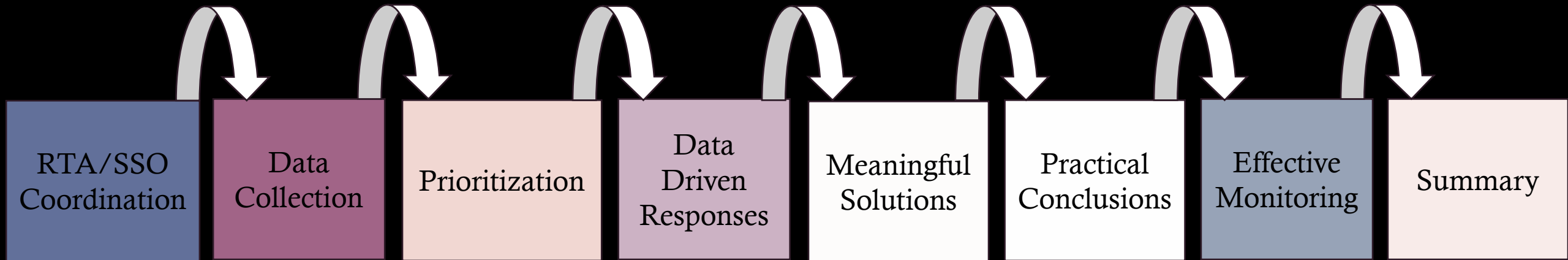
Sound Transit Tacoma Link

- Track Miles: 4 miles.
- Stations: 12
- Vehicles: 8

WSDOT RBI PROCESS



AREAS OF IMPORTANCE



RTA/SSO COLLABORATION



HOW DID WE GET HERE?

WSDOT/ Sound Transit RBI Workshop Agenda



Transportation Building
310 Maple Park Avenue S.E.
P.O. Box 47300
Olympia, WA 98504-7300
360-705-7000
TTY: 1-800-833-6388
www.wsdot.wa.gov

WSDOT SSO & Sound Transit RBI workshop

Address: OMF CENTRAL FL 4 NORTHGATE 242
Date: Tuesday February 6th, 2024
Time: 10:00 to 12:00

WSDOT Attendees

Ryan Sigurdson	Transit Safety Oversight
Jennifer Morrow	Transit Safety Oversight
Steven Meyeroff	FTA Compliance Administrator
Molly Hughes	SSO Manager

Sound Transit Attendees

Branden Porter	RTA Sound Transit
Melissa Durel	RTA Sound Transit
Karl Shoemaker	RTA Sound Transit
Will Chevalier	RTA Sound Transit
Robert Alderman	RTA Sound Transit
George McGinn	RTA Sound Transit

Time	Topic	Lead	Outcomes
10:00 – 10:15	Introduction & WSDOT SSOA Update <ul style="list-style-type: none"> Attendees will go around the table for introductions. General overview of RBI Program 	Ryan Sigurdson	Develop Point of Contacts and answer generalized Risk Based Inspection Questions
10:15 – 10:45	Review draft language. <ul style="list-style-type: none"> Provide copies of SSO draft language RBI checklist review Provide toolkit 	Ryan Sigurdson	Provide SSO documents on current RBI language and documents to support RTA ASP language development.
10:45 – 11:50	Access for announced/unannounced & Escort vs. No Escort <ul style="list-style-type: none"> New Procedure for 24- hour SSO permit Contacts and procedures? What method of contact is preferred? Where within the system will announce vs. unannounced be applicable? (what locations using fig. 1 from Category 2 list) (This also includes T line) Where within the system will an escort be required? (This also includes T line) What does current SSO badge have access too? (This also includes T line) 	Steven Meyeroff	Discussion on creating a new procedure to allow SSO inspectors access for unannounced inspections in restricted areas (exclusive ROW for example). If time answer additional questions listed under the topic.

HOW DID WE GET HERE?

WSDOT/Sound Transit Mock Inspection Process Checklist and Notes



Washington State
Department of Transportation

Unannounced Risk Based Inspection Checklist – Sound Transit
Mock RBI Inspection Notes: Skull Island Conference Room
October 15, 2024 10:00 AM – 2:30 PM

Restricted Area	Done	Not Done	Comments
1. Access <ul style="list-style-type: none"> • Within 2 hours of arrival 	√		Reviewed, Note • ROW training is every Thursday at 9am
2. Notification of Inspection	√		Reviewed
<ul style="list-style-type: none"> • Onsite escort (required) 	√		Reviewed
<ul style="list-style-type: none"> ○ SSO will present inspection notification form to RTA supervisor 	√		Reviewed
<ul style="list-style-type: none"> ○ SSO will call LCC to notify them of inspection location and type (unannounced) and request an EIC 	√		Reviewed
<ul style="list-style-type: none"> ○ EIC provided by KCM 	√		EIC may not always be readily available; need to identify access area. SSO will document if EIC is delayed, and RTA will have LLC document delay.
<ul style="list-style-type: none"> ○ EIC communicates with LCC for access <ul style="list-style-type: none"> ▪ EIC radio call sign 	√		Note: LLC does not control the yard. Sound Transit is in the process of creating a position; not going to call it Yardmaster-title to be determined.
<ul style="list-style-type: none"> ○ LCC logs information related to, and makes notifications re: inspection <ul style="list-style-type: none"> ▪ Location & type 	√		Reviewed
<ul style="list-style-type: none"> ○ If EIC not present, LCC will notify assumed Craft Chief(s) based on scope of inspection 	√		Reviewed
<ul style="list-style-type: none"> ○ LCC will call KCM Safety on-call and email Link RBI Inspections email list to notify leadership of SSO arrival 	√		Reviewed, ST will need to still develop email.
<ul style="list-style-type: none"> ○ Inspection to begin within 2 hours of notification to LCC 	√		Reviewed
<ul style="list-style-type: none"> ○ Safety Staff may accompany SSO inspector during inspections 	√		Reviewed

WHAT ARE WE LOOKING FOR?

Mock Inspection Action Items

Action Item	Responsibility	Status
Standardized format template for inspection notification.	SSO	Due end of Qrt.1
A list of all RTA SOPs or access to the folder of kept SOPs for SSO	Sound Transit	1/30/2025: SSO names have been sent to ST for SharePoint access.
Provide EAMS access	Sound Transit: Don Burr	Identifying correct contact within ST.
Update ST/KCM SOP to include LCC Chief contact number as well as process to provide updated contacts when needed.	Sound Transit: Don Burr	Include SOC number and Finalize SOP.
Identify documents to be submitted to SSO	Sound Transit: Kyle Froelich & Mike <u>Bauck</u>	Finalizing 1 / 2 line. Tlink completed
Provide a list of SSO badge access and explore additional badges for inspection areas needed.	Sound Transit: Robert Taaffe/ SSO	Request sent to security. Verification needed. SSO will then test badge access.
Develop checklists for audit topics	SSO	Completed.

WHAT ARE WE LOOKING FOR?

Sound Transit Link

Vehicle Maintenance Data

What is required	WSDOT Suggestion	Sound Transit applicable document name	Sound Transit POC
Inspection and maintenance records and report forms	Internal inspection results, Monthly internal maintenance results	EAMS – PM's and the checklists associated	Mike Bauck/ Kyle Froelich
Work orders	Work orders	EAMS – Work orders	Mike Bauck/ Kyle Froelich
Records of failures and defects	Summary of vehicle inspection	EAMS – Repair work order, Open work orders etc.	Mike Bauck/ Kyle Froelich
Records of revenue vehicles out of service, including causal information	Bulletins, out of service logs	EAMS	Mike Bauck/ Kyle Froelich
Major maintenance activity schedule and progress	Monthly vehicle schedule	EAMS PM calendars	Mike Bauck/ Kyle Froelich
Adherence to maintenance schedules, including reports and documentation of deferred maintenance.	Quarterly review of vehicle maintenance schedules	PM – compliance report from EAMS	Mike Bauck/ Kyle Froelich

Infrastructure Maintenance Data

What is required	WSDOT Suggestion	Sound Transit applicable document name	Sound Transit POC
Inspection and maintenance records and report forms	Internal inspection results, Monthly internal maintenance results	EAMS – PM's and the checklists associated	Mike Bauck/ Kyle Froelich
Work orders	Work orders	EAMS – Work orders	Mike Bauck/ Kyle Froelich
Records of failures and defects	Monthly list of infrastructure defaults, daily report outs, station reports	EAMS – Repair work order, Open work orders etc.	Mike Bauck/ Kyle Froelich
Records of infrastructure with work arounds, including causal information	Bulletins, out of service logs	EAMS	Mike Bauck/ Kyle Froelich
Major maintenance activity schedule and progress	Monthly infrastructure schedules	EAMS PM calendars	Mike Bauck/ Kyle Froelich
Adherence to maintenance schedules, including reports and documentation of deferred maintenance.	Quarterly review of infrastructure maintenance schedules	PM – compliance report from EAMS	Mike Bauck/ Kyle Froelich









DATA COLLECTION




EMAIL REMINDERS

- Ensures compliance with Federal Transit Administration (FTA) requirements
- Supports accurate risk evaluation and oversight
- Reduces the likelihood of findings, corrective actions, or funding impacts
- Demonstrates strong internal controls and audit readiness

RE: Q2 RBI Data Submission for 1 and 2 Line – Due July 31st

 Sigurdson, Ryan
To:  Taaffe, Robert;  Burr, Don
Cc:  Mars, Jennifer;  Syferd, Ryan;  Trepadean, Andrea;  Taylor, Rick;  Harrell-Edge, Liza;  Schmitt, Cassie

Retention Policy: Delete item older than age (3 years) Expires: 6/26/2028
 Follow up. Start by Monday, July 7, 2025. Due by Monday, July 7, 2025.

Good morning,

This is a courteous reminder that Q2 RBI data for 1 Line and 2 Line must be submitted to the SSO by July 31st.

To help streamline the submission process, I've outlined the specific documentation required by the deadline. Additionally, I will detail out what information we already have access to and what is provided to us monthly.

Documentation Required by July 31st

The following items must be submitted by the July 31st deadline.

1. Safety Data

- Internal and external audit reports

2. Infrastructure Maintenance Data

- Capital project schedules and progress updates
 - Source: Updated documentation for *TSS-MTX-2024-Certification-Milestone-Schedule-Matrix-FINAL_11.7.24*

3. Inspection and Operational Data

- Inspection and maintenance records and report forms
 - Sources: Fastfield App (KC Supervisor ride reports); Power BI Field Observation App (ST Transportation Superintendents' train ride data)
- Documentation of adherence to inspection schedules, including reports of missed inspections
 - Sources: Fastfield App (KC Supervisor ride reports); Power BI Field Observation App (ST Transportation Superintendents' train ride data)
- Failure and defect records
 - Source: CSR Log
- Speed restriction records
 - Source: Daily Train Orders SharePoint
- Incident and Safety Risk Mitigation Verification
 - Source: ESRT SSO Report

Access to Data and Records by July 31st

The following information and documentation will be available or accessible to the SSO by the July 31st deadline.

SAFETY

Examples:

- Monthly Hazard Log
- Event Reports
- **30-day Event log** →
- RTA Monthly Joint Rail Safety & Security Committee (JRSSC)
- Monthly CAP logs

Collision (8 Event records)												
Transit	1L2025-0206	Closed	LINK	02-06-2025	6:00 pm	Orcas Street	ROW	Incident	Collision	Pedestrian	THE SOC RECEIVED AN LCC ST ALERT NOTIFICATION ADVISING OF AN LRV/PEDESTRIAN COLLISION NEAR THE AREA OF MLK JR WAY AND ORCAS ST CAUSING A SIGNIFICANT DELAY IN SERVICE. THE INVOLVED PEDESTRIAN WAS REPORTEDLY TRANSPORTED TO THE HARBORVIEW MEDICAL CENTER BY MEDIC ONE FOR TREATMENT OF WHAT WAS DESCRIBED AS MAJOR INJURIES.	
Transit	1L2025-0210	Closed	LINK	02-10-2025	6:50 am	MLK and Dawson Street	ROW	Incident	Collision	Vehicle	Link Light Rail Train #13 was operated in revenue service by Operator #23865. At 06:48, as Train #13 was proceeding NB on MLK Jr. Way S approaching S Dawson st, motor vehicle (V2) made an illegal left turn and contacted the right side panel behind the driver's compartment of LRV 263B. Rail Supervisor #570 responded and noted a damaged right side skirt and right corner coupler hood of LRV 263B. Vehicle maintenance arrived to remove the damaged side skirt and Train #13 was taken out of revenue service and operated back to the OMF-Central. No injuries were reported by the operator or passengers on Train #13. Passengers were transferred to following Train #14. V2 was towed from the scene.	
Transit		Closed	LINK	02-15-2025	4:11 pm	MLK JRway and S Kenyon	ROW	Incident	Collision	Vehicle	AT ABOUT 1627 HOURS, T-210 (G. HURST) CALLED THE SOC TO REPORT A NON-INJURY COLLISION BETWEEN A VEHICLE AND	

MAINTENANCE VEHICLE

Enterprise Asset Management (EAMs)

Messages ★ Screens Reports Welcome SIGURDSONR Help Logoff GMT-7

SOUNDTRANSIT

Home HowToDocs Work Management Service Request CLKDocs Legacy Query

Current Working Location Go to Work Order

Current Location: CLKLRV - CLK LRV VEHICLE MAINTENANCE View Calendar Year: 2025 No. Go

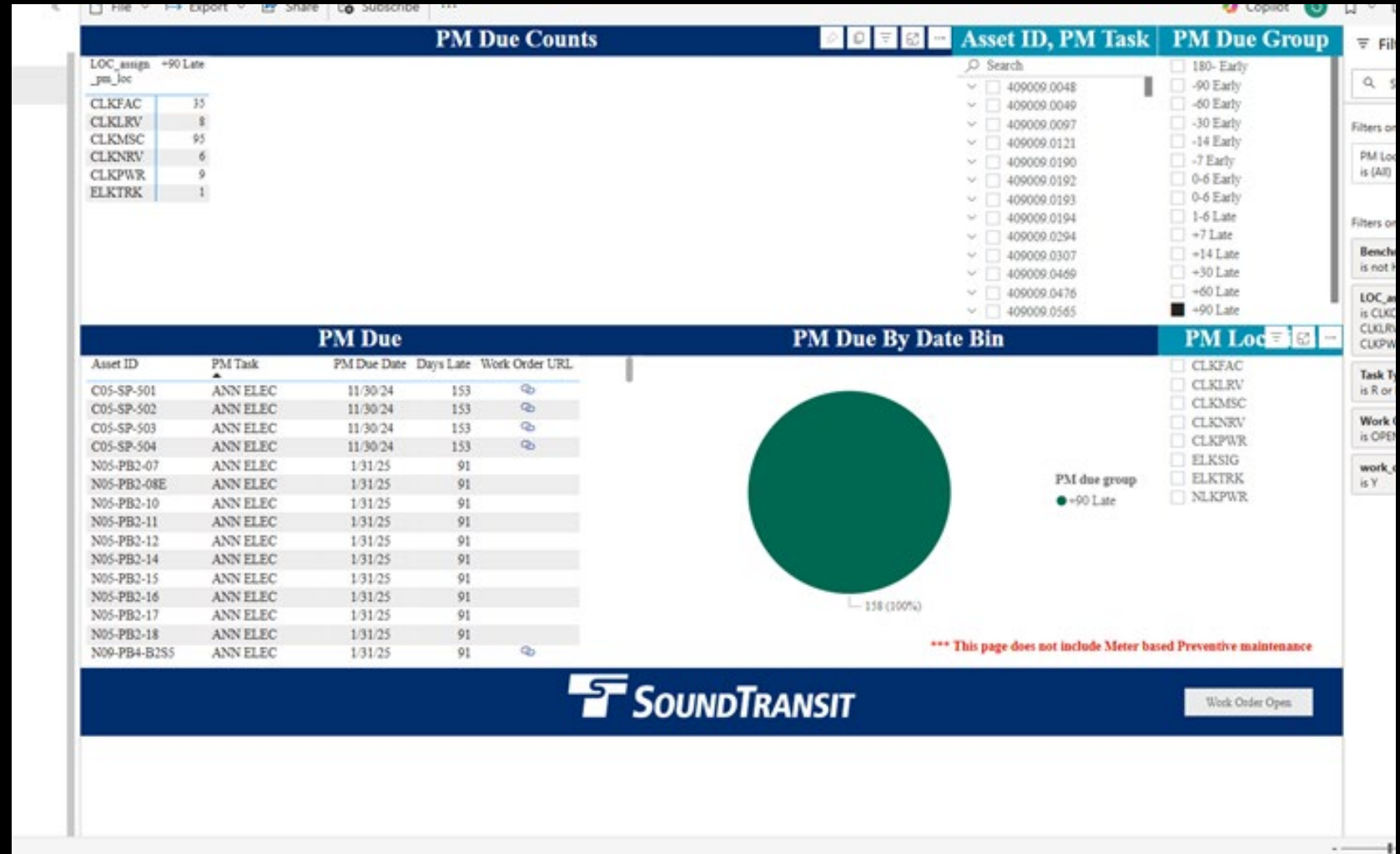
Work Orders: 10 Expand All Collapse All

Tasks	WO Number	View / Edit Assignments	Asset ID	Service Status	Type	PM Service	Maint. Class	Repair Reason	Delay	Date Unit In	Date Scheduled	Tasks Completed	Priority	Days Open/Left
<input type="checkbox"/>	19443	Assignments	MILES: 2-0 NONE==SIEMENS S70 LIGHT RAIL VEHICLE	OOS	REPAIR		19-SIEMENS-S70	100	D	11/15/2024 09:05		0 / 2 C		173 / N/A
<input type="checkbox"/>	3678	Assignments	L294 - 2019 SIEMENS S70==Meters: 1-201965 MILES: 2-0 NONE==SIEMENS S70 LIGHT RAIL VEHICLE	OOS	REPAIR		19-SIEMENS-S70	100		02/19/2025 08:58		0 / 2 C		77 / N/A
<input type="checkbox"/>	10231	Assignments	L102 - 2007 KINKISHARYO LRVLF==Meters: 1-755377 MILES: 2-0 NONE==LOW FLOOR LIGHT RAIL VEHICLE	OOS	REPAIR		07-KINKSHRO-LF	120	P	09/22/2021 11:16		1 / 1 C		1322 / N/A
<input type="checkbox"/>	8912	Assignments	L311 - 2019 SIEMENS S70==Meters: 1-124849 MILES: 2-0 NONE==SIEMENS S70 LIGHT RAIL VEHICLE	OOS	REPAIR		19-SIEMENS-S70	100		04/22/2025 07:31		0 / 6 C		15 / N/A
<input type="checkbox"/>	5362	Assignments	S452045 - 2011 PENNMACH MTRTRK==Meters: 1-670049 MILES: 2-0 NONE==MOTOR TRUCK	OOS	REPAIR		07-PENNMACH-MTRTRK	120		06/08/2021 20:34		0 / 2 B		1428 / N/A
<input type="checkbox"/>	10165	Assignments	L102 - 2007 KINKISHARYO LRVLF==Meters: 1-755377 MILES: 2-0 NONE==LOW FLOOR LIGHT RAIL VEHICLE	OOS	REPAIR		07-KINKSHRO-LF	120	P	09/21/2021 07:52		0 / 1 C		1324 / N/A
<input type="checkbox"/>	8161	Assignments	110200-UB10946 - 2019 SIEMENS A2V0000261418A==Meters: 1-105196 MILES: 2-0 NONE==POWER TRUCK - COMPLETE	OOS	REPAIR		19-S70-PWRTRK	120		05/20/2024 20:13		0 / 1 B		351 / N/A
<input type="checkbox"/>	2001	Assignments	S451120 - 2007 PENNMACH CTRTRK==Meters: 1-1099469 MILES: 2-0 NONE==CENTER TRUCK	OOS	REPAIR		07-PENNMACH-CTRTRK	120	P1	01/28/2025 16:12		0 / 1 B		96 / N/A
<input type="checkbox"/>	9885	Assignments	L294 - 2019 SIEMENS S70==Meters: 1-201965 MILES: 2-0 NONE==SIEMENS S70 LIGHT RAIL VEHICLE	OOS	PM	PM-10K	19-SIEMENS-S70	105		05/07/2025 06:07		0 / 11 D		0 / N/A
<input type="checkbox"/>	9884	Assignments	L294 - 2019 SIEMENS S70==Meters: 1-201965 MILES: 2-0 NONE==SIEMENS S70 LIGHT RAIL VEHICLE	OOS	PM	PM-200K	19-SIEMENS-S70	105		05/07/2025 06:08		0 / 2 D		0 / N/A

Back Work Order Center Review and Close WOs

MAINTENANCE VEHICLE

- PowerBi



MAINTENANCE INFRASTRUCTURE

Enterprise Asset Management (EAMs)

SOUNDTRANSIT GMT

Home | HowToDocs | **Work Management** | Service Request | CLKDocs | Ad Hoc

Work Management Portal

Current Working Location: **FACLINK - FACILITIES LINK MAINTENANCE** | Layout | Refresh: OFF

View Calendar | Multi-asset WO | Crew Management | Crew Time Entry | Service/Inspection Due | Scheduled Services | Direct Charges - Commercial | Indirect Charges - Labor

Asset Search

Eq ID - Serial # [] ... Go

Go To Service Request

Service Request ID [] ... Go

Service Request Summary Add/Edit Filter

Filter	Edit	Saved Filter	SRs
ALL			54

Go To Work Order

FACLINK | Year: 2025 | No. [] Go

Work Order Summary Add/Edit Filter

Filter	Edit	Saved Filter	Planning	Pending	Open	Finished
ALL			0	94	142	16

Work Orders

ID	Assignment Status	Asset	Priority	Job Type	Status	Delay Status
FACSOUTH-2025-4434	Assignments	565-STATION - FEDERAL WAY TRANSIT CENTER	2	REPAIR	OPEN	TRANSFR
FACSOUTH-2025-4435	Assignments	565-STATION - FEDERAL WAY TRANSIT CENTER	2	REPAIR	OPEN	TRANSFR
CLKFAC-2024-4371	Assignments	M05-FACILITY - MOW EAST - MOW FACILITY	C	REPAIR	OPEN	
ELKFAC-2025-3060	Assignments	M04-FACILITY - OMF EAST - FACILITY	C	REPAIR	OPEN	
FACLINK-2023-765	Assignments	C35-PRKLOT - TUKWILA INTL BVD P & R	C	REPAIR	OPEN	
FACLINK-2024-81	Assignments	N11-EXT - NORTHGATE STATION - FIRE EXTINGUISHERS	C	REPAIR	OPEN	

Rows: 252

Service Requests

ID	Asset	Priority	Task or Symptom	Status	Co
C09-STATION-FACSPEC-8037087	C09-STATION-FACSPEC - INTERNATIONAL DIST STATION - FAC	4	PAINTED GRAFFITI - PAINTED GRAFFITI	PENDING	GRAFFITI > PAINT TVM ON THE SOU
N17-STATION-FACSPEC-8308040	N17-STATION-FACSPEC - SHORELINE NORTH STATION - FAC SPEC	3	DOOR / LOCK / KEY - DOOR / LOCK / KEY	PENDING	DOOR / LOCK / KE
C19-STATION-FACSPEC-8075780	C19-STATION-FACSPEC - BEACON HILL STATION - FAC SPEC	3	OTHER - OTHER	PENDING	
N11-STATION-FACSPEC-8034008	N11-STATION-FACSPEC - NORTHGATE	3	PEST TREATMENT - PEST TREATMENT	PENDING	PEST TREATMENT-

Repair Work Order

Preventive Maintenance

Warranty Work Order

Completed Work Order

Rail Issues

Power Issues

SCADA Issues

Signals Issues

VM Issues

Assets Or Checklist Modification

Graffiti Labor Hours WPS

Unplanned Work Orders

Pending Part Request

Work Orders by Location

SCADA CCTV Work Order

SCADA CCTV Service Req

SCADA CCTV Title Search

Work Order Delay

Work Order Delay Open Trend

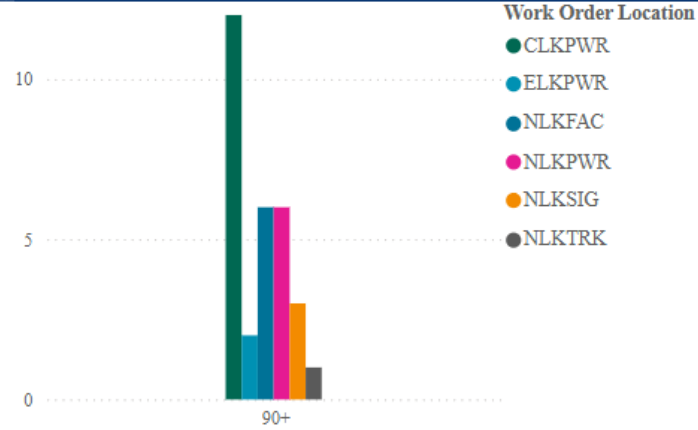
Contractor Support

Work Monitor

Repair Work Order Counts

Work Order Location	90+	Total
CLKPWR	12	12
NLKFAC	6	6
NLKPWR	6	6
NLKSIG	3	3
ELKPWR	2	2
NLKTRK	1	1
Total	30	30

Repair Work Order Chart



Groups

- 0-29
- 30+
- 60+
- 90+
- 180+
- 365+

Work Group

- Search
- CLKPWR
 - ELKPWR
 - NLKFAC
 - NLKPWR
 - NLKSIG
 - NLKTRK

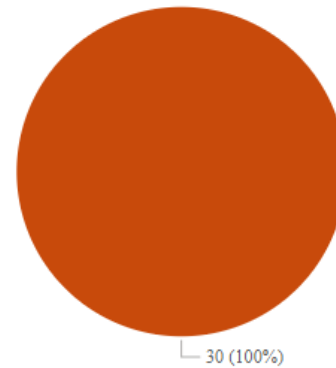
Work order Count

30

Repair Work Order Counts

Work Order Asset ID	First Work Order URL	Min of Work Order Days open
C755-OCS-1		
CLKPWR-2024-1504	🔗	134
C755-OCS-2		
CLKPWR-2024-1456	🔗	144
E10-OCS-EB		
ELKPWR-2025-56	🔗	92
E12-TPSS		
CLKPWR-2024-1404	🔗	159
M01-TPSS		
CLKPWR-2024-1448	🔗	146
N00-TPSS		
NLKPWR-2024-535	🔗	169
N03-TPSS		
NLKPWR-2024-682	🔗	126

Repair Work Order Chart



Task Description

- 500 MCM MESSENGER WIRE
- APPRENTICE TRAINING - GENERAL
- BENDER GROUND DETECTOR
- CATENARY HANGER
- DC FEEDERS
- DC MAIN BREAKERS
- EMERGENCY TRIP SWITCH
- FIRE ALARM SYSTEM
- FIRE SYSTEM
- GENERAL TASK FOR ASSET
- INSIDE LIGHTING
- INSULATORS
- METERING AND CONTROL DEVICE
- MOTOR OPERATED TRANSFER S...
- NON-REVENUE VEHICLE ADDED ...
- OR 270 TRIP OPERATOR INTERFA...



POWER BI

MAINTENANCE INFRASTRUCTURE

INSPECTION/ OPERATIONAL DATA

Examples:

- Employee Safety Reporting Tool
- Train Orders
- EAMs
- **Fastfield App** →
- PowerBi



- *4.13 - Bell and Horn Signals: 7,392 (22.94%)
- *7.33.3 - Birthing Markers: 5,765 (17.89%)
- *7.24 - Accelerating and Braking: 4,681 (14.53%)
- *7.38 - Operating Speeds: 3,625 (11.25%)
- *7.21.4 - Train Door Operation (Terminals): 3,171 (9.84%)
- *7.26 - Station Announcements: 2,813 (8.73%)
- *7.13 - Information to Passengers: 1,768 (5.49%)
- All Others: 1,101 (3.42%)
- 7.18 - Adherence to Schedule: 865 (2.68%)
- *SOP 5.1 - MLK Operations: 584 (1.81%)
- 1.26 - Uniforms: 452 (1.40%)

PRIORITIZATION



HOW WE ASK OURSELVES THE BIG QUESTIONS

Safety Metrics

Version 2024

Safety Data

Data Type	Initial assessment
Records of events, including: <ul style="list-style-type: none"> • primary source information from each RTA investigation if the RTA completes investigations on behalf of the SSOA. • causal and contributing factors. • root cause • on-time reporting 	Are types of events trending up? Are hazards going up within a specific area? Do events have repeated causal/ contributing factors & root cause? Are there multiple event recurrences? Is documentation completed and follows internal processes?
Hazard records include: <ul style="list-style-type: none"> • hazard source • associated consequences. • safety risk ratings • status of any mitigations. • employee safety reports 	Are types of hazards (Physical, Biological, Ergonomic, Chemical, and Psycho-Social) trending up? Are hazards going up within a specific area? Is documentation completed and follows internal processes? Are there repeated concerns/ hazards?
Safety risk mitigation records include: <ul style="list-style-type: none"> • before and after risk ratings • how the RTA monitors the implementation and effectiveness of safety risk mitigations. 	Are RTA identified safety performances being met? Are operational performances being met? Are KPIs being met? Is documentation completed and follows internal processes? Are there repeated concerns/ hazards? How many RTA safety inspections were performed? Any trends within RTA safety inspections?
Corrective Action Plans <ul style="list-style-type: none"> • hazard rating • source of CAP • CAP status 	Are CAPs closed on time? How many source types are there? How many similar hazard ratings? Is documentation completed and follows internal processes? Are there repeated concerns/ hazards?

RISK EVALUATION - CALCULATIONS

$$\text{Likelihood (L)} \times \text{Severity (S)} = \text{Risk Factor (RF)}$$

Likelihood

10.0	Certain to happen	Certain to happen in under 3 months (1 in 10)
6.0	Probable	Likely to happen within 3 to 6 months (1 in 100)
3.0	Possible	Likely to happen within 6 to 12 months (1 in 1,000)
1.0	Remote	Likely to happen within 12 to 24 months (1 in 10,000)
0.5	Unlikely	Likely to happen within 2 to 5 years (1 in 100,000)
0.2	Extremely Remote	Would not expect to happen within 10 years. (1 in 1,000,000)

Severity

		Safety Program Data	Maintenance Data	Inspection Data	Personnel Data	SSO Field Observations	Industry Trends
100.0	Catastrophic	Massive effect involving all RTA departments	No Maintenance Program/ Extensive damage greater than \$1M	No inspection program/ Massive effect multi-agency response	No records/ data to provide/ Massive effect multi-agency response	Massive effect involving all RTA departments SSO immediately halts rail operations.	Massive loss across multiple agencies
40.0	Hazardous	FTA Reportable/ Major effect, involving Multiple RTA departments	Recurring Deficiencies/ not fully implemented program/ Major damage greater than \$500K but less than \$1M	Recurring Deficiencies/ not fully implemented program/ Multiple findings	Recurring Deficiencies/ not fully implemented program/ Multiple findings	Major effect, involving Multiple RTA departments findings. / > 50% of SSO observations result in findings.	Multiple RTAs significant element failures. Unable to continue operation. FTA requests immediate response
10.0	Major	State reportable/ Major effect, involving Multiple RTA departments	Open work orders >3months / Local damage greater than \$250K but less than \$500K	Single significant event element failure. / May be unable to continue the operation. / Substantial financial loss	Localized effect, specific area, or department. / < 50% of SSO observations result in findings.	Localized effect, specific area, or department. / < 50% of SSO observations result in findings.	Localized effect, Specific area, or department may be unable to continue operation.

RISK EVALUATION - RESPONSE

Risk Factor Rating Table

RF	Risk	Priority	Response	Actionable Timescale
>600	Very High	1	Intolerable, Immediate inspection scheduled.	Inspection Immediately
599- 400	High	2	Substantial,	Inspection within 3 months
399- 200	Moderate	3	Moderate	Review in 3 months; any item left at moderate for 9 consecutive months will move to high.
199- 90	Possible	4	Tolerable	Review in 6 months
<90	Low	5	Acceptable,	Review in 12 months

RISK EVALUATION - RESPONSE

	Catastrophic	Hazardous	Major	Minor	Negligible
Certain to happen	Very High	Very High	High	Possible	Possible
Probable	Very High	High	Moderate	Moderate	Possible
Possible	High	Moderate	Moderate	Moderate	Low
Remote	Moderate	Moderate	Moderate	Low	Low
Unlikely	Moderate	Moderate	Low	Low	Low
Extremely Remote	Low	Low	Low	Low	Low

RISK FACTOR LOG RESULTS

Maintenance Data (Infrastructure)

Data Type	Initial assessment	Initial results	Risk Factor Rating	Response																											
Inspection and maintenance records and report forms	Any trends (Work Group) within RTA-Identified Defects?	Work orders by location, MLK total 26 CLKPWR has 19 and CLKTRK has 7. All open more than 365 days. As well as incorporating events along the alignment.	400	Inspection within 3 months																											
Work orders	How many work orders are still open?	Repair work orders CLKFAC has a total of 584 open work orders, 219 are 365+ days, 110 are 180+ days, 75 are 90+ days, 45 are 60+ days, 63 are 30+ days and 72 are less than 29 days.	100	Review in 6 months																											
Records of failures and defects	What is the status of RTA-Identified Defects?	<table border="1"> <thead> <tr> <th>Work Order Location</th> <th>90+</th> <th>Total</th> </tr> </thead> <tbody> <tr> <td>CLKTRK</td> <td>8</td> <td>8</td> </tr> <tr> <td>NLKFAC</td> <td>7</td> <td>7</td> </tr> <tr> <td>NLKPWR</td> <td>3</td> <td>3</td> </tr> <tr> <td>NLKSIG</td> <td>3</td> <td>3</td> </tr> <tr> <td>ELKTRK</td> <td>2</td> <td>2</td> </tr> <tr> <td>NLKSCA</td> <td>1</td> <td>1</td> </tr> <tr> <td>NLKTRK</td> <td>1</td> <td>1</td> </tr> <tr> <td>Total</td> <td>25</td> <td>25</td> </tr> </tbody> </table>	Work Order Location	90+	Total	CLKTRK	8	8	NLKFAC	7	7	NLKPWR	3	3	NLKSIG	3	3	ELKTRK	2	2	NLKSCA	1	1	NLKTRK	1	1	Total	25	25	100	Review in 6 months
Work Order Location	90+	Total																													
CLKTRK	8	8																													
NLKFAC	7	7																													
NLKPWR	3	3																													
NLKSIG	3	3																													
ELKTRK	2	2																													
NLKSCA	1	1																													
NLKTRK	1	1																													
Total	25	25																													
Major maintenance activity schedule and progress	What is the progress of the scheduled activities?	PMs for CLKPRW has a total of 14 past due work orders, 10 of those are 365+days. 7 waiting engineering support (7 is waiting ESR to ST maintenance oversight)	400	Inspection within 3 months																											
Adherence to maintenance schedules including:	Are any of the maintenance activities are on	PM inspected for CLKFAC had 19 PMs at 90+ days but less than 180+ days.	100	Review in 6 months																											

RISK FACTOR LOG RESULTS

Maintenance Data (Vehicle)



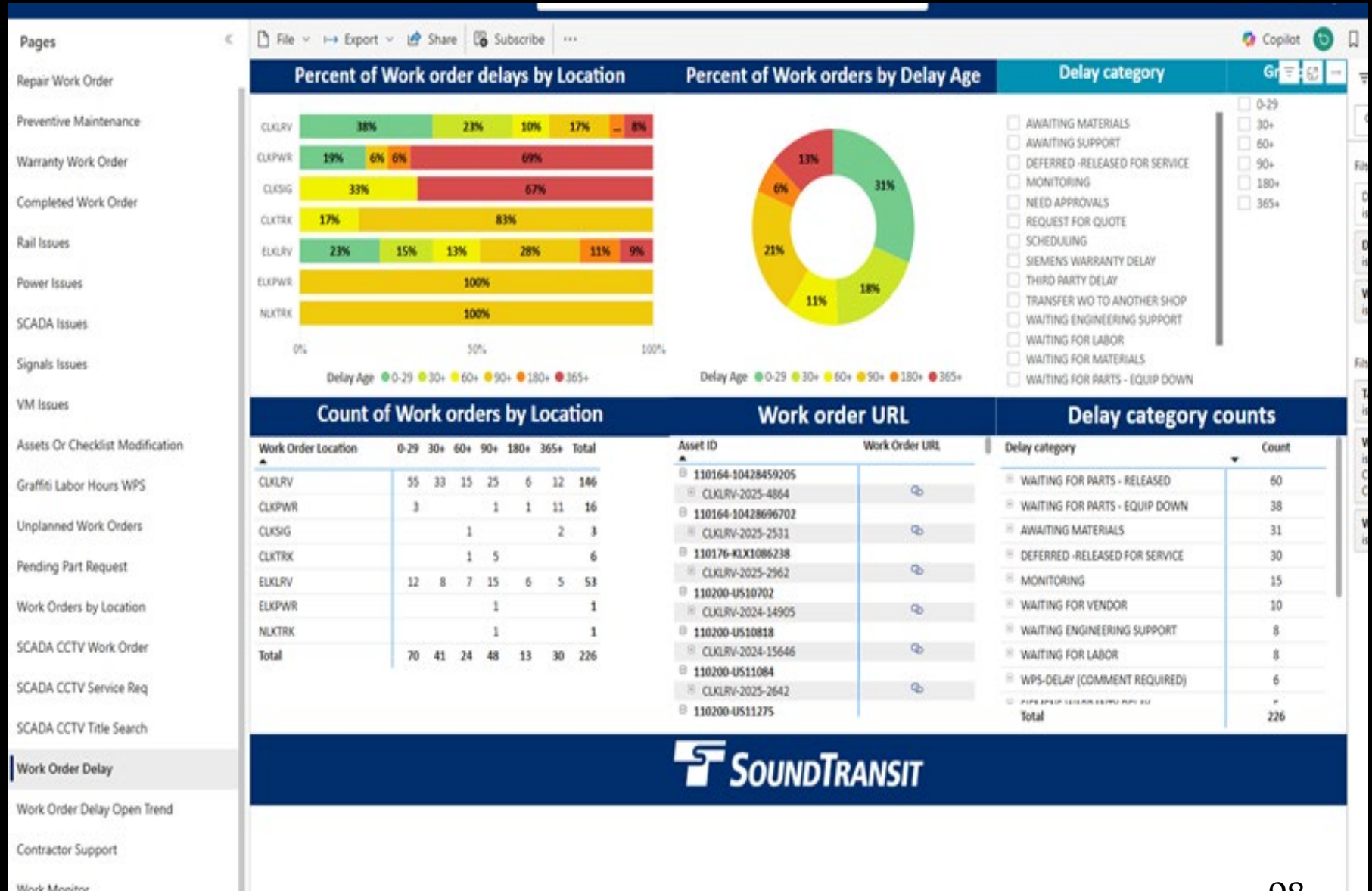
Data Type	Initial assessment	Initial results	Risk Factor Rating	Response
Inspection and maintenance records and report forms	Any trends (location) within RTA-Identified Defects?	Repair work orders CLKLRV has a total 166 that are over 30+ days. With 28 being 365+ days.	100	Review in 6 months
Work orders	How many work orders are still open?	Repair work orders CLKLRV has a total 166 that are over 30+ days. With 28 being 365+ days.	100	Review in 6 months
Records of failures and defects	What is the status of RTA-Identified Defects?	90+ days CLKLRV: 30 open workorders CLKNRV: 1 open workorder ELKLRV: 11 open workorders	100	Review in 6 months
Records of revenue vehicles out of service, including: <ul style="list-style-type: none"> causal information 	How many vehicles are out of service?	CLKLRV: 10 vehicles out of service ELKLRV: 34 vehicles out of service	100	Review in 6 months
Major maintenance activity schedule and progress	What is the progress of the scheduled activities?	PMs for CLKMSC has a total of 321 past due work orders, 103 of those are 180+days. Annual tool inspections.	400	Inspection within 3 months

QUARTERLY REVIEW & TRENDS

RBI Maintenance Infrastructure Trending

Data Type	Initial assessment	Data Analysis results
Inspection and maintenance records and report forms	Any trends (Work Group) within RTA-Identified Defects?	CLKTRK has 18 open work orders, 14 are 365+ days (11 of those are 1000+ days), 1 is 90+ days and 3 are 30+ days.
Work orders	How many work orders are still open?	Repair work orders CLKFAC has a total of 584 open work orders, 219 are 365+ days, 110 are 180+ days, 75 are 90+ days, 45 are 60+ days, 63 are 30+ days and 72 are less than 29 days.
Records of failures and defects	What is the status of RTA-Identified Defects?	CLKTRK: 8 NLKFAC: 7 NLKPWR- 3 NLKSIG-3 ELKTRK-2 NLKSCA-1 NLKTRK-1
Major maintenance activity schedule and progress	What is the progress of the scheduled activities?	PMs for CLKPRW has a total of 14 past due work orders, 10 of those are 365+days. 7 waiting engineering support (7 is waiting ESR to ST maintenance oversight)
Adherence to maintenance schedules including: <ul style="list-style-type: none"> reports and documentation of deferred maintenance. 	Are any of the maintenance activities are on time or past due?	PM inspected for CLKFAC had 19 PMs at 90+ days but less than 180+ days.
Inspection and maintenance records and report forms	Any trends (Work Group) within RTA-Identified Defects?	CLKTRK has 18 open work orders, 14 are 365+ days (11 of those are 1000+ days), 1 is 90+ days and 3 are 30+ days.

QUARTERLY REVIEW & TRENDS



DATA-DRIVEN RESPONSES



HOW WE INITIATE

RBI Planned Inspections

Inspections Data	Inspection Type	Notification	Location	Notification Date	Scheduled Date	Risk rating
Records of events	Planned Announced Inspection/ Un-Restricted Area	Minimum 14-day advanced notification	Union Station	Tuesday May 27 th	Tuesday June 10 th	400
Inspection and maintenance records and report forms	Planned Announced Inspection/ Un-Restricted Area	Minimum 14-day advanced notification	MLK & Union Station	Thursday July 3 rd	Thursday July 17 th	400
Major maintenance activity schedule and progress- Maintenance Data (Vehicle)	Planned Announced Inspection/ Restricted Area	Minimum 14-day advanced notification	OMF-C	Thursday July 3 rd	Tuesday July 17 th	400
Major maintenance activity schedule and progress- Maintenance Data (Infrastructure)	Planned Announced Inspection/ Restricted Area	Minimum 14-day advanced notification	OMF-C	Thursday July 31 st	Thursday August 14 th	400

This letter serves as notification that a risk-based inspection will be conducted at your facility. Please find the details of the inspection below:

Inspection 1: Inspection and maintenance records and report forms

- **Inspection Date:** July 17th, 2025
- **Inspection Time:** 09:00
- **Inspection Location:** MLK Alignment
- **Inspection Type:** Physical walking inspection along MLK alignment.
- **How Risk Was Established:** Evaluation of work orders by location, MLK total 26: CLKPWR has 19 and CLKTRK has 7. All open more than 365 days. As well as incorporating events along the same alignment. Our focus was on the CLKTRK. Due to the likelihood of MLK corridor events the rating is 10.0: Certain to happen: Certain to happen in under 3 months (1 in 10). As well as the severity rating of 40.0: Hazardous: Recurring Deficiencies. This risk rating was calculated as Likelihood (L) x Severity (S) = Risk Factor (RF)

$$10 \times 40 = 400 \text{ Risk Factor}$$

Risk factor ratings of :599- 400 is considered high with a response level of Substantial and an Inspection within 3 months.

- **Restricted/Unrestricted Area:** Unrestricted; Rail Stations (public areas)
- **Escort Required:** None
- **Meeting Location for Inspectors:** Rainier Beach Station
- **Documentation needed:** MLK workorders CLKTRK 2022-2022, CLKTRK 2024-440, CLKTRK 2024-441, CLKTRK 2024-444 & CLKTRK 2024-446. As built list per each workorder location. Associated risk assessment or reactive hazard identification to each workorder.

Inspection 2: Major maintenance activity schedule and progress

- **Inspection Date:** July 17th, 2025
- **Inspection Time:** 13:00
- **Inspection Location:** OMF-C, Maintenance department
- **Inspection Type:** Document review
- **How Risk Was Established:** Evaluation of progress on scheduled preventative maintenance, PMs for CLKMSC has a total of 321 past due work orders, 103 of those are 180+days. Our focus was Annual tool inspections. Due to the likelihood of MLK corridor events the rating is 10.0: Certain to happen: Certain to happen in under 3 months (1 in 10). As well as the severity rating of 40.0: Hazardous: Recurring Deficiencies. This risk rating was calculated as Likelihood (L) x Severity (S) = Risk Factor (RF)

INSPECTION ACTIVITIES



MEANINGFUL SOLUTIONS



FINDINGS

Inspection 1:

- 3 findings relevant to assets along MLK corridor.

Inspection 2:

- 5 findings relevant to tool calibration process and management.



RECOMMENDATIONS

Recommendations:

- Define for King County staff the difference in documenting on workorder Accident or Incident
- Identify training for KCM track inspection employees to properly document accident/ inspection within work orders.

Observation noticed by RTA:

Providing reflective paint or striping on pedestrian cages to provide more awareness at night. Currently asphalt color



THE CONCLUSION

Final Inspection Report

SENT VIA EMAIL

July 19, 2025

Robert Taaffe
Acting Director, Transportation Safety & Security
Sound Transit
401 S. Jackson St.
Seattle, WA 98104

Re: WSDOT SSOA Report on Announced Inspection of Sound Transit Link Light Rail

Dear Mr. Taaffe,

This report provides a summary of the announced inspection conducted at your location on July 17, 2025, between 9:00 AM and 3:00 PM. This inspection is a requirement under the Washington State Department of Transportation (WSDOT) State Safety Oversight Agency (SSOA)'s Risk-Based Inspection Program.

The inspection was initiated following the SSOA's review of first quarter (Q1) 2025 data, specifically the evaluation of open work orders by location along the MLK alignment. A total of 26 open work orders were identified: 19 attributed to CLKPWR and 7 to CLKTRK. All these work orders have remained open for over 365 days. Based on this analysis and associated events along the alignment, the inspection focus was directed toward the CLKTRK location.

Additionally, the SSOA reviewed Q1 2025 data related to scheduled preventive maintenance activities. At CLKMSC, a total of 321 past-due work orders were identified, with 103 overdue by more than 180 days. The inspection emphasized annual tool inspections as part of the maintenance review.

Report Number: 20250717_LLRLR_MLK & 20250717_LLRLR_OMFC

Date and time: 07/17/2025, 9:00am-3:00pm

SSO Inspectors: Jennifer Mars and Ryan Sigurdson

RTA Contacts: Robert Taaffe, Don Burr, Greg Dwidjaya, Mike Bauck, Brandon Porter, Jim Nitz, Joe Forgette and Eric Gatliff

Type and Location of Inspection: Physical walking inspection along MLK alignment. Brandon Street, Orcas Street, Columbia Street, Oregon Street and Alaska Street. Also, a document review at the OMF-C, Maintenance department.

PRACTICAL CONCLUSIONS

An underwater photograph showing a large school of fish, likely salmon, swimming in clear water. The fish are dark brown with lighter spots. Light rays and bubbles are visible in the upper portion of the frame, creating a bright, shimmering effect. The overall scene is dynamic and captures the natural behavior of the fish in their habitat.

CAP PROCESS

RTA develop CAP

```
graph TD; A[RTA develop CAP] --> B[RTA submits to SSO within 45 days for approval]; B --> C[RTA provide monthly updates]; C --> D[RTA gathers and collects evidence for closure submission]; D --> E[SSO review for closure];
```

RTA submits to SSO within 45 days for approval

RTA provide monthly updates

RTA gathers and collects evidence for closure submission

SSO review for closure

QUARTERLY CAP DISCUSSIONS

RBI Findings/CAP Status

Inspection Date and type	Finding	Mitigation / Status	Est. Completion Date	Challenges
7/17/25 -Document review at the OMF-C, Maintenance department	No documented process to confirm 1 st and 2 nd notification request per SMP 22.18 section 4.5.	208A - Moving forward, MSC staff will add a comment in the 'Notes' portion in EAMS tools PM workorder, for each calibration request that is sent to the Department which will notify each Craft for the tool calibration. Feasibility of auto-generated notification features/functionality within new EAMS for calibration due date will be explored.	9/18/2026	
7/17/25 -Document review at the OMF-C, Maintenance department	No organized process of locating gathering tools for calibration when they come due. Items listed at OMF-C but located at OMF-E	208A - Future action: Craft will be assigned to manage their own tools. The Pilot program with Signals and subsequent follow-up with the other departments will move this responsibility to each department. The movement of tools will be tracked by the departments that use them. The departments new assigned calibration PMs will initiate the process of them providing the tools to MSC for calibration.	9/18/2026	
7/17/25 -Document review at the OMF-C, Maintenance department	Items listed as "non calibrated tool" still appear in EAMs and Power Bi as past due. KCM is unaware if items should be calibrated	208A - Tool Calibration will be transferred to each Craft, owner of their tools. By doing so, this will transfer the responsibility to each department Craft and create a direct line of communication to ensure tools are properly input in EAMS for calibration.	9/18/2026	

EFFECTIVE MONITORING



QUARTERLY REVIEW

Top Three CAPs Identified

CAP	Assigned To	Action Item	Current Mitigations	Challenges Encountered	Expected Completion Date
137A	Chris Kardish	Apple Cup audit finding.	New PIMS capabilities.	Collecting monthly CAP Log updates. *CAP Log updates with project updates may not align.	Q4 2026

Previous Top CAPs

Q3 SSO Report - Reported in the last 6 months	Q4 SSO Status
195: Finding 1 - KCM method for documenting and maintaining training records for its employees. Finding 3 – and retaining training records for KCM staff	Currently requesting CAP Closure
162B: Westlake Station roof lid damaged; Investigation found that ST was notified in advance of the construction work that was to take place above WLS station roof.	Closed 07-2025

QUARTERLY REVIEW

Risk Prioritization

Category	# of Occurrences 2025 YTD & Q3 2025	Agency Response	Risk Rating
Transit Workers Assaults	Q3 • 4 Physical Assault – revenue Vehicle • 7 Physical Assault –revenue facility Which occurred on platforms 2025 YTD: 83 Worker Assaults	<ul style="list-style-type: none">Continued monitoring of several mitigations; de-escalation training, security, ambassadors, SOP'sResponse for FTA's General Directive 21-1	4B- Moderate Security Matrix
Collisions	Q3 • 5 Vehicles • 1 pedestrian 2025 YTD: • 11 Vehicles • 2 pedestrians	<ul style="list-style-type: none">ST Investigations and assessments team conducting review of root cause, determining factors, and corrective actions	3B-Undesirable (vehicle) 2C-Undesirable (pedestrian) Safety Matrix
Power Outages	Q3 5 - Tukwila International Boulevard (2), Roosevelt, Mountlake Terrace, Columbia City, OMF-C 2025 YTD: 17 Power outages	<ul style="list-style-type: none">4 loss of power at stations Signals was contact to investigate the issues1 breaker over heated found the HVAC in substation was not working. Facilities was working to resolve the issue. Door opened to cool down	5B-Acceptable with review Safety Matrix

ANNUAL LOG

Data Type: Maintenance Infrastructure	2025 Results
Inspection and maintenance records and report forms	400: Inspection within 3 months
Work orders	240: review in 3 months
Records of failures and defects	240: review in 3 months
Major maintenance activity schedule and progress	240: review in 3 months
Adherence to maintenance schedules	400: Inspection within 3 months
Capital project schedules and progress.	<90: Review in 12 months

SUMMARY



KEY TAKEAWAYS

- Acknowledging imperfection and growth
- Meaningful corrective actions
- Increased awareness and involvement
- Stronger relationships and inclusion

THANK YOU

Jennifer Mars

(360) 810 – 1369

Jennifer.Mars@wsdot.wa.gov

Ryan Sigurdson

(360) 810 -1720

Ryan.Sigurdson@wsdot.wa.gov

Contact Information

Risk-Based Inspection Program
FTA-RBI@dot.gov