



Final Return to Service Plan

Final Phase of the re-introduction of 7000-series railcars into passenger service

April 10, 2023

1. PURPOSE OF DOCUMENT

In January 2023, as part of the National Transportation Safety Board (NTSB) investigation, NTSB investigators and all parties to the investigation reached consensus that a probable cause of the October 2021 derailment can be mitigated safely by increasing interference fit and by increasing press tonnage of the 7000-series wheelsets.

This document explains:

- How Metro will continue to ensure safe operation of the 7000-series fleet using the ongoing wheelset measurement program, which has been refined and closely monitored since May 2022.
- How to make improvements or alterations to the wheelset measurement program and procedures should data analysis warrant a change.
- How railcars re-enter service and are no longer subject to the WMSC order dated December 29, 2021, once the wheel replacement has been completed on a railcar.

This document supersedes all previous versions of the Return to Service Plan.

2. COORDINATION WITH WASHINGTON METRORAIL SAFETY COMMISSION (WMSC)

This plan incorporates the lessons learned from multiple prior plans that were developed under the oversight of the WMSC. This collaborative, incremental approach has informed this latest version which relies upon the data and analyses collected during the implementation of the previous versions of the plan. Of note, 20 railcars were held out of service by the Chief Mechanical Officer in December 2022 due to high baseline measurements and will remain out of service until the wheels are replaced under Section 4.

Any deviation from this plan will be reported to the WMSC using the existing notification process per the WMSC Program Standard Section 7, Safety Event Notification. Notifications will be sent as O-25 events. Per the Program Standard, the WMSC may require a preliminary or final report per incident.

As section 3.4 states, Metro will continue to communicate to the WMSC any exceedances based on MSI 140026.

3. WHEELSET MEASUREMENT PROGRAM

3.1. Definitions

- Service day - single day of mainline operation in passenger service for operating hours, open to close.
- Non-revenue activities – any uses of 7000-series trains that do not involve transportation of customers. WMATA employees and contractors may ride trains in non-revenue activities.

3.2. Movement of Compliant Cars under the Wheel Measurement Program

The terms and supporting data requirements of a step must be completed before Metro can progress to the next step.

#	Summary	Duration
Step 1	All cars may run on all lines, measured at a 15-day measurement interval	Minimum 30 days, or until a railcar receives the wheel replacement
Step 2	All cars may run on all lines, measured at a 30-day measurement interval	Minimum 60 days, or until a railcar receives the wheel replacement
Step 2 Option	All cars may run where AWIS is certified, at a measurement interval based on the latest available data analysis	Minimum 60 days, or until a railcar receives the wheel replacement

3.2.1. Step 1: Measurement Interval of 15 Days

Metro will increase its measurement interval to 15 days. Metro will run under the terms of this step for at least 30 calendar days.

The terms of this step are as follows:

- Applies to all railcars.
- No limit on number of trains in service.
- All railcars may run on all operating lines.
- No limit on number of railcars in service for any population
- A back-to-back inspection per MSI 140026 is valid for 15 consecutive service days for railcars in passenger service and used in non-revenue activities.
 - If a qualified railcar has entered the mainline, the railcar will be qualified for 15 consecutive service days.
 - Qualified railcars that have not entered mainline shall be considered qualified for 15 days before its inspection expiring.

3.2.1.1. Supporting Data

Metro will submit the following data:

- Monthly wheel movement data and analysis consisting of measurement data and movement of the wheels relative to baseline
- Monthly vehicle/track interaction (VTI) data consisting of raw data from the VTI system
- Monthly VTI analysis consisting of an analysis from the interdisciplinary team chartered under Phase 2. The submittal will include consideration of all other relevant available track and structure inspection data, responses to trends observed in VTI data requiring a special condition assessment, and any corrective actions taken.

3.2.2. Step 2: Measurement Interval of 30 Days

At least five calendar days after Metro submits 30 days of data under section 3.2.1.1 for Step 1, Metro will increase its measurement interval to 30 days. Metro will run under the terms of this step for a minimum of 60 calendar days.

The terms of this step are as follows:

- Applies to all railcars that have not received wheel replacement.
- No limit on number of trains in service.
- All railcars may run on all operating lines.
- No limit on number of railcars in service for any population
- A back-to-back inspection per MSI 140026 is valid for 30 consecutive service days for railcars in passenger service and used in non-revenue activities.
 - If a qualified railcar has entered the mainline, the railcar will be qualified for 30 consecutive service days.
 - Qualified railcars that have not entered mainline shall be considered qualified for 30 days before its inspection expiring.

3.2.2.1. Supporting Data

Metro will submit the following data:

- Monthly wheel movement data and analysis consisting of measurement data and movement of the wheels relative to baseline
- Monthly vehicle/track interaction (VTI) data consisting of raw data from the VTI system
- Monthly VTI analysis consisting of an analysis from the interdisciplinary team chartered under Phase 2. The submittal will include consideration of all other relevant available track and structure inspection data, responses to trends observed in VTI data requiring a special condition assessment, and any corrective actions taken.

3.2.3. Step 2 Option: Wheelset Measurement with Automated Wayside Inspection System (AWIS)

Once the terms and supporting data requirements of Step 2 are satisfied, Metro can communicate at any time to WMSC the date when Metro may convert to the AWIS wheel measurement procedure. This is included as an optional step as Metro has not yet verified AWIS as an operational system safe for use.

The development of the AWIS processes and procedures will be managed through the safety certification process, not this plan. Exercising this option is dependent on AWIS receiving safety certification, under the direct oversight of WMSC. If exercised as an option, this step will be rolled out as the safety certification dictates. Any associated change to the interval of the (manual) wheelset measurement program will be managed as per Section 3.2.4 below.

Metro will run under the terms of this step for at least 60 calendar days. The terms of this step are as follows:

- All railcars may run where AWIS is safety certified.
- No limit on number of railcars in service for any population.
- Back-to-back measurement interval will be set through the safety certification, under the oversight of WMSC.

The supporting data requirements of this step are the same as those outlined in 3.2.1.1

3.2.4 Process to Amend the Wheel Measurement Program

At any time, Metro may submit to WMSC an engineering analysis to support one or more proposed changes to the interval, procedures, or any other part of the wheelset measurement program. Any engineering analysis is likely to include the same data and analysis described in Section 3.2.1.1 yet may also include other or matured

data sources. Once safety certified, data from AWIS may be part of the justification to alter the wheel measurement program.

WMSC will review any submission under this section within 14 calendar days and provide actionable comments or offer no technical objection, so the change can be implemented by Metro.

If an amendment is made, Metro will run railcars under the amended terms or procedure for at least 60 calendar days and meet the supporting data requirements as outlined in 3.2.1.1. The wheelset measurement program only applies to railcars that have not had the wheelsets replaced under the Wheelset Replacement Program.

3.3. Transport of Non-Compliant Cars

Metro will transport rail cars subject to Steps 1 or 2 that are out of compliance with MSI 140026 under the following conditions:

- Include a CMNT Road Mechanic on all transports
- Reduced speed of 15 miles per hour in non-revenue movement
- Car does not have axles that have failed MSI 140026

3.4. Responding to Exceedances

For any exceedance based on MSI 140026, Metro will:

- Investigate the railcar's track movement history
- Investigate any other relevant information, such as other railcar exceedances, track information, or other unusual observations
- Communicate the exceedance to WMSC and supply relevant supporting information. If any patterns in the data indicate additional safety steps are necessary, Metro will communicate these patterns to the WMSC and take the necessary safety actions.

4. TRANSFER OF RAILCARS TO PERIODIC INSPECTION PROGRAM

Once a railcar completes the Wheelset Replacement Program under MSI 000005, the railcar will no longer be subject to this return to service plan and will revert to the periodic inspection program. Metro will requalify used axles as part of the program, including axles from the hold list cars referenced in Section 2. Used journal bearings will be sent to the Original Equipment Manufacturer for overhaul prior to reuse.

A railcar with replaced wheelsets under MSI 000005 will receive back-to-back and journal bearing measurements during the periodic inspection per MSI 140026.

MSI 000005 details how a railcar progresses through the engineering, quality assurance and certification of conformance process to receive a wheelset replacement. MSI 000005 also details the role of the independent inspectors, and quality and inspection hold points. The program is subject to safety certification, through which WMSC will have full oversight of the process.

As a precautionary measure, Metro will implement the Wheelset Replacement Surveillance Program under DCMV 140040, where the first 40 railcars that receive wheel replacement under MSI 000005 will remain under the wheelset measurement program Step 1 (Section 3.2.1) for the opening period of 120 calendar days. The 120 calendar days shall begin when the first married pair completes the Wheelset Replacement Program.

Railcars that have not received the wheel replacement will remain subject to the latest wheelset measurement program under Step 2 (Sections 3.2.2), which will continue until all cars receive the replacement.

5. APPLICABLE PROCEDURES

Metro will use the most recent revision of the following procedures as part of normal operations. Metro may add additional procedures or rescind existing procedures based on the appropriate department's document control procedures.

- MSI 140026, Wheel Back-to-Back and Journal Bearing Measurements
- SBF 110, Removing a 7K Car from Service Due to Back-To-Back Failures
- MSI 000002, Back-to-Back Tools – CMM Calibration Procedure
- MSI 000003, Procedure for Utilizing Tread Worn Hollow Gauge
- MSI 000005, Wheel Set Assembly Procedure
- MSI 000006, Axle Inspection Procedure
- CMOR SOP 102.07, Control of 7K Vehicles for Compliance with Wheelset Requirements
- CMNT SOP 302.15, Control of Class 1 Rail Vehicles
- DCMV 140040, Wheelset Replacement Surveillance Program
- CMOR SOP 102.11, Control of 7K Vehicles with Replacement Wheelsets