

**Los Angeles County  
Metropolitan Transportation Authority  
Office of the Inspector General**

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**Review of Rail Car  
Preventive Maintenance**

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*Our review identified several areas where Metro rail divisions may improve their operations in preventive maintenance on rail cars.*

Report No. 11-AUD-12

July 21, 2011





**Metro**


Los Angeles County  
Metropolitan Transportation Authority

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**DATE:** July 21, 2011

**TO:** Board of Directors  
Chief Executive Officer

**FROM:** Karen Gorman   
Acting Inspector General

**SUBJECT: Final Report: Review of Rail Car Preventive Maintenance  
Report No. 11-AUD-12**

The Office of the Inspector General (OIG) performed a review of the preventative maintenance (PM) process on rail cars. The objective of our review was to determine the adequacy of controls over preventative maintenance on Metro rail cars.

We analyzed ten QA inspections conducted during March to August 2010 of PM completed by the rail divisions. Three of these inspections found that the PM performed on rail cars was unsatisfactory/poor. Although mechanics and their supervisors signed off that the required PM tasks were completed, the QA inspections found the following types of deficiencies:

- ❖ Work orders were not completed and/or properly closed out.
- ❖ Completed tasks were not always reviewed by the supervisor or leadman.
- ❖ Required tests were not always performed.
- ❖ Required data was not always recorded and documented.

Our review found that additional guidance and increased oversight and verifications were needed to ensure mechanics properly perform and document PM tasks. We also reviewed four QA inspection reports subsequently issued in February and March 2011. Those reports indicated satisfactory results. The OIG issued a draft report to Metro management on May 13, 2011.

Since the QA inspections in March 2010, leadership changes have been made within the Rail Vehicle Maintenance Department with the appointment of the current Executive Officer, Rail Vehicle Maintenance, the recent appointment of a new Director who oversees the Quality Assurance, Warranty and Instruction Department, and additional position adjustments at the Division level.

The new Rail Vehicle Maintenance Executive Officer agreed with the recommendations in the report, and expressed a positive attitude to make changes to improve performance in the areas indicated. The full text of management's response is included in the enclosed final audit report.

I thank Metro staff for their assistance and input during this review. If you have any questions, please contact Jack Shigetomi, Deputy Inspector General – Audits at (213) 244-7305.

**Review of Rail Car Preventive Maintenance  
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## **EXECUTIVE SUMMARY**

The Audit and Investigation Units of the Office of the Inspector General (OIG) performed a joint review of the rail car preventive maintenance (PM) on the Red, Green, and Gold Lines. The OIG received information that a Quality Assurance (QA) inspection in 2010 of two Red Line cars indicated a lack of proper preventive maintenance (PM). Our initial review found similar unsatisfactory audit results from the Green and Gold Line. QA also performed two PM inspection audits on the Blue Line in 2010, and the inspection results were excellent. Thus, the Blue Line was not included as a part of our review.

### **Objective and Scope of the Review**

The objective of our review was to determine the adequacy of oversight and controls over preventive maintenance on Metro rail cars. We analyzed QA PM inspection reports, reviewed applicable policies and procedures, and interviewed rail division managers and mechanics. (See Attachment A for additional information).

### **Preventive Maintenance Program**

Rail division mechanics perform PM on rail cars based on the manufacturer's guidelines. The Fleet Rail Services Warranty/Quality Assurance section evaluates the effectiveness of the PM performed and compliance with PM requirements (see Attachment B for additional information).

### **Summary of Results of Review**

Our review identified several areas where Metro rail divisions may improve their operations in preventive maintenance on rail cars. We analyzed ten QA inspections conducted during March to August 2010 of PM completed by the rail divisions. Three of these inspections found that PM performed on rail cars was unsatisfactory/poor. Although mechanics and their supervisors signed off that the required PM tasks were completed, the following types of deficiencies were found:

- Work orders were not completed and/or properly closed out.
- Completed tasks were not always reviewed by the supervisor or leadman.
- Required tests were not always performed.
- Required data was not always recorded and documented.

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Our review found that additional guidance and increased oversight and verifications were needed to ensure mechanics properly perform and document PM tasks. We also reviewed four QA inspection reports subsequently issued in February and March 2011. Those reports indicated satisfactory results. The OIG issued a draft report to Metro management on May 13, 2011.

Within the Rail Vehicle Maintenance Department, leadership changes have been made with the appointment of the current Executive Officer, Rail Vehicle Maintenance, the recent appointment of a new Director who oversees the Quality Assurance, Warranty and Instruction Department, and additional position adjustments at the Division level.

### RESULTS OF REVIEW

#### A. Analysis of Quality Assurance Inspections in 2010

We analyzed all ten QA inspections<sup>1</sup> performed of rail cars during 2010. Three of these inspections resulted in a rating of poor/unsatisfactory, while the others received a rating of satisfactory or higher. The three poor/unsatisfactory ratings were given to cars from the Red, Green, and Gold Lines, as shown in the table below:

***Table 1 - Results of 2010 QA Inspections***

<b>Inspection Date</b>	<b>Rail Line</b>	<b>PM Service Interval (miles)</b>	<b>Rail Car Number</b>	<b>Overall Result</b>
3/25/2010	Red	22,500	519 & 526	Poor/Unsatisfactory
4/01/2010	Green	7,500	217	Good
4/16/2010	Red	45,000	589 & 590	Very Good
4/22/2010	Blue	5,000	134	Excellent
5/24/2010	Red	22,500	507 & 510	Good
5/26/2010	Green	90,000	218	Poor/Unsatisfactory
6/03/2010	Gold	30,000	707	Poor/Unsatisfactory
6/30/2010	Green	22,500	203	Very Good
7/08/2010	Blue	30,000	107	Excellent
8/02/2010	Red	90,000	597 & 598	Excellent

<sup>1</sup> No QA preventive maintenance inspections were performed prior to 2008.

**1. Details of Three Quality Assurance Inspections with Poor/Unsatisfactory Ratings**

**Red Line Cars 519 and 526**

The Red Line division performed scheduled PM (22,500 mile) on cars 519 and 526. After the PM was completed, the QA team inspected the cars. The inspection reported an overall rating of “Poor.”

The cars did not pass all tests and they were not allowed back into revenue service until noted deficiencies were corrected. The inspection noted the following concerns:

- On both cars, the top Traction Motor (TM) brushes were found to be worn beyond specification limits. (See picture at Attachment C-1.)
- On car 526, the Commutator was damaged by condemned brushes. All four sets of brushes were found to be beyond the acceptable limit of 3/8 inch; the Brush Holder was out of adjustment; and the Brush Springs were the wrong type, not to specification.
- PCE Air Duct was severely torn and deteriorated beyond repair (car 519). (See picture at Attachment C-1.)
- Duct Tape (unsafe & unauthorized) was used to secure cap on High Voltage Cable area. (See picture at Attachment C-1.)
- All Cyclone Filter screens were completely clogged with debris. (See picture at Attachment C-1.)
- Blowers found to have excessive amounts of carbon dust. (See picture at Attachment C-1.)
- Braided sleeve was frayed and exposed high voltage wires. (See picture at Attachment C-1.)
- Improper fasteners were used to secure TM #3 Cover (car 526).
- TM Blower Brush Spring was not seated properly.
- TM Safety Cables were not adjusted properly.
- All evaporators were found filthy with accumulation of crusty carbon waste.
- Rear Condenser Cover (car 526) was missing.
- Debris was found in the Condenser Coil (car 526).

**Green Line Car 218**

Shortly after Green Line division mechanics performed scheduled PM (90,000 mile) on car 218, the QA team inspected the rail car. The inspection reported an overall rating of “Poor - Unsatisfactory.” QA did not allow the car to be released for revenue service until noted discrepancies were corrected. The inspection noted the following concerns:

- Brake Actuator Boots were torn. (See picture at Attachment C-2.) No work order was opened to address repairs. The PM inspection task required a visual check for damage on brake system.
- The A1 Axle had a damaged ground cable that exposed wires at the lug area. (See picture at Attachment C-2.) The PM instructions required Axle Ground Brushes to be checked for damage and wear.
- Sand release function failed to activate when tested. The inspection determined that the Sand Line was clogged. The PM inspection task required that all Sand Boxes be filled and functional before releasing car into service.
- Cab Communication System was inoperable due to missing Voice Data Communication Unit. The car had no PA Intercom or Destination Signage.
- Car HVAC fault light would not reset.
- Operator Dash Board had missing or broken LED lights and covers.
- All PM tasks/inspections were not performed on the Twin Tower Air Dryer (an O-Ring was not replaced). PM instructions require overhaul of Twin Tower Drain Valve.
- Required PM was not performed on the High Speed Circuit Breaker.
- Tasks/jobs were being signed-off; yet tasks/jobs were not completed or addressed.

**Gold Line Car 707**

Shortly after the Gold Line division performed scheduled PM (30,000 mile) on car 707, the QA team inspected the rail car. The inspection reported an overall rating of “Unsatisfactory.” The car was not allowed back into revenue service until noted deficiencies were corrected. The inspection noted the following concerns:

- Pantograph End Horn found to be very loose and rattled. (See picture at Attachment C-3.)



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- Tread Lubricator Sticks were not properly adjusted. The distance between lubricator cartridge and wheel was found beyond maximum adjustment levels. (See picture at Attachment C-3.)
- Test equipment was not removed, and was found still attached to the vehicle brake control unit.
- Tasks and jobs were signed off as completed, but were discovered incomplete.

**Records/Documentation Requirements:** Although maintenance personnel signed off that PM tasks were completed, the QA inspections found deficiencies. The QA inspection reports found that the records/documentation requirements were not always followed. For example:

- Work orders were not completed and/or properly closed out.
- The supervisor/leadman did not always review completed tasks (see Attachment D for additional details).

**Maintenance Effectiveness:** The QA inspection reports found that maintenance effectiveness was not always adequate such as:

- Required tests were not always performed.
- The cars did not always pass all of the tests applied.
- Required data was not always recorded and documented (see Attachment D for additional details).

### **B. Reasons Why Preventive Maintenance Was Not Properly Performed**

We interviewed QA personnel and maintenance management at the Red, Green, and Gold Lines regarding QA inspection results. We also interviewed six Red Line mechanics, four Green Line mechanics, and three Gold Line mechanics. These mechanics worked on the rail cars that the QA inspection team found poor/unsatisfactory PM results.

#### **1. Inconsistent Expectation of Responsibilities**

We found that there were inconsistent understanding and expectations of maintenance repair responsibilities among managers, mechanics, and the Quality Assurance team. The mechanics believed that they did not always have to repair or report exceptions or deficiencies noted during their PM work. On the other hand, the QA inspection team expected that all PM tasks be completed and any deficiencies found be corrected or reported for subsequent repair. For example:

- QA inspectors found Red Line mechanics did not clean or report a clogged cyclone filter, debris in a "condenser coil," and excessive carbon dust in "blowers." The mechanic stated that he thought cleaning carbon dust, debris, and clogs are included in the "blown down" procedures that are the responsibility of Service Attendants during the 45,000 mile inspection.
- The QA inspection found that Green Line mechanics did not repair or report a damaged auxiliary panel dash board, a damaged ground cable, and an inoperable Sand System. The mechanics stated that they thought these exceptions were not critical, and would not affect the operation of the rail car.
- The QA inspection found that a Green Line mechanic did not report a broken actuator cover. The mechanic stated that he did not report the broken actuator cover because he believed that his supervisor would not have allowed him to fix the problem.
- A Gold Line mechanic stated that he reported a leaking gearbox to his supervisor, but he was told to just clean and release the car.
- Maintenance Managers at all three rail lines stated that if the mechanics followed inspection procedures, they should have caught all of the exceptions/deficiencies found by the QA inspection team.

## **2. Additional Preventive Maintenance Guidance Is Needed**

Our review found that Metro has written procedures, instructions, and manuals in place covering mostly administrative matters for how employees should conduct themselves in rail yards, how rail cars should be operated, how tools and equipments should be handled, detailed instructions on troubleshooting, and specific tasks required to perform PM on rail cars.

Our review found that preventive maintenance procedures were inconsistently applied amongst the divisions and the mechanics. For example:

- Mechanics in one division stated that they could generate repair work orders when they found exceptions during PM inspections; however, mechanics in another division stated that they were not allowed to generate their own work orders.
- When exceptions were found, some mechanics made required repairs while others did not make any repairs.

- Some mechanics did not document exceptions they found during PM inspections. Others consulted with their leader or supervisor. If they were told to ignore the exception, the mechanics would not write them down.
  
- Mechanics in one division stated that they got parts from the storekeeper themselves. Mechanics in another division stated that the leadman would obtain parts for them.

Existing written guidance did not adequately cover the (1) role and responsibilities of the mechanics, leaders and supervisors, (2) requirements to document and/or repair exceptions/deficiencies noted, and (3) need to maintain transparency and accountability for following required procedures. In this regard, all deficiencies noted by the mechanics should be documented. If a supervisor or leadman determines that repair work is not necessary, the supervisor or leadman should also document this fact on the task order and sign off. This increases transparency and responsibility for the PM work.

### **3. Verification of Completed Preventive Maintenance**

We found that the Red Line supervisors did not perform any verification of completed preventive maintenance performed by mechanics. All Red Line mechanics that we interviewed stated that they knew their work would not be checked. The Red Line Maintenance Manager stated that post work inspection is time consuming and there are many employees whose work would have to be inspected.

However, we found that the Green Line and the Gold Line supervisors performed random monthly verifications of completed PM work. Nevertheless, the scope of these verifications was limited. The Green Line Maintenance Manager told us that a supervisor is not allowed to use tools around rail cars because of the restrictions set by the Collective Bargaining Agreement; therefore, it limits the verification performed by supervisors. We believe that supervisors and managers should be allowed to use tools, on a limited basis, for the purpose of providing oversight and verification of work done by mechanics.

### **C. Subsequent Inspections**

In mid February 2011, we shared the results of our review with the maintenance managers of the Red, Green, and Gold Lines. We advised them that maintenance supervisors and leaders should actively monitor PM work performed by mechanics and ensure that PM tasks are properly completed and closed out. Subsequently, we analyzed four additional QA inspections performed in 2011. The results of these QA inspections are shown on table on the following page:

**Table 2 - Results of 2011 QA Inspections**

<b>Inspection Date</b>	<b>Rail Line</b>	<b>PM Service Interval (miles)</b>	<b>Rail Car Number</b>	<b>Overall Result</b>
2/25/11	Green	22,500	210	Very Good
3/16/11	Red	90,000	524/525	Good
3/23/11	Blue	90,000	110	Outstanding
3/31/11	Green	7,500	212	Satisfactory

Although the QA inspection resulted in a satisfactory or higher rating, the QA reports identified some instances where improvements were needed in properly closing out and documenting PM inspection tasks, which indicates that continued management emphasis of this matter is needed. Examples of deficiencies noted are:

- Red Line Cars 524/525: QA found PM tasks were not properly completed concerning the evaporator motor cleaning inspection (Task 1 and 2, Job #6). QA found electrical wires exposed and the conduit frayed.
- Green Line Car 210: QA found the PM task incomplete pertaining to Mechanical Coupler Cleaning and Lubrication (Task #1, Job #16). Specifically, the coupler height adjustment screws were not properly applied.

**D. Other Related Matters**

**1. Rotation of QA Inspectors**

Rail Fleet Services QA/Warranty specialists are stationed at all of the rail divisions. They conduct QA PM inspections at the rail divisions, and assist the division on warranty, repair, and maintenance issues. They perform the QA inspections at only the divisions that they are assigned to support. We believe that the QA/Warranty specialists should be rotated so they would perform inspections at other rail divisions. This would:

- Provide greater consistency and standardization in the QA inspections conducted,
- Increase types and numbers of recommendations to improve maintenance, and
- Broaden the experience and skills of QA/Warranty specialists by working with other types of rail cars.

## 2. Warranty/QA Manager Comments

The Warranty/QA Manager suggested that his team's capabilities would be enhanced by adding:

- Resources, expanding audit coverage, and as well as increasing audit frequencies across all Maintenance Divisions,
- Audit capability in support for Metro's rail contractors and vendors, and
- Support for rail accident and incident Quality Control investigations.

Some of the mechanics we interviewed said that they were unaware that the QA team performs inspections of their maintenance work. The Warranty/QA Manager stated that he would like to see an increased awareness on the proper maintenance procedures.

## RECOMMENDATIONS

We recommend that the Rail Fleet Service Management:

### 1. Develop Guidance for Performing Preventive Maintenance.

Rail Fleet Service should develop additional written guidance that covers the rail PM process, including overall policy, responsibilities, accountability, procedures, and implementation plan. Additional guidance will help to ensure that duties and services are performed in a consistent manner and increases transparency and responsibility. The guidance should require that:

- a. Mechanics repair any exception or deficiency found during PM, prepare a work order, or report the exception in the maintenance system.
- b. Supervisors or leaders also document in the maintenance system and sign off if they determine that repair work is not necessary.

### 2. Coordinate among Rail Divisions and QA Team.

Rail Fleet Services should:

- a. Coordinate among rail maintenance staff and Warranty/QA team on the understanding and expectation of criticalities on the PM inspection procedures that need to be resolved before PM is completed and cars are released back into revenue service.

- b. Re-enforce these criticalities to mechanics, leaders, supervisors, and managers, so there is consistent expectation of PM maintenance inspection procedures.
- c. Ensure that rail maintenance management continue working with the Warranty/QA team and Rail Instruction team in updating PM maintenance guidance to reflect proper procedures for mechanics to follow.
- d. Consider surveying the Blue Line because of their excellent QA results, and develop best practices to be shared among all rail divisions.

**3. Verify Maintenance Work.**

Rail Fleet Services should:

- a. Work with rail divisions to increase supervisory oversight and/or verification of preventive maintenance work.
- b. Consider developing a model for division supervisors to conduct random verifications, and using a specialist (mechanic) to assist the supervisor in carrying out the verification. Random verification of work helps to ensure proper maintenance and provides management feedback on areas where instructions and procedures need improvement.
- c. Consider making any necessary changes or amendments to the Collective Bargaining Agreements that might be needed to allow supervisors and managers the ability to provide oversight and verification of work performed by mechanics.

**4. Re-enforce Requirements to Mechanics.**

Rail Fleet Services should re-enforce to mechanics proper preventive maintenance procedures. If certain mechanics make repetitious mistakes, provide them additional instructions and/or training.

**5. Monitor Quality Assurance Inspections Results.**

The Warranty/QA team should monitor the results of their QA inspections of PM completed by the divisions, and consider targeting activities or areas that have a high number of exceptions. Continuing QA inspections of preventive maintenance will help improve the effectiveness of the program.

**6. Rotate QA Inspectors.**

The Rail Fleet Services Warranty/Quality Assurance team should consider periodically rotating QA/Warranty specialist assigned so that the same QA inspector does not constantly perform QA PM inspections at the same rail division. Rotating inspection assignments would help improve consistency and standardization of inspections performed amongst the various rail divisions.

**MANAGEMENT COMMENTS**

On July 19, 2011, the Executive Officer, Rail Vehicle Maintenance provided a response to the OIG draft report. The Executive Officer agreed with the recommendations and provided a corrective action plan, which included the following actions:

**■ Develop Guidance for Performing Preventive Maintenance**

- Division and Instruction Managers have already, or are in the process of reviewing the PM policies, procedures, and guidelines with supervisory staff to ensure inclusion of noted accountability factors. The procedures either implement new or enhance existing protocols to address deficiencies found during Preventive Maintenance Inspections (PMI).
- The importance of proper guideline assurances, via procedures for Work Order repair documentation and work sign-off, is emphasized to Specialists, Leaders, and Supervisors.

**■ Coordinate Among Rail divisions and Quality Assurance Team**

- The Division Manager, with QA Manager's oversight, will continue to emphasize that supervisors do not release a partial PMI vehicle into revenue service, regardless of revenue need, unless ALL open Work Orders are properly completed indicating resolution of deficiency.
- Maintenance and Instruction are currently reviewing PMI policies at all division, as stated above (under recommendation 1).
- QA-Warranty will continue to observe and enforce maintenance coordinated audit and inspection activities.

**■ Verify Manual Work**

- Division Managers and Instruction are developing and upgrading supervisory oversight policies and guidelines for random verification of PMI completion check points, jointly assisted by an ATU Specialist and/or Leadman.

- The “Supervisor Post Inspection Form” developed in 2002 has been upgraded for consistent application across all rail divisions.

■ **Re-enforce Requirements to Mechanics**

- Division Managers, the QA Manager, and the Instruction Manager will develop a process for reinforcing Specialist PMI competence, as well as any required retraining efforts.

■ **Target Quality Assurance Inspections**

- QA-Warranty will focus even more intently on monitoring PM Inspections by division as well as target areas with noted performance discrepancies.
- Division Managers will enforce frequent post inspection audits to be performed by maintenance supervisory staff.
- QA-Warranty goals are already in place to increase the number of PMI audits by 25 percent.
- When training opportunities exist, QA-Warranty and Instruction will develop training programs to focus more on Supervisor hands-on experience, plus have them attend training classes on rail vehicle equipment.

■ **Rotate QA Inspectors**

- The QA-Warranty Manager will organize and schedule periodic rotation assignments between rail divisions to help improve consistency and inspection standardization.

See Attachment E for the full text of management comments.

## **EVALAUTION OF MANAGEMENT COMMENTS**

Metro’s proposed corrective action plan is responsive to the findings and recommendations in the report. Therefore, we consider all issues related to the recommendations in the report resolved based on the corrective action plan. Although the recommendations are resolved, staff must follow up on the recommendations that are still open until all corrective actions are completed. This requirement is set forth in Management Audit Services Audit Report Follow-up & Resolution Policy (MAS 1).



# **ATTACHMENTS**

## **Objective, Methodology, and Scope of Review**

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The former Metro General Manager of Rail Operation referred a matter to the OIG that a QA inspection gave a “poor” rating for PM performed on Red Line cars 519 and 526. The General Manager was concerned that the problems found by the QA inspection could be more widespread and indicative that maintenance personnel were just signing off on completing the required maintenance when in fact they did not do the maintenance work.

The objective of our review was to determine the adequacy of controls over preventive maintenance on Metro rail cars.

To accomplish this review objective, we:

- ❖ Interviewed Rail Fleet Service QA personnel regarding their QA inspections of rail cars.
- ❖ Obtained and analyzed QA inspection reports on rail car preventive maintenance.
- ❖ Reviewed Metro’s Rail Operation manuals, procedures, and related rulebooks.
- ❖ Interviewed various rail maintenance managers and mechanics who were responsible for the preventive maintenance on rail cars at the Red, Green, and Gold Lines.
- ❖ Observed the preventive maintenance process and shift turnovers at two rail divisions.

The audit portion of the review was performed in accordance with Generally Accepted Government Standards for staff qualification, independence, and due professional care and included such tests of procedures and records as deemed necessary under the circumstances.

The scope of our review is limited to the preventive maintenance process on the Red, Green, and Gold Line. We did not attest to the accuracy of the QA inspection reports, nor did we test the accuracy of documentation generated from Metro’s M3 system used by RFS for maintenance monitoring.

## **Background – Preventive Maintenance Process**

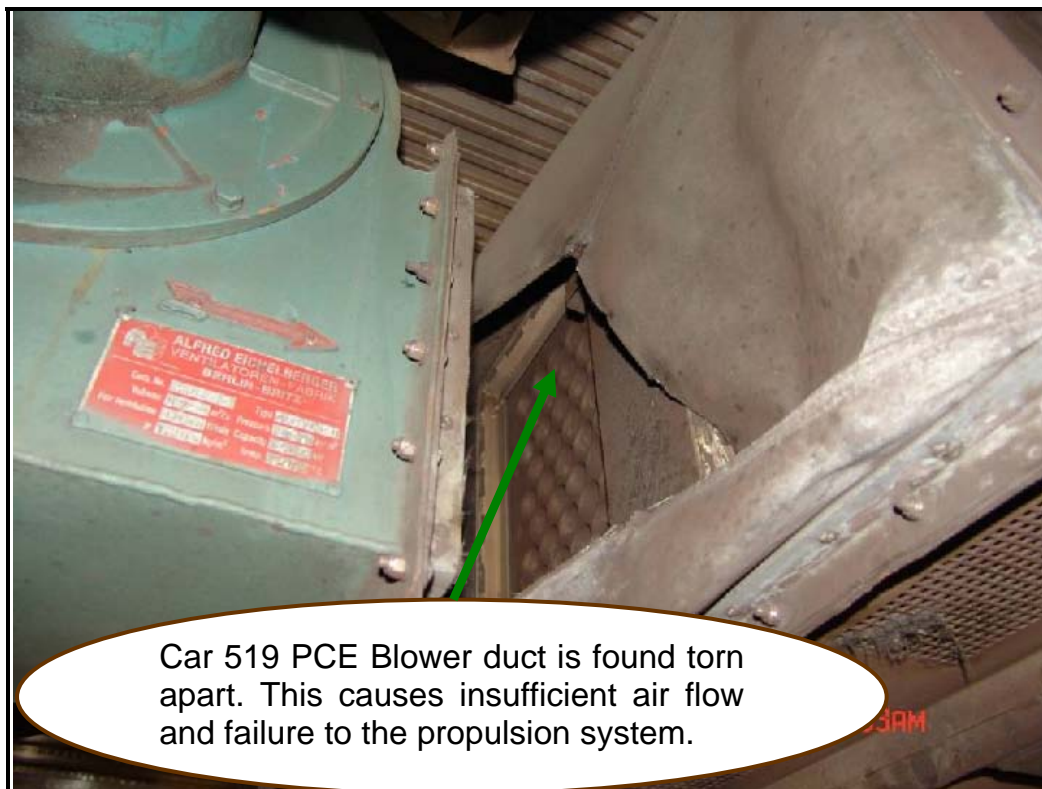
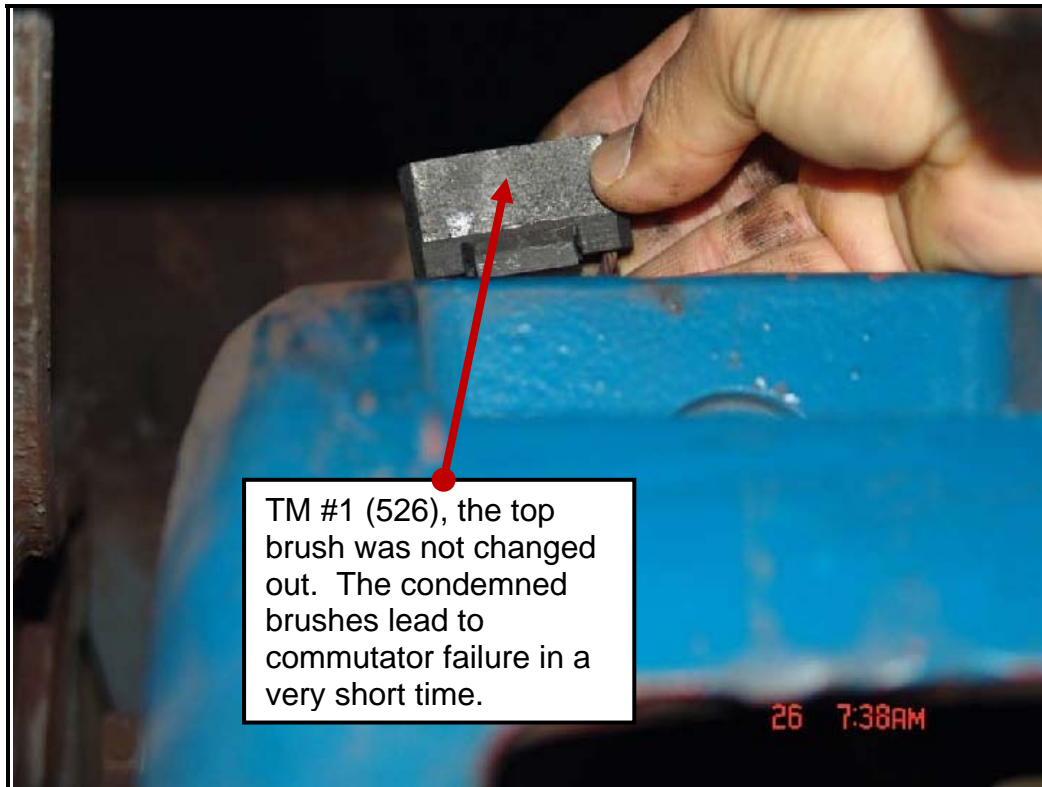
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Metro's Preventive Maintenance Program consists of regularly scheduled preventive maintenance to maintain rail car performance. Rail Fleet Services sets rail car maintenance inspection schedules based on manufacturer's guidelines. The Maintenance Divisions track rail car mileage and alerts maintenance management of required preventive maintenance. When a PM service interval is near, the scheduler arranges for the rail car to be pulled into the maintenance yard.

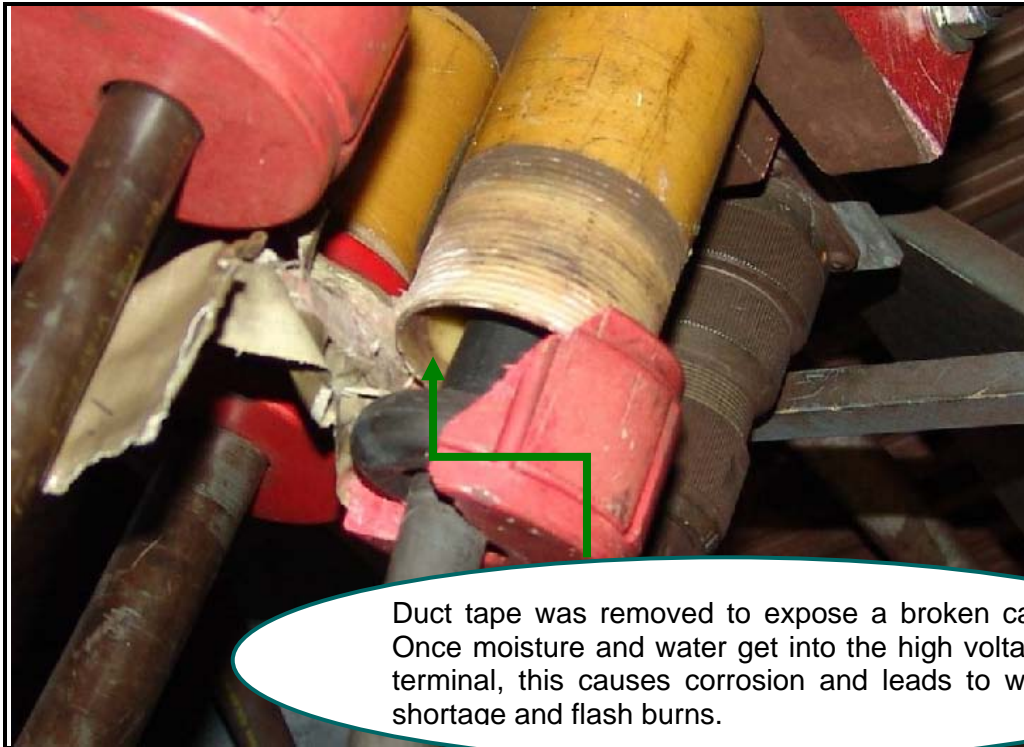
Maintenance management creates PM work orders for the cars to be worked on. After mechanics clock-in on the M3 system for their daily shift, they are assigned work tasks by either a supervisor or a leader. These assignments can be new ones or unfinished tasks from the prior shift. Mechanics take the printed work orders, log onto M3 to "job-on", and view their detailed task instructions including procedures. Preventive maintenance often requires the routine replacement of parts. Mechanics request parts from the storekeeper prior to beginning work. The shift leader assists the mechanics when needed to help in ordering parts and solving problems. When mechanics find exceptions/deficiencies during the inspection, they make notes on the work order and notify their leader or supervisor. The supervisor or leader then creates work order(s) for exceptions and/or deficiencies. When mechanics finish the PM task, they sign off on M3 electronically indicating the task is completed, and then notify the leader. The supervisor or leader also electronically signs off on the M3 system that the task has been completed.

Before the end of the shift, mechanics report the status of their work to the shift leader or supervisor by submitting printed work orders with their initials next to each task attesting that they have accomplished the task. The leader and supervisor then log the status of these work orders on a computer spreadsheet and in a log book. When all required inspection procedures are completed and there is no outstanding work order tasks, management releases the rail cars to revenue service.

## Pictures Pertaining to QA Inspection on Red Line Cars 519 and 526



## Pictures Pertaining to QA Inspection on Red Line Cars 519 and 526



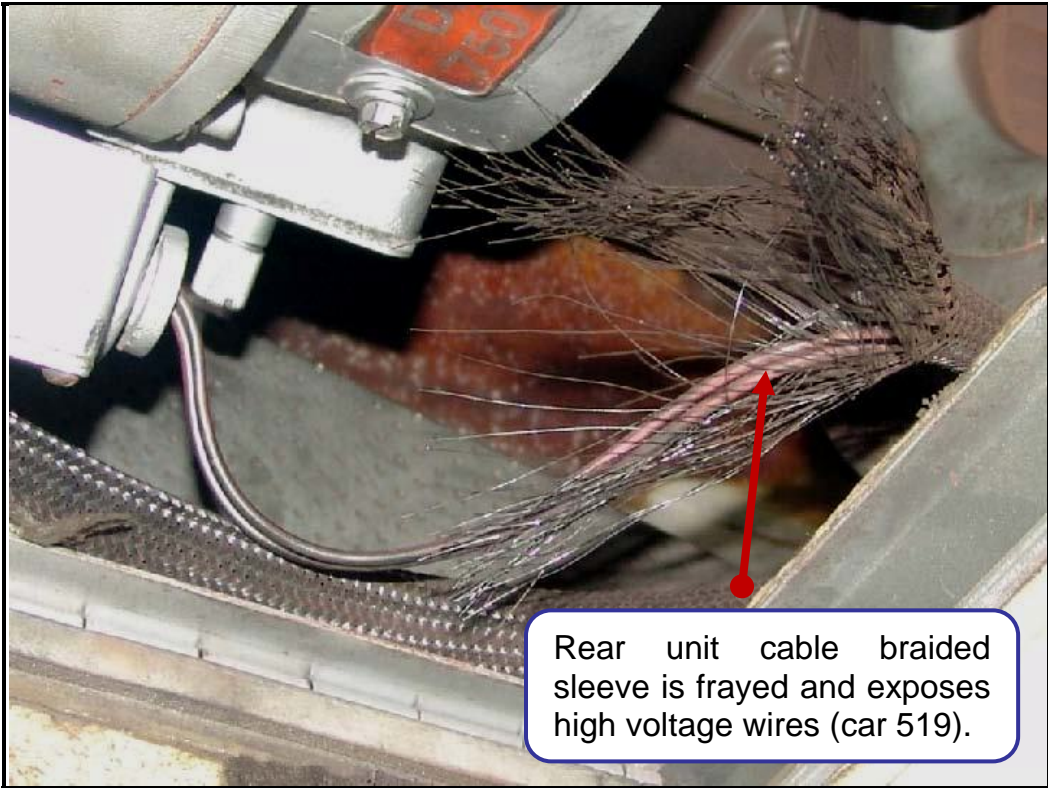
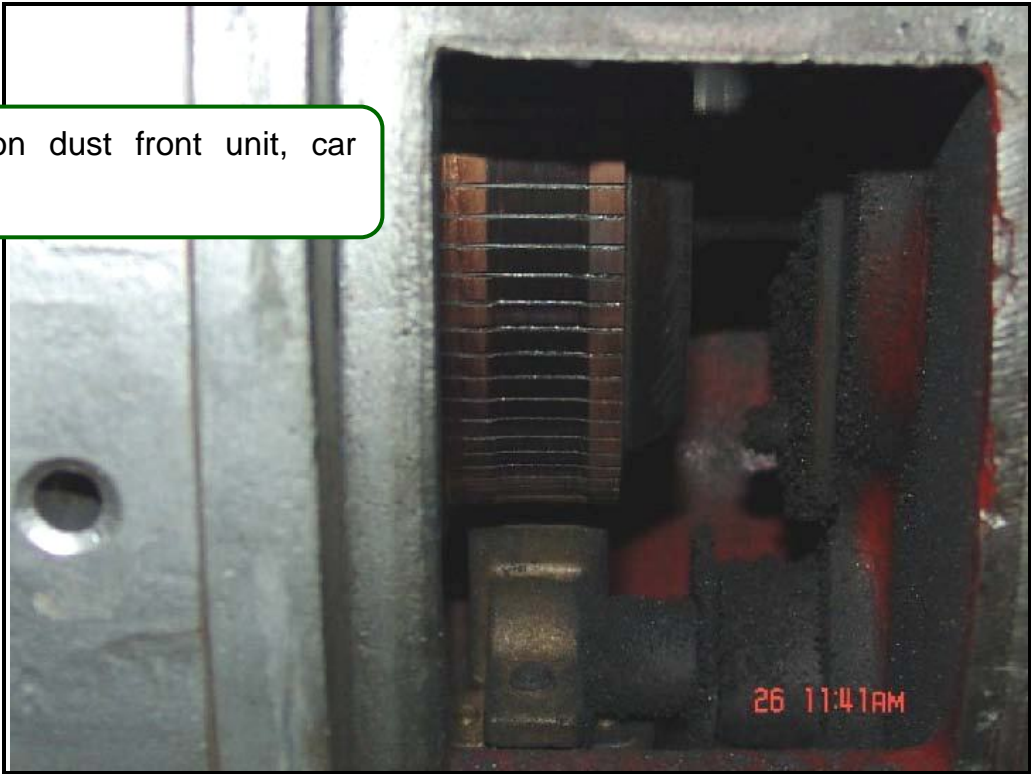
Duct tape was removed to expose a broken cap. Once moisture and water get into the high voltage terminal, this causes corrosion and leads to wire shortage and flash burns.



Every (TM -PCE) blower is clogged with debris. This leads to costly TM failure. The blowers must be cleaned and cleared for the Cyclone filter to work properly.

**Pictures Pertaining to QA Inspection on Red Line Cars 519 and 526**

Carbon dust front unit, car 519.



Rear unit cable braided sleeve is frayed and exposes high voltage wires (car 519).

# Pictures Pertaining to QA Inspection of Green Line Car 218

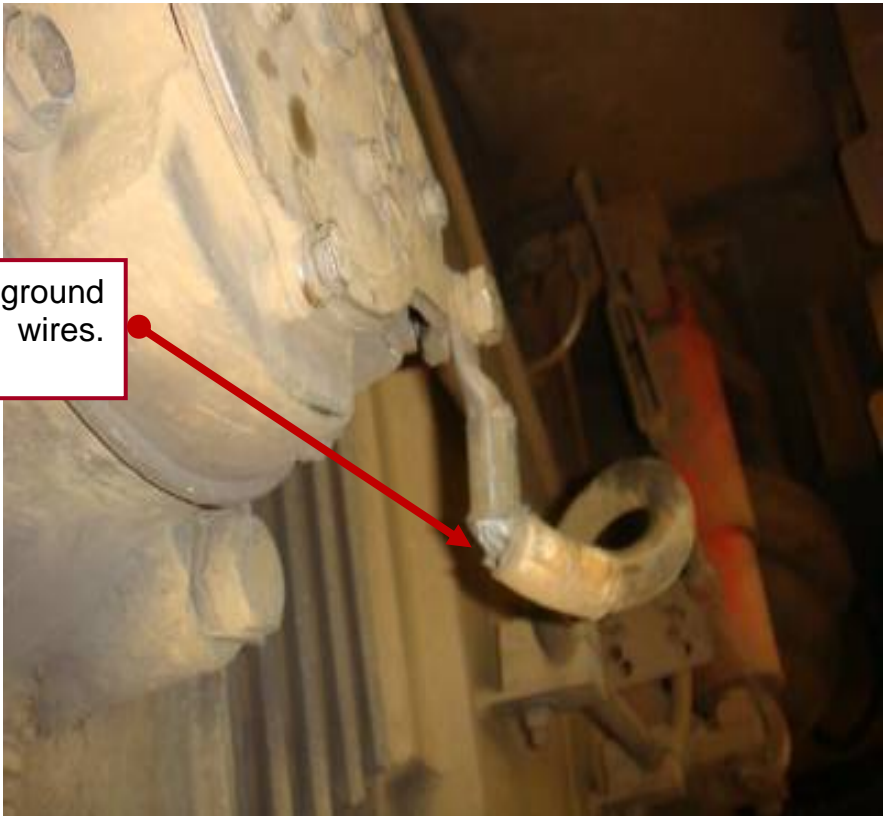
Damaged Actuator Bellows:

- left boot and
- right boot.

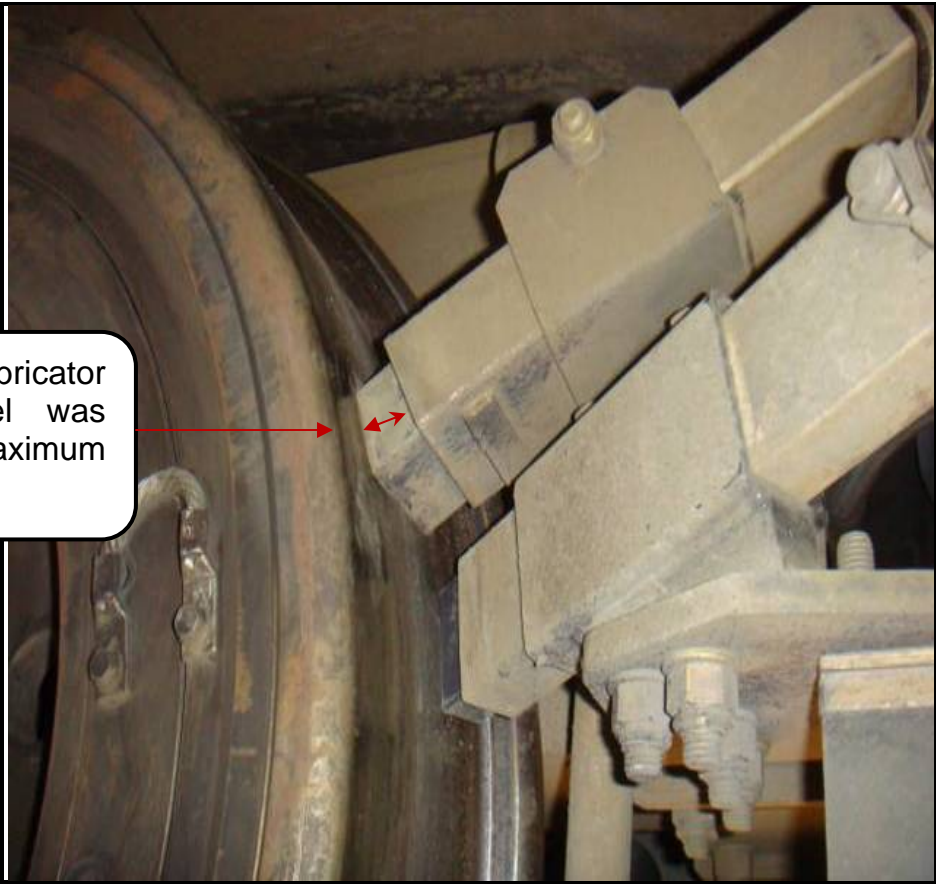
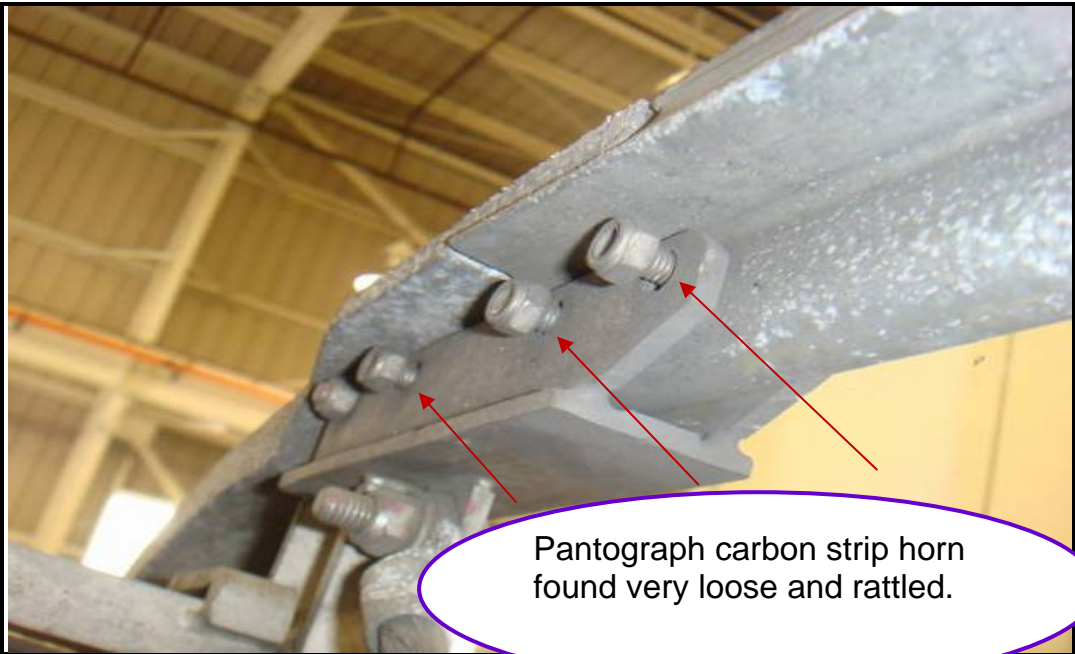
PM requires visual check for damage to brake system. No work orders or inspection notes were open to address torn bellows.



A1 Axle has damaged ground cable that exposed wires. Actuator Bellows



**Pictures Pertaining to QA Inspection of Gold Line Car 707**





## Records Documentation and Maintenance Effectiveness

Summary of results of three QA inspections for Red Line cars 519 and 526, Green Line car 218, and Gold Line car 707 are summarized below.

### Records/Documentation Requirements

		QA Inspection		
		Red Line Cars 519/526	Green Line Car 218	Gold Line Car 707
1.	Was each work order completed and properly closed out?	No	No <sup>1</sup>	No <sup>2</sup>
2.	Did the supervisor/leadman review completed tasks?	No	No <sup>3</sup>	No <sup>4</sup>
3.	Is the PM inspection well documented into Spears M3?	No	Yes	Yes
4.	Did the supervisor/leadman sign-off on the completed work order?	Yes	No <sup>5</sup>	Yes
5.	Is the Division Fleet Status Sheet available or posted?	Yes	Yes	Yes

### Maintenance Effectiveness

		QA Inspection		
		Red Line Cars 519/526	Green Line Car 218	Gold Line Car 707
1.	Were all required tests performed?	No	No <sup>6</sup>	Yes
2.	Did the vehicle pass all tests applied?	No	No	Yes
3.	Was all the required data recorded and documented?	No	No <sup>7</sup>	Yes
4.	If any of the above section steps were not addressed, was the car allowed back into service?	No	No	No

<sup>1</sup> QA discovered tasks and jobs were closed but they were not completed or addressed.

<sup>2</sup> The Pantograph End Horn was found very loose. It rattled, and when not properly secured, it has a direct affect on the car's performance.

<sup>3</sup> Tasks and jobs were completed/closed without verification.

<sup>4</sup> Task 2, Job 13 was signed completed and closed without verification.

<sup>5</sup> Work order signed off closed, however, several tasks/jobs were found to be not completed.

<sup>6</sup> QA discovered Task #9 tests were not performed.

<sup>7</sup> QA found no notes or open work orders to address discovered issues.

## Management Comments to Draft Report



**Metro**

### Interoffice Memo

Date	July 19, 2011
To	Jack Shigetomi Deputy Inspector General - Inspections
From	Richard M. Lozano Executive Officer, Rail Vehicle Maintenance
Subject	Report on Rail Car Preventative Maintenance, 11-AUD-12

I have completed my review of the OIG – Draft Report on Rail Car Preventive Maintenance, 11-AUD-12, and agree with the recommendations as noted. Per the OIG’s request I have included a corrective action response for each of the six recommendations with the planned implementation activities, although several were implemented post initial occurrence.

There are only two addendum requests to the OIG - Final Report:

- 1) State in the executive summary the timeframe of the original incident which started in March 2010 and was followed by the OIG-Draft Report being distributed in April 2011, a nearly 13 month time lapse since original occurrence. With this request executive staff and the Metro Board will understand that the content of this report is not a current reflection of RFS Preventive Maintenance Programs.
- 2) Discuss that leadership changes have been made, beginning with my appointment to Executive Officer - Rail Vehicle Maintenance and continuing with the recent appointment of a new Director who oversees the Quality Assurance – Warranty and Instruction Departments and additional adjustments at the Division levels positions.

My team and I view the OIG- Draft Report on Rail Car Preventive Maintenance positively; notably as a tool for continued improvement of the rail Preventive Maintenance Inspection (PMI) programs with the ultimate objectives to ensure clean, safe & reliable rail vehicles for our passengers. Suffice to say, as new management staff, we get it, and will do our part to ensure staff’s understanding of the importance of this report followed by program implementation and administration as recommended.

Below are my comments to the referenced OIG - Draft Report, dated May 13, 2011, with resubmission on June 7, 2011, adding recommendation #6. Please note the implementation of the below recommendations are in some cases under development at each division for consistent PMI program guidance and compliance:

**1. Develop Guidance for Performing Preventative Maintenance**

- ✓ Division & Instruction Managers have already, or are in the process of reviewing the preventative maintenance policies, procedures, and guidelines with supervisory staff to ensure inclusion of noted accountability factors.

## Management Comments to Draft Report

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The procedures either implement new or enhance existing protocols to address deficiencies discovered during PMI.

- ✓ Importance of proper guideline assurances, via procedures for Work Order repair documentation and work sign-off, is emphasized to Specialists, Leaders & Supervisors.

### 2. Coordinate among Rail Divisions & QA Team

- ✓ Division Managers, with QA Manager oversight, continue to emphasize that supervisors not release a partial PMI vehicle into revenue service, regardless of revenue need, unless All open Work Orders are properly completed indicating resolution of deficiency.
- ✓ Maintenance Management & Instruction are currently reviewing PMI policies, as stated above in #1, at all divisions; will take some time to ensure consistency.
- ✓ QA-Warranty will continue to observe and enforce Maintenance coordinated audit and inspection activities.

### 3. Verify Manual Work

- ✓ Divisions Managers & Instruction are in the developmental stage of upgrading supervisory oversight policies & guidelines for random verification of PMI completion check points, jointly assisted by ATU Specialist and/or Leadman.
- ✓ A "Supervisor Post Inspection Form" (attached) originally developed in 2002 has been updated for consistent application across all rail divisions.

### 4. Re-enforce Requirements to Mechanics

- ✓ Division Managers/QA Manager/Instruction Manager will develop a means for reinforcing Specialist PMI competence, as well as any required retraining efforts.

### 5. Target Quality Assurance Inspections

- ✓ QA-Warranty will focus even more intently on monitoring PM Inspections by division as well as target areas with noted performance discrepancies.
- ✓ Division Managers will enforce frequent post inspection audits to be performed by maintenance supervisory staff.
- ✓ QA-Warranty goals are already in place to increase number of PMI's audits by 25%.
- ✓ In addition, and when training opportunities exist, QA-Warranty & Instruction will develop training programs to focus more on Supervisor hands-on experience, plus have them attend training classes on rail vehicle equipment they are responsible for.

## Management Comments to Draft Report

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6. **Rotate QA Inspectors**

- ✓ QA-Warranty Manager will organize and schedule periodic rotation assignments between rail divisions to help improve consistency and inspection standardization processes.

Rail Fleet Services (RFS) has made great strides towards eliminating preventative maintenance shortcomings identified in the QA report dated March 2010 and in the recent OIG report. Conscientious efforts are being demonstrated at all levels. With the recent changes to RFS executive management, PMI compliance and accountability is of the highest priority so as to eliminate recurrence of negative findings/reporting and to ensure the availability of clean, safe and reliable vehicles for our passengers.

In closing, I appreciate your understanding of the need for PMI accountability and compliance and look forward to finalizing this report as timely as possible.

If you have any questions, please contact me at (213) 922-3186.

Sincerely,

*for* *nick madanet "acting"*  
Richard M. Lozano  
EO, RVM

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