Los Angeles County
Metropolitan Transportation Authority
Office of the Inspector General

AUDIT OF METRO
BUS MAINTENANCE PROGRAM

Report No. 18-AUD-05
May 18, 2018
# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>INTRODUCTION</td>
<td>1</td>
</tr>
<tr>
<td>BACKGROUND</td>
<td>1</td>
</tr>
<tr>
<td>OBJECTIVES, SCOPE, AND METHODOLOGY OF AUDIT</td>
<td>2</td>
</tr>
<tr>
<td>RESULTS OF AUDIT</td>
<td>2</td>
</tr>
<tr>
<td>A. Incomplete Inspection Forms in Bus Maintenance Files</td>
<td>2</td>
</tr>
<tr>
<td>B. Maintenance Procedures Do Not Include Mechanics’ Review of Daily Inspection Reports</td>
<td>3</td>
</tr>
<tr>
<td>C. Past Due Preventive Maintenance Work Orders</td>
<td>4</td>
</tr>
<tr>
<td>D. Bus Pullout Cancellations Due to Mechanical Reasons</td>
<td>5</td>
</tr>
<tr>
<td>E. Metro Bus Maintenance Plan and Preventive Maintenance Inspection Guidelines</td>
<td>5</td>
</tr>
<tr>
<td>CONCLUSION</td>
<td>7</td>
</tr>
<tr>
<td>RECOMMENDATIONS</td>
<td>7</td>
</tr>
<tr>
<td>MANAGEMENT COMMENTS TO THE RECOMMENDATIONS</td>
<td>8</td>
</tr>
<tr>
<td>EVALUATION OF METRO MANAGEMENT COMMENTS</td>
<td>8</td>
</tr>
<tr>
<td>ATTACHMENTS</td>
<td></td>
</tr>
<tr>
<td>A. Past Due Preventive Maintenance Work Orders</td>
<td>9</td>
</tr>
<tr>
<td>B. Bus Pullout Cancellations Due to Mechanical Reasons</td>
<td>10</td>
</tr>
<tr>
<td>C. Copy of Management Comments to Draft Report</td>
<td>11</td>
</tr>
<tr>
<td>D. Final Report Distribution</td>
<td>13</td>
</tr>
</tbody>
</table>
DATE: May 18, 2018

TO: Metro Chief Executive Officer
    Metro Board of Directors

FROM: Yvonne Zheng, Senior Manager, Audit, Office of the Inspector General

SUBJECT: Audit of Metro Bus Maintenance Program (Report No. 18-AUD-05)

INTRODUCTION

The Office of the Inspector General (OIG) performed an Audit of Metro’s Bus Maintenance Program. This audit was conducted as part of our ongoing effort to assist Metro in improving the efficiency of operations and implementing effective controls to ensure that safe and reliable buses are placed in service.

BACKGROUND

Metro operates approximately 2,200 buses that provide transit service to over 9.6 million people. It is Metro’s policy to operate and maintain its revenue service vehicles safely and effectively with established maintenance practices and procedures. In addition, Metro must also adhere to State and Federal regulations covering bus maintenance and recordkeeping requirements.

Metro’s Bus Maintenance is performed by Division Maintenance and Central Maintenance.

- Metro has 11 bus divisions. The maintenance department at each division is responsible for ensuring that safe and reliable buses are placed in service and that Metro’s policies and procedures and government regulations covering bus maintenance requirements and recordkeeping are being adhered to.

- The Central Maintenance Department has primary fleet maintenance responsibility and is responsible for:
  - Establishing and updating Metro’s Bus Maintenance Plan,
  - Creating new maintenance practices and procedures,
  - Reviewing and modifying existing maintenance practices and procedures,
  - Reporting fleet status, and
  - Recommending corrective actions to Division Maintenance Managers.
OBJECTIVES, SCOPE, AND METHODOLOGY OF AUDIT

The objectives of this audit were to determine whether:

- Controls over bus maintenance and record keeping are adequate and ensure buses placed in service are safe and reliable, and
- Metro’s practices, policies, and procedures are in compliance with State and Federal regulations.

To achieve these audit objectives, we interviewed appropriate maintenance staff and reviewed:

- State and Federal regulations covering bus maintenance and recordkeeping requirements for motor carriers;
- Metro’s Revenue Service Bus Maintenance Plan that includes the Preventive Maintenance Inspection Guidelines (Attachment H of the Plan);
- Other applicable Metro policies and procedures;
- Department of California Highway Patrol (CHP) Annual Safety Compliance Reports for all divisions for calendar years 2015 and 2016;
- Bus maintenance files;
- Past due preventive maintenance work orders for the period of July 1, 2016 to May 31, 2017; and
- Bus pullout cancellations for the period of July 1, 2016 to May 31, 2017.

We conducted this audit in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on the audit objectives.

RESULTS OF AUDIT

We found that the internal controls over bus maintenance appear adequate for ensuring that buses placed in service are safe and reliable. In addition, Metro’s practices, policies, and procedures appear to be in compliance with State and Federal regulations. However, we found the following areas that warrant management’s attention:

A. Incomplete Inspection Forms in Bus Maintenance Files

California Code of Regulations (CCR), Title 13, Section 1234 and the Code of Federal Regulations (CFR), Title 49, Part 396 require motor carriers to maintain a bus file for each bus. At a minimum these bus files should contain a year of inspection forms documenting maintenance and repair work performed and three months’ of Daily Vehicle Inspection Reports (DVIR) prepared by
operators. We selected a sample of 10 bus maintenance files from Division 13 for detail testing. These bus files also included inspection forms completed by Divisions 1 and 10.¹

1. **Defect Cards**

Metro’s Preventive Maintenance Inspection Guidelines require that each bus inspection form be dated and signed by the mechanic, leader, and supervisor along with a notation of the number of defect (repair) cards made during the inspection. We found that 7 of the 10 bus maintenance files contained some inspection forms that did not have the number of defect card(s) recorded on the form. When this information is not provided on the forms, there is less assurance that defects identified in an inspection are corrected before the bus is placed in service.

To ensure that bus maintenance records accurately reflect inspections conducted and repair work performed, Metro’s Bus Maintenance needs to communicate to staff the importance of following the requirements in the Preventive Maintenance Inspection Guidelines to record the number of defect cards on all inspection forms.

2. **Mileage Information on Inspection Forms**

State and Federal regulations require that the date of the inspection or vehicle mileage be recorded on inspection forms. Metro’s inspection form has space for recording both the date of inspection and mileage.

Our review of 10 bus maintenance files found that all of the inspection forms contained the date of the inspection. However, 7 of the 10 bus files contained some inspection forms where the maintenance staff did not record the bus mileage reading on the inspection form.

The Preventive Maintenance Inspection Guidelines states: “Each inspection form must be dated and signed…” However, the guidelines did not address whether documenting mileage on the inspection form is required. If Operations management believes that mileage is an important factor/indicator for many of the maintenance areas that are reported on the inspection forms, then the maintenance department needs to clarify in the guidelines that mileage should also be recorded on the inspection forms. This would provide information on the number of miles driven between inspections and repairs and ensure that inspection forms are completed in a consistent manner.

**B. Maintenance Procedures Do Not Include Mechanics’ Reviews of Daily Inspection Reports**

CCR, Title 13, Section 1234(e) and the CFR, Part 396.11 require motor carriers to have drivers complete and submit a daily vehicle inspection report (DVIR) at the completion of each day’s work for each vehicle operated. This report is used to document any defects or deficiencies noted by the operator. The operator must prepare a report even if no defect or deficiency is discovered. Maintenance management advised us that mechanics review the DVIRs completed by operators

¹ During Operation’s “shake-up” period, buses can be reassigned to other divisions.
on a daily basis. If a mechanic corrects a defect or deficiency he must denote on the DVIR the repairs made, sign and date the DVIR along with his/her supervisor’s signature. If no repairs are made, the mechanic does not have to sign or date the DVIR. However, the mechanic’s supervisor as part of his/her review must still sign and date the report.

Our review of Metro’s Bus Maintenance Plan and Preventive Maintenance Inspection Guidelines found that the procedures for documenting mechanics’ review of bus operators’ DVIRs were not included in these policies. When we brought this matter to management’s attention, they attributed oversight as the reason these procedures were not included in the written policies. We believe that these procedures should be incorporated into Metro’s policies to ensure that compliance with requirements regarding the mechanics’ review of DVIRs is followed on a consistent basis and to ensure that mechanics know what is expected of them.

C. Past Due Preventive Maintenance Work Orders

Federal Transit Administration (FTA) Circulars 9030.1E and 5010.1E require motor carriers to incorporate a preventive maintenance program within their written bus maintenance plan. This program should describe various types of routine maintenance services performed at scheduled intervals. When a service is not performed at its scheduled time, the service is past due. A large number of past due work orders provides less assurance that a motor carrier’s preventive maintenance program is working effectively and buses placed in service are safe and reliable. Because of the importance of completing preventive maintenance on time, Metro’s Bus Maintenance Plan states: “Past due not to exceed a ratio of 0.01.” Maintenance Department management clarified that the goal is that past due preventive maintenance work orders shall not exceed 1%.

We reviewed Metro’s past due preventive maintenance program (PMP) work orders for all 11 bus divisions for the period of July 1, 2016 to May 31, 2017 (see Attachment A). We found that out of approximately 141,500 PMP work orders scheduled to be performed, 739 or 0.52% were not completed on time. The percentage of past due PMP work orders for all divisions is under the 1% goal in the Bus Maintenance Plan. However, our analysis of the past due work orders found that 3 divisions\(^2\) accounted for 495 or 67% of the 739 past due work orders. For these 3 divisions, two types of preventive maintenance services accounted for about 39% of these past due PMP work orders, general bus cleaning and safety brake inspection. General bus cleaning accounted for 109 (22%) of the past due work orders and safety brake inspections accounted for 84 (17%).

When we brought this information to the attention of maintenance management, they informed us that they could not identify anything out of the ordinary during this period that would have caused past due PMP work orders to be higher at these three divisions. Management advised that past due PMP work orders is one of the department’s key performance indicators and that their focus has been to reach the goal of zero past due PMP work orders at all divisions.

\(^2\) Division 5, 253 past due work orders; Division 8, 133 past due work orders; and Division 10, 109 past due work orders.
Maintenance management should monitor on a continuous basis reports of past due PMP work orders, identify any trends by division and type of preventive maintenance service, and take appropriate corrective action. This will help to ensure preventive maintenance is performed on schedule.

D. Bus Pullout Cancellations Due to Mechanical Reasons

Metro’s Bus Maintenance Department’s main responsibility is to ensure that there are safe and reliable buses available to meet service needs. Occasionally a bus is not available to be pulled out to meet service requirements. The reason for the pullout cancellation can be due to lack of an operator, or not having a bus available due to mechanical reasons. We reviewed a report of bus pullout cancellations by division for the period of July 1, 2016 to May 31, 2017, and found that Division 10 accounted for 83 (72%) of 115 cancellations related to equipment (see Attachment B). When we brought the information to the attention of management, they informed us that they were unaware of the report that had been provided to us by the Service Performance Analysis Department. As a result of our review, management requested the Service Performance Analysis Department to provide this report to all management staff in the future.

Maintenance management should periodically review pullout cancellation information to identify those divisions that have a high number of cancellations in comparison to the other divisions. By identifying the divisions with a higher level of cancellations, management can work with them to lower equipment related cancellations department wide.

E. Metro Bus Maintenance Plan and Preventive Maintenance Inspection Guidelines

1. Metro’s Bus Maintenance Plan

Federal regulations require motor carriers who are recipients of Federal assistance to maintain a written maintenance plan. Our review of Metro’s Bus Maintenance Plan found that it does not reference the most current regulations. The Bus Maintenance Plan, approved October 3, 2016, under its “Statement of Policy” Section states: “This plan is intended to meet Federal Transit Administration (FTA) requirements for Rolling Stock as defined in FTA Circular 9030.1D, Urbanized Area Formula Program: Program Guidance and Application Instructions, dated May 1, 2010 and FTA Circular 5010.1D, Grant Management Requirements, dated November 1, 2008.”

Our review found that both of the Federal regulations have been cancelled and replaced with new circulars. These regulations are important because they provide motor carriers with the latest guidelines and requirements for requesting Federal assistance and administering and meeting the reporting requirements for FTA funded projects. Maintenance Management advised that referencing the outdated regulations was an oversight and they are currently updating their maintenance plan and will ensure that the correct regulations are referenced.

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3 FTA Circular 9030.1D was replaced with FTA Circular 9030.1E, effective January 16, 2014 and FTA Circular 5010.1D was replaced with FTA Circular 5010.1E, effective March 21, 2017.
Not citing the most current regulations in the written maintenance plan can give the appearance that Metro is not adhering to the most current guidelines. The Bus Maintenance Department should stay abreast of changes to regulations and ensure that the most current regulations are cited in Metro’s Bus Maintenance Plan.

2. Metro’s Preventive Maintenance Guidelines

CCR, Title 13, Section 1232(a) – Preventive Maintenance states that a motor carrier shall ensure that all vehicles subject to their control, and all required accessories on the vehicles, are regularly and systematically inspected, maintained, and lubricated to ensure they are in safe and proper operating condition. In addition, FTA Circulars 9030.1E and 5010.1E require that motor carriers who receive Federal assistance include as part of their written maintenance plan, a description of a system of periodic inspections and preventive maintenance to be performed at certain defined intervals. Our review of Metro’s written maintenance plan found that there is a preventive maintenance guidelines section incorporated into the plan. However, Metro’s Bus Maintenance Plan was dated and approved October 3, 2016; the Preventive Maintenance Inspection Guidelines section was dated December 1, 2013. Maintenance management advised that they could not recall the specific reason why the preventive maintenance section was not updated when the overall Bus Maintenance Plan was updated in October 2016. Not updating the Preventive Maintenance Inspection Guidelines section at the same time as other parts of the Bus Maintenance Plan are updated provides less assurance that the plan contains all of the most current policies and procedures. Because preventive maintenance is seen as a critical component of Metro’s Bus Maintenance Plan, we believe that the Preventive Maintenance Inspection Guidelines section should be reviewed and updated in conjunction with the overall maintenance plan. This will ensure that the plan contains the most current policies and procedures being followed by Metro’s Bus Maintenance Department.

We also found that government regulations had not been cited accurately in the Preventive Maintenance Inspection Guidelines. Specifically, the “Required Vehicle Record Retention” section of the guidelines states: “The daily vehicle pre-trip inspection report required by 13 CCR 1234(e) must be retained for one month.” However, 13 CCR 1234(e) states: “Motor carriers shall require drivers to submit a documented daily inspection report…and carriers shall retain such reports for at least three months.” Management stated that the retention period of one month cited in the guidelines was a mistake that will be corrected in the updated maintenance policy. We noted during our review of bus files that Metro is adhering to the 3 month requirement. However, citing government regulations inaccurately in the guidelines may give the appearance that government regulations are not being complied with. Metro’s Bus Maintenance Department, when reviewing and updating its maintenance plan should ensure that regulations are cited accurately.
CONCLUSION

Overall, we found that internal controls over bus maintenance and recordkeeping appear adequate and Metro’s practices, policies, and procedures are in compliance with State and Federal regulations. However, to ensure that Metro continues to maintain an effective bus maintenance program, management needs to ensure:

- Inspection forms are completed in accordance with Metro policies and procedures.
- The Preventive Maintenance Inspection Guidelines clarifies whether mileage should also be recorded on the inspection forms.
- All policies and procedures are included in the written maintenance plan.
- Management, on a continuous basis, identifies and works with the divisions that have a higher number of past due preventive maintenance work orders and/or bus pullout cancellations.
- Metro’s Bus Maintenance Plan and Preventive Maintenance Inspection Guidelines accurately cite the most current Federal regulations, and all sections of the Bus Maintenance Plan be reviewed and updated at the same time.

RECOMMENDATIONS

We recommend that the Maintenance Department should ensure:

1. Maintenance management:
   a. Communicate to staff the importance of completing inspection forms in accordance with Metro’s policies and procedures; and
   b. Determine how the documentation of mileage will be handled on inspection forms.

2. Maintenance management clarifies in the Preventive Maintenance Inspection Guidelines that mileage should also be recorded on the inspection forms.

3. All policies and procedures are incorporated into Metro’s written Bus Maintenance Plan and Preventive Maintenance Inspection Guidelines.

4. Management monitors past due PMP work orders on a continuous basis and identify and work with those divisions that have a high number of past due work orders.

5. Maintenance managers review bus pullout cancellation information on a regular basis and identifies and works with those divisions that have a high number of cancellations.

6. Metro’s Bus Maintenance Plan and Preventive Maintenance Inspection Guidelines (a) accurately cite the most current Federal regulations, and (b) all sections of the Bus Maintenance Plan are updated at the same time.
MANAGEMENT COMMENTS TO THE RECOMMENDATIONS

Metro management agreed with the recommendations in this report and has initiated the following corrective actions:

1. The Bus Maintenance Plan dated 2016 reviewed for this audit is in the process of being updated. Recommendations 1a and 1b will be incorporated into plan and communicated to staff.

2. Maintenance management will clarify in the Preventive Maintenance Inspection Guidelines whether mileage should also be recorded on the inspection forms.

3. The Bus Maintenance Plan is currently being updated and will include all current policies and procedures relative to bus maintenance and preventive maintenance inspection guidelines.

4. All past due PMP’s are monitored daily by Executive Management. This practice will continue.

5. Pullout and cancellation reports have been reviewed on a daily basis by Executive Management as of July 2017. Divisions with a high number of cancellations will continue to be identified and monitored in an effort to reduce cancellations agency wide.

6. The Bus Maintenance Plan is currently being updated and will accurately cite the most current federal regulations and all sections of this plan will be updated at the same time.

EVALUATION OF METRO MANAGEMENT COMMENTS

Metro management’s proposed corrective actions adequately address the findings and recommendations in the report. Staff must follow up on the recommendations that are still open until all corrective actions are completed.
### Past Due Preventive Maintenance Work Orders

#### New Past Due PMPs by Month and Division

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#### Past Due Preventive Maintenance Work Orders by Time

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#### Grand Total

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#### Total Work Orders

- Total Work Orders Completed on Time: 288
- Total Work Orders that were past due during the period: 12

#### Approximate Work Orders Due for Period

- 140,762
- 739

#### Total

- 140,841
- 100.0%
## Bus Pullout Cancellations Due to Mechanical Reasons

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Interoffice Memo

Date: May 9, 2018

To: Karen Gorman
   Inspector General

From: James T. Gallagher
       Chief Operations Officer

Subject: Management Response to Audit of Metro Bus Maintenance Program, Report Number 18-AUD-05

Attached is the Operations Management response to report number 18-AUD-05, Audit of Metro Bus Maintenance Program:

Recommendation #1:
We recommend that the Maintenance Department ensure Maintenance Management to:
   a) Communicate to staff the importance of completing inspection forms in accordance with Metro’s policies and procedures; and
   b) Determine how the documentation of mileage will be handled on inspection forms.

Management Response: Agree
The Bus Maintenance Program dated 2016 reviewed for this audit is in the process of being updated. Recommendations from 1a and 1b will be incorporated in the plan and communicated to staff.

Completion Date: August 2018

Recommendation #2
Maintenance management clarifies in the Preventive Maintenance Inspection Guidelines whether mileage should also be recorded on the inspection forms.

Management Response: Agree
Maintenance management will clarify in the Preventive Maintenance Inspection Guidelines that mileage should also be recorded on the inspection forms. This will be completed as part of updated Bus Maintenance Program.

Completion Date: August 2018

Recommendation #3
All policies and procedures are incorporated into Metro’s written Bus Maintenance Plan and Preventive Maintenance Inspection Guidelines.

Management Response: Agree
The Bus Maintenance plan is currently being updated and will include all current policies and procedures relative to bus maintenance and preventive maintenance inspection guidelines.

Completion Date: August 2018

Recommendation #4
Management monitors past due PMP work orders on a continuous basis and identify and work with those divisions that have a high number of past due work orders.

Management Response: Agree
All past due PMPs are monitored daily by Executive management. This practice will continue.

Completion Date: N/A

Recommendation #5
Maintenance managers review bus pullout cancellation information on a regular basis and identify and work with those divisions that have a high number of cancellations.

Management Response: Agree
Pullout and cancellation reports have been reviewed on a daily basis by Executive Management as of July 2017. Divisions with a high number of cancellations will continue to be identified and monitored in an effort to reduce cancellations agencywide.

Completion Date: July 2017

Recommendation #6
Metro’s Bus Maintenance Plan and Preventive Maintenance Inspection Guidelines (a) accurately cite the most current Federal regulations, and (b) all sections of the Bus Maintenance Plan are updated at the same time.

Management Response: Agree
The Bus Maintenance plan is currently being updated and will accurately cite the most Federal regulations and all sections of this plan will be updated at the same time.

Completion Date: August 2018

CC:  Stephanie Wiggins, Metro Deputy Chief Executive Officer
      Alex DiNuzzo, Senior Executive Officer, Bus Maintenance
      Dan Ramirez, Division Maintenance Superintendent
      Diane Corral-Lopez, EO, Operations Administration
      Nancy Alberto-Saravia, Sr. Manager, Transportation Planning
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Chief Operations Officer  
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