



*July 21, 2010*

**To:** Finance and Administration Committee

**From:** Will Kempton, Chief Executive Officer

**Subject:** Review of Vehicle Maintenance

### **Overview**

The Internal Audit Department has completed a review of Orange County Transportation Authority's revenue vehicle maintenance program. The Internal Audit Department determined that internal controls over preventive maintenance are generally adequate; however, management should implement controls to improve compliance with manufacturer requirements, monitor adherence to standards, and review performance indicator calculations to ensure accuracy.

### **Recommendation**

Direct staff to implement recommendations included in Vehicle Maintenance Review, Internal Audit Report No. 08-020.

### **Background**

The Maintenance Department of the Transit Division of the Orange County Transportation Authority (OCTA) is responsible for maintaining the directly-operated fixed-route fleet as well as non-revenue vehicles. The Maintenance Department is also responsible for the maintenance of all OCTA-owned facilities. The department consists of five sections.

The Maintenance Resource Management Section is responsible for managing the information systems that track, schedule, and report maintenance activities performed on all OCTA vehicles and facilities. Section personnel are responsible for planning and scheduling vehicle maintenance, conducting research and analysis of fleet performance, preparing management reports, and budgeting, payroll, and timekeeping for all Maintenance Department employees.

The Transit Technical Services Section is responsible for fleet engineering, producing technical documents and specifications, managing fleet acquisitions

and deliveries, and other fleet projects. Section engineers provide expertise in the areas of air quality, alternative fuels, rehabilitation of older buses, and the purchase and implementation of new vehicle technology.

Maintenance operations at the three base locations are the responsibility of three independent sections. Personnel consist primarily of mechanics who perform preventive maintenance and repairs on rolling stock, and service workers who perform the daily fueling, fare collection, and cleaning duties. In addition to these duties, the Santa Ana maintenance section is responsible for mechanical rebuild, electronics, and maintenance of OCTA's non-revenue vehicles. The Garden Grove Base maintains the OCTA contingency fleet and operates the maintenance instruction unit in addition to the normal base maintenance functions.

### ***Discussion***

The objective of this review was to assess the adequacy of internal controls designed to ensure proper maintenance of the revenue fleet. Specifically, the Internal Audit Department (Internal Audit) reviewed and tested procedures designed to ensure that the active revenue fleet is properly maintained in accordance with manufacturer requirements. Internal Audit also reviewed the calculation of maintenance performance indicators to determine if they are accurately calculated and reported.

Internal Audit noted that manufacturer requirements for preventive maintenance were not always included in work order instructions or were not included at the frequencies recommended by the manufacturer. Internal Audit recommended that management periodically review work order instructions against manufacturer requirements to ensure that all required maintenance is performed or adequate documentation exists to demonstrate the reason for deviations. Management concurred with the recommendation and has already implemented corrective action.

Internal Audit reviewed a sample of preventive maintenance work orders and noted instances of work orders lacking evidence that certain required tests were performed or that certain required inspections took place. Internal Audit recommended that management implement monitoring controls to ensure all required tests and inspections are performed. Management concurred with the recommendation and is in the process of implementing corrective action.

Internal Audit reviewed the calculation of certain performance statistics included in the Maintenance Department Standards and Performance Indicators reports and noted two minor errors. Internal Audit recommended that management implement oversight controls to identify errors. Management

concurred with the recommendation and is in the process of implementing corrective action.

***Summary***

Based on a review of vehicle maintenance, Internal Audit offered three recommendations to ensure all required maintenance is performed and to ensure performance indicators are accurately calculated and reported. Management concurred with all three recommendations and has initiated corrective action.

***Attachment:***

- A. Vehicle Maintenance Review, Internal Audit Report No. 08-020

**Prepared by:**

A handwritten signature in cursive script that reads "Kathleen M O'Connell".

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# ORANGE COUNTY TRANSPORTATION AUTHORITY INTERNAL AUDIT DEPARTMENT



## Vehicle Maintenance Review

INTERNAL AUDIT REPORT NO. 08-020

July 8, 2010



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## **CONCLUSION**

The Internal Audit Department (Internal Audit) has completed a review of the OCTA Transit Division Vehicle Maintenance Department. The objective of the review was to determine whether adequate controls are in place to ensure preventive maintenance tasks for revenue vehicles are performed as required and related performance measures are properly tracked and reported. Based on this review, internal controls over preventive maintenance are generally adequate; however, recommendations are being made to improve compliance with manufacturer requirements for maintenance, improve adherence to preventive maintenance standards, and to review the calculation of manually prepared performance indicators to ensure accuracy.

## **BACKGROUND**

The Maintenance Department of the Transit Division of the Orange County Transportation Authority (OCTA) is responsible for maintaining the directly operated fixed route fleet and the non-revenue vehicle fleet. The Maintenance Department is also responsible for providing maintenance support for the contracted operator revenue fleet and maintenance of all OCTA-owned facilities. The Maintenance Department consists of five sections.

### **Maintenance Resource Management (MRM) Section**

MRM is responsible for managing the information systems that track, schedule, and report maintenance activities performed on all OCTA vehicles and facilities. Section personnel are responsible for planning and scheduling vehicle maintenance, conducting research and analysis of fleet performance, preparing management reports, budget, payroll, and timekeeping for all Maintenance Department employees. In addition, MRM is directly responsible for managing the daily activities of the facilities maintenance unit.

### **Transit Technical Services (TTS) Section**

TTS is responsible for fleet engineering, producing technical documents and specifications, managing fleet acquisitions and deliveries, and other fleet projects. Section engineers provide expertise in the areas of air quality, alternative fuels, rehabilitation of older buses and the purchase and implementation of new technology. In addition, the TTS section is responsible for quality assurance (QA) and quality control (QC) of all rolling stock at the five bases.

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**Maintenance Base Operations Section**

Maintenance operations at the three base locations are operated as independent sections. These sections are responsible for the day-to-day maintenance of rolling stock assigned at each base. Personnel consists primarily of mechanics, who perform preventive maintenance and repairs on rolling stock, and service workers, who perform the daily fueling, fare collection and cleaning duties.

The Anaheim Base operates Monday through Friday and the Santa Ana and Garden Grove Bases operate seven days a week. In addition to maintenance of the day-to-day rolling stock, the Santa Ana Maintenance section is also responsible for mechanical rebuild, electronics, and maintenance of non-revenue vehicles. The Garden Grove Maintenance section maintains 50 buses in the OCTA contingency fleet and the maintenance instruction unit in addition to base maintenance functions.

**Directly Operated Active Bus Fleet**

Due to the economic downturn and related reductions in bus service, the directly operated, active bus fleet has been reduced from 581 buses to 468 buses as of June 2010.

**Staffing**

In September 2009, Maintenance Operations staffing totaled 237; however, due to service reductions and related layoffs, staffing is at 225 as of July 2010.

**Information Systems**

The Maintenance Department uses the Ellipse system for maintenance work order tracking. The Ellipse system contains work order templates with instructions written by Transit Technical Services to comply with manufacturer requirements and current technical bulletins. The Ellipse system interfaces with Oniqua, the OCTA maintenance management analysis tool, IFAS, OCTA's accounting system, Lawson, OCTA's payroll system, and EJ Ward, OCTA's fuel management system. Ellipse provides information on parts consumed, the cost of parts, and hours worked on each work order and vehicle.

The Transit Division utilizes BATS (Bus Automated Tracking System) to assign vehicles to drivers. The Maintenance Department is responsible for assigning buses to the three base locations and bus operations personnel utilize BATS for daily driver assignments. The base Maintenance personnel notify Bus Operations of buses that should be held each day for maintenance, parts, warranty service, etc.

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**OBJECTIVES, SCOPE AND METHODOLOGY**

The scope of this audit was limited to the maintenance activities of the active fixed route revenue vehicles operated and maintained/housed at the three bases. Maintenance activities reviewed included all regularly scheduled preventive maintenance work as well as brake pit inspections. Note: Services performed at the three bases by the Maintenance Department's service workers (fueling, cleaning, and farebox collection) was not included in the scope of this review.

This engagement was included in the Internal Audit Plan for Fiscal Year 2007-08. The objective of this review was to assess the adequacy of internal controls designed to ensure proper maintenance of the revenue fleet. Specifically, Internal Audit reviewed procedures related to ensuring that the active revenue fleet is properly maintained in accordance with manufacturer requirements and performance indicators and employee incentives intended to measure and reward effectiveness are well designed and accurately reported. The review scope included maintenance activity during the period May through September 2009. The methodology consisted of:

- Interviews of personnel responsible for scheduling and performing preventive maintenance, updating work order instructions as required to meet manufacturer standards or technical advisories, and preparing monthly performance indicator reports;
- Testing of selected work orders of scheduled preventive maintenance;
- Testing of brake pit inspections performed on selected vehicles;
- Testing of documentation of brake pit inspections performed during a period of time;
- Comparison of manufacturer requirements for preventive maintenance against current work order instructions for a selected bus type;
- Walkthrough of the process for calculating certain performance indicator data on the Monthly Standards and Performance Indicators report for one month;
- Review of the calculation of maintenance personnel incentive awards related to vehicle maintenance.

This review was conducted in accordance with generally accepted government auditing standards. Those standards require that Internal Audit plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for findings and conclusions based on audit objectives. Internal Audit believes that the evidence obtained provides a reasonable basis for these findings and conclusions.



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**AUDIT COMMENTS, RECOMMENDATIONS AND MANAGEMENT RESPONSES**

**Noteworthy Accomplishments**

Internal Audit noted during this review that preventive maintenance of the revenue vehicle fleet is performed timely. In addition, Maintenance Department personnel perform weekly brake pit inspections on the active bus fleet, noting any mechanical issues that require attention.

**Work Order Instructions Should Conform with Manufacturer Guidelines**

Internal Audit's review of the New Flyer Manual (Manual) in conjunction with work order templates for the New Flyer buses, noted that some required maintenance tasks are not scheduled as required by the manufacturer. Tasks required by New Flyer that are not included in preventive maintenance work order instructions include:

1. Service to the Electronic Accelerator every 12,000 miles;
2. Inspection of the Roof Vent/Hatch every 6,000 miles;
3. Service to the Kneeling Valve every 24,000 miles;
4. Service to the Air Dryer every 24,000 miles;
5. Service to the Brake Treadle & Plunger every 24,000 miles;
6. Front End Alignment, disassembly and cleaning of the Front Axle Brake Chamber, and an Air Regulator inspection at 48,000 miles

In addition, some tasks required by New Flyer are not performed at the required intervals, such as:

1. The Manual requires a hydraulic filter change every 3 months; however, this service is only scheduled every 36,000 miles.
2. The Manual requires CNG fuel filter drainage on a daily basis; however, this is scheduled only at 6,000 miles and 30,000 miles.

**Recommendation**

To ensure proper maintenance of revenue vehicles and to preserve the value of warranties, Internal Audit recommends management undertake a review of all work order templates against manufacturer guidelines to ensure conformance with requirements or to ensure adequate documentation of variances from manufacturer recommendations. Management should schedule such a review on a periodic basis.

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**Management Response**

Tasks required by New Flyer that were not included in preventative maintenance work at the time of the audit were subsequently added and/or clarified by maintenance staff via Technical Data Notices with explicit work order instructions included.

A maintenance management quarterly review process is being implemented as recommended by the audit team.

**Work Orders Should be Reviewed to Ensure All Required Work is Performed**

Internal Audit reviewed of 20 preventive maintenance work orders, and related documentation and noted the following exceptions:

1. Eight of 20 (40 percent) work orders lacked evidence that required coolant tests were performed. These tests are performed to ensure chemical balance is maintained in the coolant system. When results are found to be out of range, additional work is required.
2. Five of 20 (25 percent) work orders did not include evidence that a required supplemental inspection of the driver's seat was performed. Supplemental work orders, while not required by the manufacturer, have been developed by management to enhance safety, comfort and/or appearance. The supervisor at one base indicated that base personnel began performing this supplemental work at every other inspection, rather than every inspection, in response to having fallen behind on the schedule in the past.

**Recommendation**

Internal Audit recommends that management implement periodic monitoring controls to ensure all scheduled maintenance is performed as required. In addition, management should consider implementing a procedure for identifying and resolving issues at the base level, such as when maintenance backlogs occur.

**Management Response**

Maintenance management agrees with the audit finding. Through the use of MRM and TTS QA/QC staff, periodic (weekly) monitoring will be put into place immediately. In addition, base management will ensure that this item is tailgated daily at the start of each shift so that all employees are informed of the requirement to properly document their work.

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**Management Should Review Monthly Performance Indicators Report for Accuracy**

The Standards and Performance Indicators monthly report reflects calculations of key performance statistics that are derived from a variety of systems and manual logs. Data included in the report is the result of manual input and calculation from these various sources.

Internal Audit noted two instances in which monthly performance statistics were inaccurately reflected in the report. While the errors were not significant, current procedures do not include controls to detect such errors.

**Recommendation**

Internal Audit recommends management implement oversight controls to ensure the accuracy of performance statistics.

**Management Response:**

Maintenance management staff will implement periodic monitoring controls to help ensure the accuracy of these reports.