

Tri-State Oversight Committee



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DRPT

Three-Year Safety and Security Review of the Washington Metropolitan Area Transit Authority

Railcar Maintenance

Elements 15 and 16

Review Conducted: March and September 2015

Draft Report: January 21, 2016

Final Report: February 22, 2016

Introduction

Representatives from the Maryland Department of Transportation (MDOT), the District of Columbia Department of Transportation (DDOT), and the Virginia Department of Rail and Public Transportation (DRPT) comprise the Tri-State Oversight Committee (TOC), which provides regular oversight of the Washington Metropolitan Area Transit Authority (WMATA) Metrorail system. To comply with State Safety Oversight Final Rule 49 Code of Federal Regulations Part 659 (Part 659), the Federal Transit Administration (FTA) requires states to designate a State Safety Oversight (SSO) agency to administer safety and security programs for rail transit and fixed guideway systems within their jurisdictions. Specifically, 49 CFR Part 659 requires TOC to conduct an on-site safety review of each element of the WMATA System Safety Program Plan (SSPP) at least once every three years. These reviews must assess WMATA's implementation with all 21 elements of its SSPP and seven elements of its Security and Emergency Preparedness Plan (SEPP), along with related plans and procedures. Beginning in 2013, the TOC has split its Three-Year Safety and Security Review topic areas into separately occurring reviews spread out during a three-year period.

The following report documents the observations and findings of the TOC's review of WMATA's rail vehicle maintenance. Generally, this review focused on whether WMATA's maintenance program complies with its own written plans as well as industry standards and best practices. These topics are the responsibility of Car Maintenance (CMNT), with support and internal auditing from the Department of Safety and Environmental Management (SAFE) and Quality Assurance and Warranty (QAAW). The relevant SSPP elements for this review were all or part of:

- Element 15: Maintenance Audits/Inspections
- Element 16: Training and Certification

The TOC Program Standard and Procedures defines WMATA requirements for these elements in Section 12 and in Appendix B. Specific requirements are cited further, below.

Methodology

The Federal Transit Administration conducted a series of Safety Management Inspections (SMI) of WMATA in March, 2015. The TOC was a participant in the FTA SMI review of Car Maintenance conducted March 16-19, 2015. This report reflects the activity by the TOC both during the SMI as well as a separate abbreviated triennial review conducted in September of 2015. Information obtained during the FTA review including interviews, documentation and field observations is also incorporated in this report.

In advance of the abbreviated review, the TOC requested and reviewed relevant WMATA plans, procedures, checklists, and reports. The on-site portion of the review occurred September 3, 2015. During the on-site review sessions, the review team interviewed WMATA personnel and reviewed various documents and records to assess compliance with procedures. The reviewers also talked with front-line personnel. Persons interviewed

(except front-line personnel) and documents reviewed are noted at the end of this report. As the review progressed, TOC representatives discussed preliminary findings and addressed questions from WMATA personnel. This report identifies conditions evident during the review period, regardless of the current progress of potential remediation activities.

A Finding may refer to an instance of WMATA operating out of compliance with an applicable internal or external written requirement, plan, policy, rule, standard, or procedure. Findings may also refer to instances whereby WMATA may technically be conducting business in compliance with existing WMATA, TOC, or FTA procedures and requirements; however, there may be no relevant written plan, policy, or procedure in place, or the existing plan, policy, or procedure is not in accordance with industry best practices. Findings may be safety-critical in nature regardless of whether the issue identified is “non-compliant.”

This review, including all findings presented in this report, intends to assist WMATA with enhancing system safety throughout Metrorail. **Upon receipt of this draft report, WMATA has 30 days to respond with comments regarding the content of this report, primarily for accuracy.**

After publication of the Final Report, TOC will transfer the report to FTA for further action. FTA will then determine the appropriate mechanism by which the findings documented in this report will be addressed by WMATA.

The TOC would like to thank WMATA personnel for their time, cooperation, and forthrightness throughout the review process.

Current Conditions

The WMATA Car Maintenance Department (CMNT) is responsible for the maintenance and performance of WMATA’s revenue rail vehicle fleet. Scheduled and corrective maintenance functions are divided amongst five Service and Inspection (S&I) Shops: Alexandria, West Falls Church, Shady Grove, Greenbelt, and New Carrollton. In addition to the S&I shops, corrective maintenance is also carried out at Branch Avenue, Brentwood, and Glenmont Shops. To ensure long term performance, Greenbelt and Brentwood Shops conduct an internal vehicle and equipment overhaul program for vehicle heavy equipment and sub-components.

The CMNT General Superintendent and Assistant General Superintendents are responsible for car maintenance and performance. They are supported by location Maintenance Shop Superintendents, Assist Superintendents and Supervisors. The audit team discussed vehicle maintenance organizational responsibility and its direct impact on transportation operations. The audit team also discussed the original equipment manufacturer (OEM) recommended maintenance procedures, scheduled and unscheduled maintenance and inspection processes, vehicle reliability, document

control, hazard management identification and recognition and its corrective action processes. The team also reviewed internal support processes of other WMATA departments that support CMNT.

On a daily basis the Shop Superintendent meets with oncoming and outgoing shift supervisors for pass-down progress reports, open issues, and to set work objectives for the next 24 hours. Supervisors meet daily with their direct reports at the start of shift and conduct toolbox meetings to issue work assignments, daily safety briefings, and safety rule compliance.

Fleet Inventory

The current inventory is as follows:

	ORIGINAL COUNT	REVENUE	NON- REVENUE
1K FLEET	300	280	20
2K FLEET	76	76	0
3K FLEET	290	282	8
4K FLEET	100	100	0
5K FLEET	192	184	8
6K FLEET	184	184	0
 GRAND TOTAL	 1142	 1106	 36

7K FLEET - At the time of this review, 24 new cars are in various stages of acceptance and revenue service.

Maintenance Requirements

The scheduled maintenance program is designed to maintain car reliability by detecting potential defects and allowing them to be corrected before they fail. It also permits servicing of equipment requiring lubrication, measurement, and adjustment. Preventive maintenance and inspections are as follows:

- **Daily Inspection:** Prior to revenue service the WMATA’s rail fleet receives a Daily Inspection. The Daily Inspection process consists of an inspection of the interior and exterior of the car, and a functional test of safety-critical and passenger convenience components such as lighting, the public address system, and emergency evacuation equipment. Defects are corrected prior to releasing the car for service.

- **Intermediate Inspection, conducted at 30 day intervals:** This inspection involves the examination and servicing of types of equipment that require more extensive and time-consuming action than is possible on the daily inspection. Inspection priorities are similar to the Daily inspection and incorporate the sub component functional testing, replacement of HVAC and pneumatic systems filters, battery cells are inspected and tested, and a detailed inspection of wheel truck assemblies.
- **“A” Inspection: Conducted at 90 day intervals:** Prior to any A, B, and C inspections under-car equipment is cleaned to enhance the quality of the inspection. Compressed air hoses are used to blow carbon dust out of traction motors and all rotating equipment generators. Blow pits also have hot water wash equipment to remove grease and dirt from mechanical components such as air conditioning condenser coils, couplers and wheel trucks. Following the cleaning process, the car receives a preventive maintenance inspection for designated system components for function and service.
- **“B” Inspection Conducted at 180 day intervals:** This includes all the requirements of the “A” inspection. Additional tasks include but are not limited to a brake caliper torque check, a detailed coupler and draft gear inspection, and other servicing and adjustments not required as frequently as in the previous inspections.
- **“C” Inspection, conducted annually:** Encompasses all the requirements of the previous inspections, and adds routine overhaul of selected electrical and mechanical components. The equipment to be overhauled is removed and replaced in compliance with the original equipment manufacturer recommendations.
- **Component Overhaul:** The overhaul program involves the pre-failure replacement of components based on known and projected failure rates. Components are scheduled for overhaul at regular intervals based on mileage or operating hour criteria as appropriate. Overhauls are performed by the Brentwood Shop or by outside vendors. Removal and replacement of the parts on the car performed by WMATA service and inspection shop personnel.
- **Scheduled Car Body Refurbishment:** Carpeting and painted surfaces of the rail car body require periodic scheduled maintenance or replacement to ensure that the car’s appearance is maintained.
- **Vehicle Cleaning Program:** Cars are cleaned on a continual basis. Trash is removed daily while the train is in service. Car cleaning personnel are also assigned daily to terminal stations for cleaning. Exterior washing is accomplished daily by train operators taking their trains through the automatic car wash as they return to the yard following passenger service. In storage yards

cars are cleaned daily that include trash removal; spot cleaning of walls, windows, and seats; carpet vacuuming; and removal of minor graffiti.

On a continual basis WMATA resolves deficiencies reported by train operators and inspectors conducting preventive maintenance and inspection via Corrective Maintenance. Any deficiency reported will prevent a car returning to revenue service until repair is completed and tested prior to returning to service. At times, spare parts may not be available for replacement. In this case Supervisors have the authority to place cars back into revenue service so long as spare part is a non-safety critical component.

At the time of this review the first inspections of the new 7000-series rail cars are being used to finalize each A and B preventive maintenance procedure. WMATA is currently breaking down a list of preventive maintenance and inspection (PMI) tasks provided by Kawasaki, the manufacturer, into PMI cards and procedures. This task is nearly complete. CMNT also participated in review of the preliminary draft manual for the 7000 series cars, and final draft manuals were recently submitted for comment. WMATA noted that there are many challenges to writing car maintenance procedures without a vehicle physically on hand. WMATA's institutional knowledge has allowed them to supplement Kawasaki's original technical requirements for maintenance with additional information. WMATA trainers have attended classes presented by Kawasaki, and a proposal is in development to extend Kawasaki training of WMATA employees by an additional two years. Preventative maintenance for this series will be completed by mileage rather than by time interval.

Car Communications Systems

Car communications systems are maintained by CMNT. Onboard radios requiring repair are delivered to Systems Maintenance to be sent out for repair by an outside contractor, while CMNT removes, installs, and checks performance of radios. Operators also check onboard radio performance daily.

Train intercoms are repaired in-house, as well. Engineering has validated that all intercom systems are compatible between cars in each different series. Intercoms are also checked during PMI, and checks include intercom function in all cars and a test of the Passenger / Train Operator Call Stations. WMATA QA has sampled random cars and not identified any intercom issues that would not be detected through existing inspection processes. QA will be completing another audit of intercoms in the near future.

Public Address (PA) systems are also checked daily and during PMI for 100% validation of internal and external speakers. CMNT noted that car microphones have limited range to avoid detecting ambient noise, and observed that recent reports of PA system problems may be caused by operators not speaking closely into the microphone.

CMNT acknowledged historic issues with Vehicle Monitoring Systems (VMS) throughout the fleet. In the event of a crash, the VMS system of a train locks to protect data collected

prior to the incident. VMS memory is overwritten so frequently that data quality is sometimes impacted. Additionally, some replacement parts for VMS are no longer available due to the age of the systems. Depending on the lead car of the train, different data is collected, as each car series collects unique data elements and only the lead car collects a complete set of data.

Several interventions are planned or have been implemented to address fleet VMS issues. WMATA plans to award a capital project contract for the creation of a unified VMS system, whereby the entire fleet will be upgraded and reconfigured to WMATA's desired configuration. The Office of Chief Engineers, Vehicles (CENV) has played a key role in development of this proposal. Many VMS units have their memory changed out on a regular schedule as a part of periodic maintenance, approximately every two years. VMS checks are conducted every 30 days as a part of regular PMI procedures, and cars without functioning VMS are not put into service as lead cars. VMS work orders logged in Maximo against non-working cars appear in Railcar Program Manager (RPM) as restrictions indicating that those cars are ineligible for use as lead cars. Previously, VMS breakers could be switched down to prevent VMS data from being overwritten. This breaker is now sealed so that the VMS system may not be disabled during normal operations. If VMS memory is corrupted, there is typically no way to retrieve incident data. New 7k series cars utilize a unique VMS system with increased capabilities. Authority to download VMS data lies with CMNT, although CENV will download data in incidents to maintain a chain of custody. VMS data is used in other settings as a troubleshooting tool.

Maintenance of the CCTV system is a CMNT responsibility. In the event of an incident, MTPD has access to the CCTV system and takes custody of hard drives containing recordings of the event. CMNT is typically unable to access CCTV hard drives, therefore no maintenance is performed on certain elements of the CCTV system because custody issues have not been completely resolved with MTPD. CMNT noted that they would also like to access CCTV recordings as a resource to validate reports of car performance issues, but the department is prohibited from accessing the recordings.

Maintenance Management Information System (MMIS)

A review of Maximo preventive maintenance, inspections, and repair work orders confirms that inspection schedules are being completed and all work orders were completed correctly and verified against work orders in the Maximo MMIS database. All records examined confirm that mileage based preventive maintenance and inspections are performed.

CMNT's Maximo program is also designed to allow employees to search and query planned and upcoming maintenance inspections, or view cars by series or system in the car maintenance section. In Maximo, there are direct links between work orders and supporting documents for maintenance procedure to be carried out.

Procurement

Many parts used by CMNT are interchangeable between each car series. An engineering review is conducted before parts from one series may be used in repairs of another series. However, the seven (7) unique fleets operated by WMATA continue to require many unique parts as well. Maximo is currently configured to flag all parts that are installed without clearance for a particular series.

CMNT reports that due to a lack of spare part inventory, stock outages prevent them from returning cars to service. This issue was prevalent at all CMNT maintenance facilities.

QAAW

The Quality Assurance and Warranty (QAAW) group monitors fleet performance to ensure that vehicle maintenance practices and procedures are effectively supporting the goal to provide the best in safe, reliable, cost effective and attractive rail transit services. Periodic audits are performed within the various maintenance shops to measure the quality of maintenance performed. The results of the audits are reported to the respective maintenance managers, General Superintendent and Chief Mechanical Officer. Considerable time is spent auditing preventive maintenance in progress and immediately after completion. Procedural problems and failure trends are reported to CENV group for further evaluation and corrective action.

The QAAW group has been involved in multiple audits of Technical Training and Document Control (TTDC). Each audit includes records reviews, review of SOPs, field visits, review of manuals, and a check on the status of employees in a particular department. At the time of this review, it was unclear whether QAAW had recently conducted an audit for TTDC of CMNT regarding vehicle maintenance-related training issues. TOC requested a copy of QAAW's most recent audit report.

Hazard Management

Regarding hazard management practices, CMNT noted that hazards identified by mechanics move up the chain of command in several different ways. If procedures have been violated, reinstruction commands are issued. In other instances, a PMI committee can adjust procedures. These changes are reviewed by an engineering review board. The most immediate response to a hazard is a report to a supervisor, and the PMI committee is made up of supervisors. Lastly, hazards can be controlled via action of the Local Safety Committee (LSC).

Rule Compliance

To ensure quality, supervisors audit the maintenance work of the staff they supervise, which supplements QAAW audits. Most shifts have a lead man who is a subject matter expert. Supervisors sign off on all jobs to validate that processes and procedures carried out correctly. Supervisors also have annual plans with audit targets for preventative inspection and other maintenance tasks. Each supervisor has a different breakdown of

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audits depending on their role. Supervisors may directly observe maintenance work or examine the train once work is completed.

In the past, WMATA's inspection compliance rate was low. Tools have since been developed to track and monitor compliance using Maximo. Currently, each PI supervisor has a calendar populated 3-4 weeks out with upcoming inspections. Cars are taken out of service within 3 days of their inspection due date, and remain out of service if not inspected in the window. CMNT's Maximo records are integrated with RPM, which allows WMATA to track the location of each car in yards and throughout the WMATA system. RPM makes it possible to view which cars are out of service or have active service restrictions, and all of these status reports are linked to Maximo records.

Maintenance System Observations

The audit team reviewed maintenance practices at Greenbelt Shop. The review team reviewed annual testing and calibration of tools and electrical test meters. The team also reviewed method of in-house subcomponent repair or renewal based on OEM standards. CMNT personnel repair components such as; heating elements, air conditioning units, ventilation equipment, current collector assemblies, door motors, batteries, and wheel/axle and gear unit replacement. Also, as vehicles meet overhaul thresholds CMNT seeks to rebuild truck assemblies and brake-rigging.

The audit team reviewed of WMATA's car management processes to ensure vehicles are captured for in-service repair and preventive maintenance. The review team conducted interviews with employees and supervisors on the shop floor and inspected Greenbelt's machine shop, truck shop, inspection and preventive maintenance process on cars 6082 and 6083 and a document review of the scheduled PMI and running repair work orders in process. Also, the review team inspected the Greenbelt maintenance sub-component rebuild processes and test equipment for the coupler shop, electrical wiring shop, electronic shop, high voltage equipment shop, HVAC shop, traction motor and small motor shop. The review team also conducted a review of spare parts management and inventory control process of the Greenbelt Shop.

The review team traveled to the Brentwood Shop and discussed vehicle maintenance organizational responsibilities. The audit team discussed the Brentwood Shop expertise as secondary heavy maintenance, collision repair and overhaul processes of WMATA's rail fleet. The review team also discussed vehicle reliability, document control, facility hazard management and corrective action processes. Further, the review team conducted a facility tour and assessed vehicle maintenance, repair and overhaul processes. The team reviewed Maximo reporting for tool and equipment calibration, hazard management processes, interviews with employees and supervisors and fleet overhaul and collision repair documents.

The review team traveled to New Carrollton Maintenance Facility and discussed vehicle maintenance organizational responsibilities. The audit team discussed preventive

maintenance and inspection (PMI), unscheduled repair processes, and daily safety inspections processes. The review team also discussed 5K car vehicle reliability issues, 5K engineering modification initiatives, document control, facility safety hazard management and corrective actions. Further, the review team conducted a facility tour and reviewed the engineering test plan and installation (ETI) of the Dynamic Brake Feedback Monitor modification to car 5084. The team also conducted an inspection of cars 5080 and 5081. The team interviewed with shop supervisors and CENV Engineers overseeing the ETI of 5084.

Records Review

The team reviewed selected periodic written inspection records at Greenbelt Shop and compared the record to the Maximo database.

Car	Date of Inspection and PI Interval	Comments
6070/6071	7/21/15 – A2	Post-PI Checklist incomplete.
6070/6071	4/22/15 - B	Complete
6070/6071	1/27/15 – A1	Complete
6070/6071	10/17/14 – C3	Complete
6070/6071	10/14/13 – C2	Post-PI Checklist incomplete.
6070/6071	7/15/13 – A2	Complete
6070/6071		Some 2014 records missing for this pair. CMNT employees explained that the cars may have been out of service during that time.
6054/6055	8/24/15 – A1	Incomplete supervisor sign-off sheet. PI checklists complete.
6054/6055	5/26/15 – C4	Complete
6054/6055	2/25/15 – A2	Incomplete supervisor sign off sheet.
6054/6055	11/24/14 – B	Complete
6054/6055	8/14/14 - A1	Complete
6032/6033	7/1/15 – B2	Complete
6032/6033	3/26/15 – B	Complete
6032/6033	10/2/14 - C4	Complete
6032/6033	12/24/14 - A1	Complete
6032/6033	7/1/14 – A	Blank supervisor sign off sheet, no signature.
6098/6099	7/14/15 – A2	Complete
6098/6099	4/13/15 – B	Complete
6098/6099	9/30/14 – C3	Complete
6098/6099	7/2/14 – A	Incomplete supervisor sign off sheet, no signature.

Daily Inspection Checklists:

Car	Date of Inspection and PI Interval	Comments
3181	8/8/15	Complete
3180	8/8/15	Complete
1190	8/8/15	No initials on certain items.
1191	8/8/15	Complete
1193	7/17/15	Complete
1192	7/17/15	Complete
1174	7/17/15	Complete
1175	7/17/15	Complete
1270	7/3/15	Complete
1271	7/3/15	Complete
1102	6/16/15	No initials on certain items.
1103	6/16/15	Complete
1160	6/15/15	Complete

Training

The majority of WMATA vehicle inspectors start their careers at preventative maintenance and inspection (PMI) facilities and are rotated through a range of tasks to be exposed to a variety of vehicles and systems. WMATA prefers that CMNT employees develop hands-on experience prior to undergoing intensive technical training to add value to the training experience. This practice also allows technical trainers to supplement their course materials in response to new questions.

New CMNT employees participate in an 8-day familiarization class, which includes a 3-day module on major vehicles systems and 5 additional days of coursework on key safety concerns, Maximo and work order creation, manuals and documentation, and the CMNT training program. The introductory course is offered only when several new employees who require the training are present and available to enroll in the course, and not offered when the pace of CMNT hiring is slow. All employees also have access to an internal employee forum, where any maintenance employee can post a question and instructors receive an email prompting them to provide an answer. New employees have very limited independence to conduct activities until exposed to introductory training and coursework.

Car maintenance courses offered by WMATA are currently divided by car series in two course blocks, Block 1 and Block 2. Each Block 1 course offers 200 hours of class time covering all major systems of each car. About 25% of total course time consists of a shop component, while the remaining 75% consists of the classroom component. Field work for each course places a special emphasis on test equipment that CMNT mechanics will

be applying during future maintenance activities. Block 2 coursework offers an additional 120 hours of training in selected vehicle systems.

Additional training comes in the form of on-the-job training (OJT) offered by supervisors. OJT training consists of supervisors and mechanics working together on various tasks, with the unique configuration of employees involved dependent on the expertise required to complete the task in question. OJT training is documented in each employee's personal file and submitted to the training department to be logged via OJT validation forms. CMNT's OJT forms are formal documents describing the specific tasks covered during each session. Currently, no formal syllabus describes all OJT training practices at WMATA; the CMNT department feels that too many variables regarding tasks, roles, and services offered at particular shops to develop a syllabus or outline for the OJT training program. As employees move to new shops, training records and personnel files are reviewed by a superintendent, a practice formalized in SOP 2.04 - *Procedures and Requirements for Job Classification Training*.

WMATA's 5-year goals for new CMNT mechanics include complete familiarity with two vehicle types and floor experience with vehicles from other series. Progress toward this and other training goals is documented in a PeopleSoft module called Electronic Learning Management (ELM) implemented in March 2014. This software module allows supervisors to view training records by course and department, and to see which employees have completed certain coursework. The software is used frequently in other WMATA departments to monitor certifications; CMNT staff is currently learning the details of tools and queries that are available through the program.

WMATA's CMNT trainers are typically recruited from within. Typically, the recruits are C mechanics. WMATA expressed a desire to recruit more AA mechanics internally, but a salary differential between AA mechanic pay and instructor pay provides a disincentive. C mechanics realize an increase in salary upon taking an instructor position. CMNT has participated in discussions with WMATA HR regarding creating a Senior Instructor position to address this differential and retain talent. WMATA has trialed programs in the past to address this gap via other means and saw poor results. CMNT indicated that additional funding could improve the challenges WMATA is experiencing in hiring and retraining qualified maintenance instructors, along with other issues such as technical support for maintenance activities. Currently, some union maintenance employees out-earn their supervisors, and supervisors do not receive a raise when union employees receive one. Frequently, multiple supervisors on a single shift earn different amounts. WMATA noted that the last AA mechanic hired to fill an instructor position took the role on for a significant pay cut, and remained in the position for only two years. Retention has been difficult in many areas – for example, WMATA has hired eight Automatic Train Control (ATC) instructors over the last six years alone. Frequent turnover makes it difficult for WMATA to implement new coursework and remain current on new technology. These issues have a significant operational impact.

CMNT employees identified several weaknesses in the way employee training requirements are tracked and monitored in ELM. The current tracking system does not allow supervisors to evaluate how closely an individual's training corresponds to an idealized training schedule, and cannot produce reports on individuals and their personal training requirements. Similarly, it is not possible to pull records on whether or not an entire class or department has undergone training in a specific area. WMATA has been engaged in a company-wide exploration of new software tools to track compliance.

The CMNT SOP, which does list the training requirements for each employee class, indicates that maintenance supervisors are responsible for ensuring that their team members are trained in all applicable aspects of car maintenance. Not all individuals in the department are required to undergo all technical training. The CMNT SOP includes a matrix on both technical and other training. Courses offered are set up to match this matrix, which includes a list of competencies and associated learning objectives.

In terms of course scheduling, training does not plan classes in response to demand for particular courses. However, the courses offered by training are typically in high demand. Demand for new coursework occasionally conflicts with the personnel requirements of daily operations, along with vacations and other absences.

Information Technology

WMATA noted several other challenges associated with CMNT information technology infrastructure. Supervisors in the department have no rights to query the training record system unless a request to access the records is approved by IT. Multiple layers of security prevent some employees from generating meaningful reports, and not all employees are able to view the total training requirements of each CMNT employee class. WMATA noted that this pertains to global training and not to technical training alone. Additionally, the current system does not generate notifications when training or retraining is due for individual employees. Certification elements of the software perform poorly, especially if certification classes are taken past deadline. The software can also potentially generate false reports showing noncompliance with certification requirements in certain instances.

Overall, the review team finds WMATA rail fleet is maintained in accordance with WMATA vehicle maintenance standards and operating procedures. The review team found maintenance employees are trained, knowledgeable and are prepared to perform vehicle maintenance and demonstrate an understanding of vehicle systems.

Findings

FTA Findings

In addition to the new issues identified in the Findings section below, the TOC concurs with the following findings and recommendations from the FTA's SMI report dated June TOC Three-Year Safety and Security Review: Railcar Maintenance

17, 2015. These deficiencies will be tracked to resolution by TOC via the FTA SMI CAP process:

Finding R-15 Maintenance and Operations Departments have not ensured the RWP training program is being conducted as required. Annual refresher and biennial recertification requirements for Level II and Level IV are behind schedule.

- *R-2-15-a Each WMATA Department with Roadway Worker Protection trained and qualified employees must coordinate with Technical Skills & Maintenance Training to get or establish an accurate status on each employee's refresher and requalification training.*
- *R-2-15-b Each WMATA employee with lapsed refresher training or requalification must repeat the initial training and qualification for his or her level as specified in WMATA's roadway worker protection training program.*
- *R-2-15-c WMATA's Information Technology Department must work with Technical Skills & Maintenance Training to develop a long-term solution to tracking employee status and ensuring that Computer-Based Training records, classroom records and employee records are accessible to all departments.*
- *R-2-15-d WMATA must include annual Roadway Worker Protection refresher and requalification time in overall work scheduling protocols and requirements.*

Finding R-16 Technical Training for operations and maintenance departments is under-resourced and fractured, currently provided by five different departments and IT, is insufficiently directed and resourced, and relies significantly on on-the-job-training (OJT) which is informal and lacks oversight.

- *R-2-16-a WMATA must conduct a coordinated study to prioritize technical training needs for maintenance personnel, and operations training for Rail Traffic Controller, Train Operators, and Field Supervisors.*
- *R-2-16-b WMATA must evaluate whether re-organization or consolidation of training functions would improve the agency's ability to manage, schedule, budget for, develop, oversee and assess training and ensure that training material remains up-to-date.*
- *R-2-16-c WMATA must establish a comprehensive training program to communicate the new "Fire Life Safety 1000 --Inspection, Testing and Maintenance Procedure" to WMATA Operations and Maintenance personnel.*
- *R-2-16-d WMATA must establish formal guidance for maintenance employees responsible for providing on-the-job training.*

Finding R-27 Documented maintenance procedures and standard operating procedures are not implemented as required.

- *R-4-27-a For all major departments with inspection and maintenance responsibilities for critical infrastructure, WMATA must establish and/or update a preventive maintenance and inspection testing quality audit process to ensure compliance with established maintenance and testing practices, and to monitor missed or incomplete preventive maintenance activities and/or inspections. *

Finding R-33 Inventory “stockouts” have impacted maintenance operations. Material Control stock out items reported by the Superintendent in Rail Car Maintenance is a serious concern in the performance of maintenance actives and ensuring equipment availability, however mitigation has not been implemented.

- *R-33-a Each WMATA Department impacted by inventory stockouts must develop a recovery or corrective action plan to ensure equipment availability and to manage delays.*

Finding R-39 Difficulties with WMATA’s ELM have forced departments to use work-arounds resulting in poor documentation of initial and refresher training, certifications, professional licenses and recertification’s.

- *R-7-39-a WMATA must evaluate the existing Enterprise Learning Management recordkeeping system and take corrective action, as necessary, to ensure accurate training, re-certification, and professional certification records are created, maintained, and readily accessible to appropriate managers and employees.*

The TOC does not require a separate response to these FTA findings. The TOC will monitor implementation of the recommendations through WMATA’s CAP submissions to the FTA.

TOC Findings

Finding 1: CMNT supervisors are unable to view the status of individual or department progress toward an idealized training schedule, nor are they notified automatically when employees are due for training or retraining on a specific topic. These issues prevent full compliance with Office of Car Maintenance SOP 2.04 – Procedures and Requirements for Job Classification Training.

Finding 2: CMNT is prohibited from accessing the CCTV system hard drives. Therefore, no maintenance is performed on certain elements of the CCTV system. MTPD maintains custody of the system and will not take responsibility for any CCTV maintenance issues. The present situation could present a potential liability exposure.

Finding 3: WMATA is experiencing difficulties in hiring and retaining instructors with preferred qualifications to meet the training needs of CMNT. Difficulty in hiring and retention of qualified railcar maintenance instructors has implications for having a qualified and trained workforce to meet WMATA's railcar availability needs.

Finding 4: WMATA does not have a Rail Vehicle Maintenance Plan. A Rail Vehicle Maintenance Plan should document current maintenance processes, internal component repair processes, procurement and inventory support, quality assurance, planning, the introduction of the 7000-series railcars into WMATA's revenue fleet, and future plans for vehicle sustainability and growth.

Finding 5: Post-Preventative Maintenance Inspection Checklists and Supervisor Sign-Off Sheets were incomplete or incorrectly filled out for several vehicles during a written records review. During TOC's review of selected inspection checklists and signoff sheets, recurring issues included missing supervisor signatures, blank checklists, and checklists with certain items left blank.

Personnel Interviewed

- [REDACTED] CMNT
- [REDACTED] QAAW
- [REDACTED] TIES / QAAW
- [REDACTED] TTDC / TIES
- [REDACTED] TTDC / TIES
- [REDACTED] CMNT
- [REDACTED] SAFE
- [REDACTED] SAFE
- [REDACTED] SAFE
- *(Front-line mechanics' names are withheld from this report)*

Documents Reviewed

- Completed Daily Inspection Checklists for 3000- and 1000- Series cars, Greenbelt Shop
- Completed A, A1, A2, B, B2, C2, C3, C4 Periodic Inspection Checklists for 6000-Series cars, Greenbelt Shop
- 1K Series Inspections:
 - Daily Safety Test
 - Periodic A Inspection Task List, Rev 0, 6/9/2014
 - Periodic B Inspection Task List, Rev 0, 6/9/2014
 - Periodic C Inspection Task List, Rev 0, 6/9/2014

- Periodic I Inspection Task List, Rev 0, 6/9/2014
 - A, B, C, and I Inspection Sign Off Sheets
- 2K/3K Series Inspections:
 - Daily Safety Test
 - Periodic A Inspection Task List, Rev 0, 6/9/2014
 - Periodic B Inspection Task List, Rev 0, 6/9/2014
 - Periodic C Inspection Task List, Rev 0, 6/9/2014
 - Periodic I Inspection Task List, Rev 0, 6/9/2014
 - A, B, C, and I Inspection Sign Off Sheets
- 4K Series Inspections:
 - Daily Safety Test
 - Periodic A Inspection Task List, Rev 0, 6/9/2014
 - Periodic B Inspection Task List, Rev 0, 6/9/2014
 - Periodic C Inspection Task List, Rev 0, 6/9/2014
 - Periodic I Inspection Task List, Rev 0, 6/9/2014
 - A, B, C, and I Inspection Sign Off Sheets
- 5K Series Inspections:
 - Daily Safety Test
 - Periodic A Inspection Task List, Rev 0, 6/9/2014
 - Periodic B Inspection Task List, Rev 0, 6/9/2014
 - Periodic C Inspection Task List, Rev 0, 6/9/2014
 - Periodic I Inspection Task List, Rev 0, 6/9/2014
 - A, B, C, and I Inspection Sign Off Sheets
- 6K Series Inspections:
 - Daily Safety Test
 - Periodic A Inspection Task List, Rev 0, 6/9/2014
 - Periodic B Inspection Task List, Rev 0, 6/9/2014
 - Periodic C Inspection Task List, Rev 0, 6/9/2014
 - Periodic I Inspection Task List, Rev 0, 6/9/2014
 - A, B, C, and I Inspection Sign Off Sheets
- 7K Series Inspections:
 - Daily Safety Test Draft, 5/19/15
 - I Inspection Draft, 5/19/15
- Operations Administrative Procedures 203-1, 203-2, 203-3, 203-4, 203-5, 203-6
- Technical Training and Document Control SOP's 1 and 3
- WMATA Car Maintenance Employee Training Plan, 5/22/08
- 2K/3K Series Training Materials:
 - 2K-3K Series Training Powerpoints
 - 2K-3K Series Student Guides
 - 2K-3K Series Course Outlines
 - 2K-3K Series Instructor Feedback Forms
- 5K Series Training Materials:
 - 5000 Series Training Powerpoints
 - 5000 Series Student Guides

- 6K Series Training Materials:
 - 6000 Series Training Powerpoints
 - 6000 Series Course Handouts
 - 6000 Series Familiarization Training Course Student Handbook, March 2007
- 7K Series Training Materials:
 - 7000 Series Railcar Train Operators Instruction Manual, 10/8/2014
 - 7000 Series Draft Periodic Inspection Manual, 4/15/2015
 - 7000 Series Illustrated Parts Catalogs
 - 7000 Series Heavy Repair Maintenance Manuals
- Assorted 1K, 2K/3K, 4K, 5K, 6K, 7K Car Maintenance Training Records