ATTACHMENT A

2008
TRIENNIAL ON-SITE
SAFETY REVIEW
SAN FRANCISCO MUNICIPAL TRANSPORTATION AGENCY
SAN FRANCISCO MUNICIPAL RAILWAY

RAIL TRANSIT SAFETY SECTION
RAIL TRANSIT AND CROSSINGS BRANCH
CONSUMER PROTECTION AND SAFETY DIVISION
CALIFORNIA PUBLIC UTILITIES COMMISSION
505 VAN NESS AVENUE
SAN FRANCISCO, CA 94102

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Final Report

Richard W. Clark, Director
Consumer Protection and Safety Division

2008 TRIENNIAL ON-SITE SAFETY REVIEW
SAN FRANCISCO MUNICIPAL TRANSPORTATION AGENCY
SAN FRANCISCO MUNICIPAL RAILWAY

ACKNOWLEDGEMENT

The California Public Utilities Commission's Rail Transit Safety Section (RTSS), with the assistance of the Commission's Railroad Operations Safety Branch (ROSB) and Utilities Safety & Reliability Branch (USRB), conducted this system safety program review. Staff members directly responsible for conducting safety review and inspection activities are:

Joey E. Bigornia, RTSS
Sherman Boyd, ROSB
Brian Dales, ROSB
Gail Davis, RTSS
Chris Ducote, ROSB
Raed Dwairi, RTSS
Steve Espinal, RTSS
Susan Feyl, RTSS
Anton Garabetian, RTSS
Georgetta Gregory, Program Manager
Robert Hertan, RTSS
Howard Huie, RTSS
Erik Juul, Lead Reviewer, RTSS
Vincent Kwong, RTSS
Dennis Lee, USRB
Arun Mehta, CPUC Representative to SFMTA MUNI, RTSS
April Mulqueen, RTSS Program & Project Supervisor
Dain Pankratz, RTSS
Rupa Shitole, RTSS
Colleen Sullivan, RTSS
Noel Takahara, RTSS
Jimmy Xia, RTSS

TABLE OF CONTENTS

Page

1. EXECUTIVE SUMMARY

The California Public Utilities Commission's (Commission) Consumer Protection and Safety Division (CPSD), Rail Transit Safety Section staff (staff), with assistance from the Railroad Operations Safety Branch and Utilities Safety Branch staff (staff), conducted an on-site system safety program review of San Francisco Municipal Railway (SFMTA MUNI) in October 2008.

The on-site review was preceded by a pre-review conference with SFMTA MUNI personnel on October 20, 2008.

Staff conducted the 2008 SFMTA MUNI on-site safety review from October 7 through October 31, 2008. The review focused on verifying the effective implementation of the system safety program plan.

Staff held a post-review conference with SFMTA MUNI personnel following the on-site safety review on December 2, 2008. Staff provided SFMTA MUNI personnel with a synopsis of the preliminary review findings and preliminary recommendations for corrective actions.

The review results indicate that SFMTA MUNI has a comprehensive System Safety Program Plan (SSPP) and has made significant progress in executing that plan. However, staff noted exceptions during the review. These exceptions are described in the Findings and Recommendations sections of each checklist. Of the 51 checklists, staff made 49 recommendations for corrective actions. These are distributed among the following departments: Track & Signal Maintenance, Cable Car Vehicle Maintenance, Overhead Lines, Service Delivery, Health & Safety, Enforcement & Safety, Safety – Configuration Control, Fleet Engineering – Change Control Board, Schedule – Green Metro Operations, SFMTA MUNI Rail Operations, Metro Rail Operations (MRO), Service Delivery – Green Metro Training, Maintenance Training, Operations Control Center, Service Delivery – Cable Car Operations and Green Metro Operations, SFMTA MUNI Green Division, Green Metro Maintenance, PCC (Presidential Conference Car) and Historic Streetcar Maintenance, Transportation Planning and Development, Infrastructure Maintenance, and Caltrans Liaison.

The Introduction for this report is presented in Section 2. The Background, in Section 3, contains a description of SFMTA MUNI rail system and a status of the corrective actions resulting from the 2005 on-site safety review recommendations. Section 4 describes the review procedure. The review findings and recommendations are depicted in Section 5. The 2008 SFMTA MUNI Triennial Safety Review Checklist Index and the Recommendations List are included, respectively, in Appendices B and C. The Review Checklists are presented in Appendix D.

2. INTRODUCTION

The Commission's General Order (GO) 164-D *Rules and Regulations Governing State Safety Oversight of Rail Fixed Guideway Systems*, and the Federal Transit Administration's (FTA) Rule, Title 49 Code of Federal Regulations (CFR) Part 659, *Rail Fixed Guideway Systems: State Safety Oversight*, require the designated State Safety Oversight Agencies to perform a review of each rail transit agency's system safety program at a minimum of once every three years. The purpose of the triennial review is to verify compliance and evaluate the effectiveness of each rail transit agency's SSPP and to assess the level of compliance with GO 164-D as well as other Commission safety requirements. Staff conducted the previous on-site safety review of SFMTA MUNI in October 2005.

On September 22, 2008, staff sent a letter to the SFMTA MUNI Executive Director/Chief Executive Officer, advising that the SFMTA MUNI safety triennial review would be scheduled October 20 to 31, 2008. Six checklists outlined inspection of track, signals, electric power systems, and vehicles. The remaining checklists focused on the verification of the effective implementation of the safety program plan.

Between October 7, 2008 and October 24, 2008, the Commission's Rail Operations Safety Branch staff conducted inspections of SFMTA MUNI's tracks, signals, and vehicles.

On October 20, 2008, SFMTA MUNI personnel and staff held an entrance meeting to discuss the events of the on-site triennial review. SFMTA Executive Director/Chief Executive Officer, Chief Operations Officer, Health and Safety Manager, various department managers, FTA Safety Liaison, CPUC Program Manager, and Rail Transit Safety Section (RTSS) staff attended the meeting.

Staff performed the on-site safety and records review from October 21, 2008 through October 31, 2008. At the conclusion of each review activity, staff provided SFMTA MUNI personnel a verbal summary of the preliminary findings and discussed preliminary recommendations for corrective actions.

On December 2, 2008, SFMTA MUNI personnel and staff held a post-review exit meeting with SFMTA MUNI's executives and department managers. Staff provided the attendees a synopsis of the major findings from the 51 checklists and discussed the need for corrective actions where applicable.

3. BACKGROUND

The San Francisco Municipal Transportation Agency (SFMTA) is the public transportation system of the City and County of San Francisco. The San Francisco Municipal Railway (SFMTA MUNI), along with the San Francisco Department of Parking and Traffic, became a part of the San Francisco Municipal Transportation Agency on March 1, 2000. A seven-member board, appointed by the mayor, governs SFMTA MUNI and the Executive Director serves as the agency's senior management officer.

SFMTA MUNI was the first publicly owned streetcar system in a major city of the United States and began operation in 1912. It has a relatively small service area of just 46.7 square miles. However, the combined rail transit modes average more than 179,000 weekday riders. SFMTA MUNI's fleet of rail transit vehicles consists of the subway and surface operating light rail vehicles (LRV), surface operating Historic Street Cars (HSC), and cable cars.

A. SFMTA MUNI Rail System Description

SFMTA MUNI rail transit operations are carried out by the Green Metro and the Cable Car Divisions. The Green Metro Division is responsible for the operation of the LRVs and the HSCs. It operates LRVs on six different lines. The HSCs are operated on the surface and principally on one double track line. Trains in SFMTA MUNI Metro Subway and Twin Peaks Tunnel operate under the control of a fully automated communications-based train control system. The majority of rail operations are on the surface in semi-exclusive and mixed traffic right-of-way, with up to a seven percent grade in some locations.

The Cable Car Division is responsible for operation of the cable cars. It provides passenger cable car service on three surface lines and traverse grades of up to 21 percent. Operating in mixed traffic, cable cars and vehicular traffic sharing traffic lanes, the cable cars transport an average of over 20,500 riders on weekdays over narrow, congested streets. A moving cable, below the surface of the street, provides propulsion for the cable cars via a mechanical grip, extending from the cable car and down through a continuous slot between the running rails. All onboard propulsion and braking controls for the cable cars are mechanical and are hand or foot-operated by the cable car operator. Cable car operation and equipment has changed little since the late 19th century and relies heavily on human performance and craft.

SFMTA MUNI Cable Car Division Lines

The SFMTA MUNI Cable Car Division operates three lines. They include:

- Powell-Hyde Line
- Powell-Mason Line
- California Line

SFMTA MUNI Green Metro Division Lines

The SFMTA MUNI Green Metro Division operates six light rail lines and one line devoted to the operation of HSCs. Those lines include:

- F – Market and Wharves Line, dedicated to HSC operation;
- J – Church Line
- K – Ingleside Line
- L – Taraval Line
- M – Ocean View Line
- N – Judah Line
- T – Third Street Line

SFMTA MUNI Metro Third Street Extension – Phase II, also known as – The Central Subway

Phase II of the SFMTA MUNI Metro Third Street Extension is commonly known as the Central Subway. The Central Subway will extend the SFMTA MUNI Third Street Light Rail line north from King Street, along Fourth Street. Current plans include a new subway between Bryant Street and Market Street on 4th Street and between Market Street and Jackson Street on Stockton Street, crossing under Market Street and Jackson Street in Chinatown. Three underground stations and one surface station located on 4th Street just north of Brannan Street are planned on the Central Subway line.

SFMTA MUNI's Transportation Planning and Development Division has primary responsibility for the planning, design, construction, and testing of this line extension.

B. SFMTA MUNI 2005 Triennial Review Recommendations Status

Staff performed the previous triennial on-site safety review in October 2005. Forty-seven checklists were used by staff in that review. Results demonstrated that SFMTA MUNI had made significant progress in developing and implementing the major elements of its system safety program since staff's first on-site safety review in 1999. Staff made 43 recommendations for corrective action that focused on important details of SFMTA MUNI's system safety program plan and its implementation.

CPUC Commission Resolution ST-82 adopted staff's report and ordered SFMTA MUNI to develop an appropriate corrective action plan and implementation schedule for staff recommendations. Resolution ST-82 also ordered SFMTA MUNI to give staff a monthly status report providing the implementation progress of these corrective actions until completed.

SFMTA MUNI developed and submitted a corrective action plan and schedules to fulfill each of the 43 recommendations. By January 2009, SFMTA MUNI reported completion of 42 of the 43 recommendations ordered by the Commission following the 2005 safety review. The remaining uncompleted recommendation #7 from 2005 was also found during the 2008 audit in Checklist #9 and involved rulebook revision.

4. SAFETY REVIEW PROCEDURE

Staff conducted the 2008 safety review in accordance with Rail Transit Safety Section Procedure RTSS-4, *Procedure for Performing Triennial Safety Audits of Rail Transit Systems*. Staff developed 51 checklists to evaluate the adequacy of SFMTA MUNI's system safety program and the efficacy of its implementation. The safety evaluation included the system's various departments, programs and processes which have system safety functions and responsibilities. It is based on Commission and FTA requirements, SFMTA MUNI's System Safety Program Plan, safety related SFMTA MUNI documents, and the staff's knowledge of the transit system. A list of the 51 checklists is contained in Appendix B.

Each checklist identifies safety-related elements and characteristics inspected and/or reviewed by staff. Substantiating Commission rules and regulations and SFMTA MUNI reference documents and relevant rules and policies establish the safety program requirements. The completed checklists include staff's findings, and recommendations for any findings indicating non-compliance. In addition to recommendations based on specific finds of non-compliance, the completed checklists may include staff comments designed to improve SFMTA MUNI's system safety program. Finally, the completed checklist may include reference to the methods used by staff to evaluate compliance with SFMTA MUNI's System Safety Program Plan. The methods used to perform the review include:

- Discussions and interviews with SFMTA MUNI management
- Review of rules, procedures, policies, and records
- Observations of operations and maintenance activities
- Interviews with rank and file employees
- Inspections and measurements of equipment and infrastructure

Upon completion of the safety review and inspection activities associated with each checklist, staff reviewed findings and, if appropriate, preliminary recommendations for corrective actions with the respective SFMTA MUNI personnel. This practice not only provides a chance to clear up any misunderstandings about the findings and recommendations, it also provides the SFMTA MUNI representative an opportunity to promptly address any necessary safety improvements.

The review checklists concentrated on system safety program requirements that affect the safety of the rail operations, public, employees, and property, and that are important to reducing safety hazards, preventing accidents, and improving safety.

5. FINDINGS AND RECOMMENDATIONS

The SFMTA MUNI 2008 Triennial Safety Review was a comprehensive review of SFMTA MUNI's system safety program elements and their implementation. To achieve that end, staff interviewed management, reviewed system safety program elements, examined and evaluated selected program records, and inspected selected facilities and equipment.

The reviewers and inspectors concluded that the SFMTA MUNI rail system has a comprehensive SSPP and is effectively implementing the plan. The reviewers and inspectors, however, did make recommendations to improve the SSPP.

Overall, the review confirms that SFMTA MUNI is mostly in compliance with its SSPP. Staff's findings identify areas where changes should be made to further improve SFMTA MUNI's system safety by bringing SFMTA MUNI into full compliance with its SSPP. The review identified 49 recommendations from the 51 checklists.

Listed below, in outline form and in the same order as the checklists, are the SFMTA MUNI system safety program's elements which staff reviewed or inspected. Each entry also includes, when appropriate, a brief summary of staff's findings of non-compliant conditions and recommendations to SFMTA MUNI for corrective action.

1. Metro Track Inspection

Findings of non-compliance:

1. Excessive flange depth allowing tread contact at the frog of crossover switches.
2. Insecure heel block assembly created by excessively loose heel block bolts at crossover switches.
3. Worn switch components allowing outer edge of wheel tread contacting gage side of stock rail and excessive metal flow at contact point of switch point and stock rail creating improper switch closure at crossover switches.

4. Worn rail through curve contributing to excessive gage.
5. Center cracked or broken compromise joint bars.
6. Track gage beyond allowable through curves and turnouts.
7. Switch components worn beyond maintainable conditions.

Recommendations:

1. SFMTA MUNI inspectors and foremen should inspect and maintain the track to the standards as outlined in SOP. Track that does not meet the minimum standards should be repaired or removed from service by SFMTA MUNI until safe operation is ensured (R.TR.PR.001).
2. SFMTA MUNI should develop a plan to conduct thorough and regular inspections of all the track components with a plan to repair all defects identified. Ultrasonic testing of the entire system should be conducted annually (GO 143-B Rule 14.05).

2. Cable Car Track Inspection

No findings of non-compliance; no recommendations.

3. LRV Inspection

No findings of non-compliance; no recommendations.

4. Historic Streetcar Inspection

No findings of non-compliance; no recommendations.

5. Cable Car Inspection

Findings of non-compliance:

Overall, the cable car division is following newly adopted SOPs. However, the SFMTA MUNI Cable Car Division has not adopted the standards for measuring and gauging car components for safe functional limits (i.e. wheel wear, brake shoe wear, side bearing clearance, journal and journal bearing wear).

Recommendations:

1. SFMTA MUNI Cable Car Division should adopt standards to measure and gauge car components for safe functional limits (i.e. wheel wear, brake shoe wear, side bearing clearance, journal and journal bearing wear, etc.) to ensure uniform maintenance criteria/standards (SSPP Section 4.14).

6. Train Control & Signal Inspection

Findings of non-compliance:

1. Staff identified two broken track bonds in the MUNI Metro Subway and pointed them out to the SFMTA MUNI personnel. One of the bonds was for a regular joint and one was a cross bond that electrically connects two separate rails together. SFMTA MUNI does not have a SOP for routine bond inspections.
2. There are two separate interlockings incorporated into the SFMTA MUNI Metro East (MME) facility. During the review of the test procedures (for safety certification), staff noted that SFMTA MUNI did not test and verify the individual track circuits using 0.06 ohm track shunt (SOP # R.SM.PR.027, page 35, "…Confirm that each freight track detection circuit shall detect the application of a shunt of 0.06 ohm resistance when the shunt is connected across the track rails of any part of the circuit (234.229)").
3. Train tracks cross Illinois Street at two locations at the MME facility. There are traffic signals at these locations. However, staff observed industrial truck traffic make right turns on red signals onto adjacent streets paralleling the tracks, fouling the train tracks and creating a collision hazard between motor vehicles and LRVs. SFMTA MUNI staff should contact and work with CPUC crossing staff to conduct a hazard analysis of the crossing and evaluate the benefit/option of posting "No Right Turn" signs where needed. "No turn on red" signs should be considered even where there are two traffic lanes. SFMTA MUNI should incorporate the necessary track circuits into the circuit design to prevent the timing out of the traffic control circuits while a LRV is in the intersection. The necessary track circuits and relays already exist. This would prevent the traffic signals from displaying green signals to oncoming traffic to prevent a collision. In fact all signals across the intersection should remain red and all traffic prevented from entering the intersection until the LRV is clear of the intersection.

Recommendations:

1. SFMTA MUNI should develop an SOP for the inspection of track bonds on a regular basis. SFMTA MUNI also should develop standards for bonding on switches and non-insulated track joints (SSPP Section 4.14).
2. SFMTA MUNI should undertake the following steps to improve the operation of the MME Facility (SSPP Section 4.14):
    a. SFMTA MUNI's SOP for track circuits requires the use of 0.06 ohm track shunt for testing purposes. Therefore, SFMTA MUNI should conduct this additional testing of MME signals to ensure safe operation of the signals (SOP # R.SM.PR.027, page 35).
    b. SFMTA MUNI staff should contact and work with CPUC crossing staff to conduct a hazard analysis of the crossing and evaluate the benefit/option of posting "No Right Turn" signs where needed. "No turn on red" signs should be considered even where there are two traffic lanes.

7. Overhead Catenary System (OCS) Inspection

Findings of non-compliance:

Staff found a number of GO 95 non-compliant findings, including GO 95 Rule 77.A, Rule 37 – Resolution No. E-1492, Rule 27 – Table 1, and Case No. 13, C at various locations. See Checklist #7 for details of the non-compliant locations.

Recommendations:

1. SFMTA MUNI should not only raise the OCS at the locations identified to meet the minimum height of 17 ft requirement as stated in CPUC Resolution # E-1492, but also inspect the remaining system to ensure OCS height compliance per GO 95, Rule 37.
2. SFMTA MUNI should survey the entire system and develop a vegetation management plan to mitigate vegetation overgrowth conditions, as required under GO 95 Rule 35 - Table 1.

8. Authority and Responsibility for System Safety Program

Findings of non-compliance:

1. Exceptions were noted by the CPUC staff where not only the 60-day accident investigation reporting requirement as stated by GO 164-D, Section 8.3e, was not met, but the 30 day follow up status reporting requirement as stated by GO 164-D, Section 8.3e, was also not met.
2. The Safety Review Committee (SRC) is not functioning per its SOP and objectives set forth therein. Questioning revealed lack of participation from the executives at SFMTA MUNI. Staff found that the Executive Director's Safety Committee (EDSC) meetings are not taking place on a regular basis.

Recommendations:

1. SFMTA MUNI has been in violation of providing timely transmittal of "required" documentation for accident investigations to CPUC. SFMTA MUNI must abide by the CPUC requirement in providing the "required" documents in a timely manner. (SSPP Section 3.0).
2. SFMTA MUNI should organize and implement the Safety Review Committee (SRC) according to the SOP # SY.PR.038. SFMTA MUNI should hold the Executive Director's SRC on a regular basis.

9. System Safety Program Plan Administration

Findings of non-compliance:

1. SFMTA MUNI has not yet completed revision of its rule book for operating a light rail vehicle. The current version of the Operators Rule Book dates back to 2001 and has been out of compliance for many years including the last 2005 CPUC triennial audit.
2. SFMTA MUNI has completed revisions of 119 standard operating procedures (SOP). Twenty-five SOPs are in the process of being completed. The current version of the SSPP does not include references to the SOPs such as the Train Operator Compliance Program SOP and the Procurement SOP, in the relevant sections of the SSPP.

Recommendations:

1. SFMTA MUNI should complete the revision of the Operators Rule Book for its light rail vehicles. SFMTA MUNI should review and revise its rule book every three years as outlined in the Configuration Management SOP (A.PR.002).

2. SFMTA MUNI should review and revise SOPs to make them current per the scheduled review dates mentioned in the SOPs. Future revisions of the SSPP should incorporate references to the revised SOPs such as the Train Operator Compliance Program SOP and the Procurement SOP, in the relevant sections of the SSPP.

10. Accident and Incident Reporting and Investigation

Findings of non-compliance:

1. SFMTA MUNI did not report 30 accidents in 2008 within two hours as required by GO 164-D. This equates to an approximate 22% non-compliance rate of the total of 136 accidents. Staff noted missing documents from the files of some of the reportable accidents.
2. SFMTA MUNI does not submit Final Accident Investigation Reports to staff within 60 calendar days of the occurrence of an accident as required by Section 8.3e of the General Order 164-D. SFMTA MUNI does not have consistent documentation in its accident investigation files. The corrective action plans for many accidents are still open. SFMTA MUNI has not consistently obtained staff approval for closing accident-related corrective action plans. SFMTA MUNI personnel should notify and verify the CAPs with CPUC staff in compliance with GO 164-D Section 9.

Recommendations:

1. SFMTA MUNI should report, complete investigations and prepare reports for all open accidents per CPUC GO 164-D Section 8 and SFMTA MUNI Accident Incident Investigation & Reporting – All Modes SY.PR.0.044.
2. SFMTA MUNI should obtain internal approval and implementation agreement on corrective action plans (CAP) from the responsible department managers. The CAP should be entered and tracked in the Transit Safe System (SY.PR.044); upper management should be notified if CAPs are not closed in a timely manner (SFMTA Accident Incident Investigation & Reporting – All Modes SY.PR.0.044).
3. SFMTA MUNI should develop an approach with staff for verification and closing CAPs for reportable accidents/incidents and update the status of CAPs entered into the Transit Safe System (CPUC GO 164-D Section 9).

11. Internal Safety Audit Program

Findings of non-compliance:

1. Not all of the SSPP elements were audited during the 3-year cycle.
2. SFMTA MUNI is responsible for submitting all Internal Safety Audit Reports to staff by February 15th of each year, but it only submitted some Internal Safety Audit reports for the year 2007 to CPUC staff.
3. SFMTA MUNI did not prepare, track, and implement corrective action plan recommendations per in a timely manner. SFMTA MUNI did not provide signatures on any of the internal safety audit reports even though the corrective action plan forms show them to be completed.
4. Monthly reports of the ISA are not being provided to staff as required by SY.PR.036, Section 1.2c.

Recommendations:

1. SFMTA MUNI should follow its SSPP and audit all 21 SSPP elements required by GO 164-D Section 5.
2. SFMTA MUNI should submit all final versions of the internal safety audit reports to staff as required by GO 164-D Section 5.5.
3. SFMTA MUNI should ensure that all ISA CAPs status are recorded adequately in the TransitSafe Program and made available upon demand by CPUC auditors.
4. SFMTA MUNI should provide monthly reports of the ISA to staff as required by SOP SY.PR.036, Section 1.2c.

12. Change Control Management

Findings of non-compliance:

SFMTA MUNI has filed the CCB documents both electronically and hard copy form, allowing for quick retrieval for review. Auditor was unable to confirm that the change orders were received by the relevant parties and determine if implementation was monitored by the Rail Change Control Board (RCCB). According to SFMTA MUNI SOP A.PR.015., Section 10.0 entitled Record Change states: "The RCCB will monitor the implementation of the approved changes…"

Recommendations:

1. SFMTA MUNI RCCB should establish a process to notify the department requesting the changes that the change orders have been approved and are being implemented.

13. Configuration Management

Findings of non-compliance:

Safety Review Committee (SRC) rarely meets with its full complement or simple majority of active members on a regular basis.

1. As specified by SRC SOP (SY.PR.038), SFMTA MUNI is supposed to enter the approved changes or Corrective Action Plans (CAPs) into the TransitSafe System for documentation; however, it does so for some and not all. SFMTA MUNI did not update all the CAPs in TransitSafe.
2. SFMTA MUNI did not formally authorize all infrastructure changes implemented on the system. Not all CPUC CAPs from the 2005 triennial audit were approved by the Safety Review Committee as required in procedure SY.PR.038.
3. SFMTA MUNI did not track all changes to completion. It did not implement all the approved changes by the SRC and/or other safety subcommittee(s), and it did not properly document the CAP process.
4. Staff also reviewed SRC meeting minutes from the years 2006-2008. During this three year time period, the SRC did not meet July-Oct 2006, and no official SRC meetings were held in 2008. SFMTA MUNI may have implemented the changes made during this period without SRC approval, but may not have properly documented them.
5. SRC SOP details that the SRC members adequately represent the stakeholders necessary to approve the change. However, not all SRC members, needed to create a proper quorum, regularly attended meetings.

Recommendations:

1. SFMTA MUNI should follow the SSPP and the appropriate Safety Review Committee (SRC) and Change Control Board SOPs to ensure a proper configuration management process (SSPP Section 4).
2. SFMTA MUNI should implement changes to rules, procedures, infrastructures, or vehicle equipment, and should go through the

configuration management process (SRC or sub-committee), as specified in SSPP Section 4.17.2.

3. SFMTA MUNI should implement the changes (CAPs) approved by the SRC and these should be properly tracked through implementation and reviewed after completion (by means of TransitSafe & Internal Safety Audits), as specified in SRC SOP (SY.PR.038) Section 3.8.
4. SFMTA MUNI SRC should meet regularly to effectively approve CAPs, as specified in SSPP Section 4.17.
5. SFMTA MUNI permanent SRC members should consistently participate in the SRC meetings to ensure that technical consideration is given to all related areas when a change is approved (SY.PR.038 Sections 4.3 and 4.4).

14. Safety Certification – Third Street Extension

No findings of non-compliance; no recommendations.

15. Measuring and Testing Equipment

No findings of non-compliance; no recommendations.

16. Subway Station and Emergency Equipment Maintenance

No findings of non-compliance; no recommendations.

17. Drug and Alcohol Program

No findings of non-compliance; no recommendations.

18. Employee Safety Program

Findings of non-compliance:

SFMTA MUNI has implemented a functioning version of the Hazardous Communications database. However, the data in the database is limited to a few months' worth of training records. Database entry history is less than six months. Anything spanning further than 6 months is not likely to be in the database.

Recommendations:

1. SFMTA MUNI should ensure the Hazardous Communication Database contains employee training history records for at least three years (OS.PR.100).

19. Operating Rules and Procedures – LRVs

Findings of non-compliance:

SFMTA MUNI does not have a process to recall a general bulletin. There is no date on the log for bulletins/notices associated with the inactivation of a bulletin. There is currently no process in place that gives the Divisional Superintendents authority to take down a general bulletin (that does not have time specified in the body of the bulletin.) Currently, there is not a process in the Operations/Rules department as to when and how to inform the Master Keeper of Records that a rule change bulletin has been incorporated into the rules and can be made inactive.

Recommendations:

1. SFMTA MUNI should perform a regular (annual) recap of all bulletins and develop a corrective action plan whereby in January of each year, for example, the Master Keeper of Records can identify the bulletins which are no longer active. The list of the inactive bulletins should be furnished to each Divisional Superintendent and placed in the master log (SY.PR.027).

20. Hours of Service Train Operators, Train Controllers and Supervisors

Findings of non-compliance:

1. SFMTA MUNI's Hours of Service Rail Operations SOP (effective date of 8/6/08) section 4.1 has the heading "Permissive On-Duty Hours (Safety Sensitive Employees)", but it only defines safety-sensitive employees and does not define what are permissive on-duty hours. Also, this SOP does not clarify platform time and work time, which are shown in the Trapeze HOS records.
2. Several follow-up phone calls to a dispatcher in the SFMTA MUNI Cable Car Division and other SFMTA MUNI personnel revealed that confusion exists in the meaning of on-duty hours between work time and platform time among its personnel.

3. Staff reviewed the Trapeze HOS records, covering a six month period from 4/1/08 to 9/30/08, of 12 cable car operators who were randomly selected from the roster of cable car operators. Staff identified three instances where the CPUC GO 143-B hours of service rules were non-compliant.
4. Staff reviewed the TESS timesheets, covering a six-month period from 4/1/08 to 9/30/08, of 21 MRO supervisors/inspectors who were randomly selected from the roster of MRO supervisors. Staff identified three instances where the CPUC hours of service rules were non-compliant.

Recommendations:

1. SFMTA MUNI should revise the Hours of Service Rail Operations SOP to define: what are permissible on-duty hours; what these hours consist of; and, lastly, to clarify platform time and work time (GO 143-B and SY.PR.047).
2. SFMTA MUNI should retrain the dispatchers in the Cable Car Division to ensure that they understand the exact meaning of permissible on-duty hours for cable car operators (GO 143-B and SY.PR.047).
3. SFMTA MUNI should review the Hours of Service (HOS) records of all of the cable car operators, identify the causes of any non-compliance found, and take appropriate actions to remedy the same as per the requirements of GO 143-B.
4. SFMTA MUNI should review the HOS records of all of the MRO Inspectors, identify the causes of any non-compliance found, and take appropriate actions (GO 143-B Sections 12.01 and 12.04).
    - SFMTA MUNI should be carefully checking the time sheets for all the MRO inspectors before their work deployment to ensure compliance with GO 143-B HOS rules.

21. Hazardous Materials Management Program

No findings of non-compliance; no recommendations.

22. Training and Certification of HSC and LRV Operators, Rail Inspectors, On Track Equipment Operators and Train Controllers

Findings of non-compliance:

For the Historic Streetcar (HSC) and Light Rail Vehicle (LRV) operators selected, SFMTA MUNI provided all the required training and certification, but there were instances of missed refresher training for some operators.

Recommendations:

1. SFMTA MUNI should develop controls in order to meet all the training and certification requirements of its rail operators (TN.MO.PL.025).

23. Training and Certification of Cable Car Grip Person, Conductors and Inspectors

No findings of non-compliance; no recommendations.

24. Training and Certification of LRV & HSC Mechanics and Technicians

No findings of non-compliance; no recommendations.

25. Track Maintenance Training and Certification

No findings of non-compliance; no recommendations.

26. Signal Maintenance Training and Certification

No findings of non-compliance; no recommendations.

27. Traction Power Maintenance Training and Certification

No findings of non-compliance; no recommendations.

28. Operating Rules and Procedures for Historic Streetcars

Findings of non-compliance:

The F-line rules contain maximum authorized speeds for PCC cars. However, such speed table was not included in the historic streetcar rules.

Recommendations:

1. SFMTA MUNI should include maximum speed limits for sections of right-of-way in the rules for historic street cars (similar to the speed table in the rules for PCC cars) (Rulebook SF-1010 and TN.MO.MN.032).

29. Program of Operational Evaluations – Metro and Cable Car Divisions

Findings of non-compliance:

Staff reviewed records for four streetcar operators. There were records of surreptitious rides only for 2008. Per the SFMTA MUNI Training Superintendent, the records for previous years are located at the Presidio Building in the Training Manager's office, while the rest of the evaluation records are at the Green Yard location. In an email dated 10/27/2008, the Training Manager advised there were no surreptitious rides for 2006 and 2007. Based on SFMTA MUNI's SOP # TN.MO.PR 019, Section 3.5, "Training and Development is responsible for scheduling at least 20% of the LRV and cable car operators for an irregular, anonymous check every year or whenever requested by a division operation superintendent or senior management."

The records of several Cable Car employees reviewed had no 2007 Annual Compliance Check. The Superintendent explained that the training department during that period of time was not managed well, and that if they did have them, the former manager did not file them.

Recommendations:

1. SFMTA MUNI should review and revise its TN.MO.PR.019 – Rail Vehicle Transit Operator Compliance Program to improve and increase its frequency for a) surreptitious ride check of operators and b) "regular (standard)" testing of operators (SSPP 4.13).

30. Central Control Dispatchers Performance

No findings of non-compliance; no recommendations.

31. Metro LRV and Historic Streetcar Train Operator Performance

Findings of non-compliance:

1. Observations indicated a number of rule violations by operators observed and interviewed and the inadequacy in the efficiency testing program. These findings appear to be similar to the violations such as stop sign

running and cell phone usage, which were involved in accidents that occurred on June 14, 2008 (16 injuries-cell phone usage), August 20, 2008 (1 fatality, ran double X stop), and September 24, 2008 (1 fatality, ran stop).

2. Records of random observations / violations cited by SFMTA MUNI inspectors observing operators were available for review during the audit. Operators were found not to carry their rulebooks and safety equipment such as flash lights with them, violating SFMTA MUNI's Rules 2.1.2 and 2.28.3 from its Rules and Instructions Handbook.

Recommendations:

1. SFMTA MUNI should review and revise its TN.MO.PR.019 Train Operator Compliance Program to improve its operational/efficiency testing procedures (TN.MO.PR.019).
2. SFMTA MUNI should train operators on required safety equipment and all rule book requirements. SFMTA MUNI should develop a training and discipline procedure for operators who do not follow the requirement. SFMTA MUNI should perform operations/efficiency testing including, but not limited to spot checks for safety equipment and rules books before operators depart yards. SFMTA MUNI should utilize its inspectors in performing street testing and issuing warnings. Training personnel should conduct operations/efficiency testing exercises on a higher frequency than the current practice of one test per operator each year (TN.MO.PR.019). Additionally the operators' personnel records should show a "failed operations test" (Rulebook SF-1010 and TN.MO.PR.019).

32. Cable Car Operating Crew Performance

No findings of non-compliance; no recommendations.

33. Operating Rules and Procedures for Cable Cars

Findings of non-compliance:

SFMTA MUNI does not keep regular records which show the timely receipt of bulletins by its operators. Staff found only one bulletin where signatures of the operators had been obtained.

Recommendations:

1. SFMTA MUNI should adhere to the procedures set forth in SY.PR.027 and Rule 2.2.8 requiring the signatures of operators on receipt of operational bulletins. This is of particular importance in that operational bulletins many times deal with safety issues and the bulletins become operating rules. Operators currently sign for their Rulebooks and should also be required to sign for operation bulletins (SY.PR.027).

34. Metro Track Maintenance Program

Findings of non-compliance:

1. There are insufficient track inspection and maintenance records for various locations including Geneva and Metro Yard, Van Ness/Duboce, Duboce/Church, Church/Castro, Castro/Eureka, Eureka/Forest Hill, Forest Hill/W. Portal, W. Portal, and Sunset Tunnel. Furthermore, much of the current open work orders do not have priorities assigned to them.
2. According to the inspection reports from 2007 – 2008, several maintenance defects identified have not been addressed and are overdue. Also, the maintenance defects were not prioritized.

Recommendations:

1. SFMTA MUNI should follow its Track Inspection and Maintenance SOP and allocate adequate resources (time, equipment, and number of workers) to inspect and maintain its tracks (R.TR.PR.001).
2. SFMTA MUNI should ensure that track defects are properly identified and corrected according to the priority rating as described in the SFMTA MUNI standards (R.TR.PR.001).

35. LRV Maintenance Program

Findings of non-compliance:

SFMTA MUNI did not properly document the work orders to rectify various defects on the LRVs reviewed by staff.

Recommendations:

1. SFMTA MUNI should ensure that defects found during inspections are properly documented on work orders (L.PR.017).

36. Historic Streetcar Maintenance Program

Findings of non-compliance:

1. Section 4.2 of L.PR.017 requires that each car's work history, open work orders, and car records be reviewed before performing inspections and preventive maintenance. Staff noted non-compliance with this SOP. Further, there are instances where preventive maintenance and inspections are not completed at the proper intervals.
2. There are instances where preventive maintenance and inspections are not taking place at the proper interval.
3. There is a discrepancy in data. Although the database may show that preventive maintenance and inspections occurred at the proper mileage interval, other records will show that it occurred at a non-compliant interval.

Recommendations:

1. SFMTA MUNI should adhere to its procedure L.PR.017, Section 4.2. Prior to performing preventive maintenance and inspections, work history reports should be compiled and reviewed using the readily available database (L.PR.017).
2. SFMTA MUNI should ensure that preventive maintenance and inspections occur at the proper mileage or time intervals per SOP L.PR.017.
3. SFMTA MUNI should ensure that the mileage and time information logged into its records for preventive maintenance and inspections is accurate and consistent (L.PR.017).

37. Cable Car Maintenance Program

Findings of non-compliance:

SFMTA MUNI is not in compliance with SOP CC.PR.004. SFMTA MUNI personnel are not submitting or properly collecting the cable car defect cards on a consistent basis at the end of each cable car run.

Recommendations:

1. SFMTA MUNI should ensure that operators consistently submit cable car defect cards to the cable car maintenance department for follow-up maintenance (CC.RR.001).

38. Cable Car Track and Cable Maintenance Program

No findings of non-compliance; no recommendations.

39. ATCS Maintenance Program

No findings of non-compliance; no recommendations.

40. Signal Systems Maintenance Program Including Power Switch Machines

No findings of non-compliance; no recommendations.

41. Substation and Overhead Lines Maintenance Program

No findings of non-compliance; no recommendations.

42. Safety Data Acquisition and Analysis

Findings of non-compliance:

SFMTA MUNI Health and Safety Department is not utilizing its safety trend analyses result in generating corrective action plans. SFMTA MUNI SSPP and Safety Data Acquisition and Analysis SOP (SY.PR.037) do not address the link between safety data acquisition and analysis and implementation of system safety program.

Recommendations:

1. SFMTA MUNI Health and Safety Department should be involved in all corrective actions resulting from the safety data acquisition and trend analysis (SSPP and SY.PR.037).

43. Interdepartmental & Interagency Coordination

Findings of non-compliance:

SFMTA MUNI did not provide documents to show interagency coordination is an element of SFMTA MUNI's internal safety audit program.

Recommendations:

1. SFMTA MUNI should include interagency coordination as an element of its internal safety audit program (SY.PR.036).

44. Contractor Safety Program

Findings of non-compliance:
SFMTA MUNI recently developed its revised version of the Contractor Safety Program SOP, but has not adopted it, pending executive approval and signatures. The SFMTA MUNI's Internal Safety Audit (ISA) report for its Contractor Safety Program was not available for review.

Recommendations:

1. SFMTA MUNI should finalize, adopt, and implement Contractor Safety Program SOP (SSPP Sections 4.16.4 & 4.18.2). Subsequent to this audit, per the e-mail dated December 4, 2008, sent by SFMTA MUNI's Health & Safety Manager, the SFMTA MUNI's Rules & Procedures Committee (RPC) approved the revised Contractor Safety Program SOP on December 1, 2008 (SSPP Sections 4.16.4 & 4.18.2).
2. SFMTA MUNI should complete and submit Contractor Safety Program ISA at a minimum of once every three years per GO 164-D and SFMTA MUNI SSPP Section 4.12.

45. Procurement Control

No findings of non-compliance; no recommendations.

46. Chief Operating Officer's Safety Initiative

No findings of non-compliance; no recommendations.

47. SSPP Review and Modification

No findings of non-compliance; no recommendations.

48. Safety Certification - Central Subway Project

No findings of non-compliance; no recommendations.

49. Bridges and Structures Inspections and Reports

Findings of non-compliance:

No formal written procedure currently exists for bridge and other structural inspections.

Recommendations:

1. Although main responsibility of structural integrity of the bridge may lie with another agency such as Caltrans, SFMTA MUNI should take the responsibility of the oversight of the PM program and relevant documentation. SFMTA MUNI should accordingly develop a new standard operating procedure (SOP) mentioning the responsibility of preventive maintenance (PM) lying with another agency and SFMTA MUNI's role as providing an oversight of the PM of the structures including bridges. (PU Code 29047).

50. Training of Executives, Directors, Senior Managers, Superintendents, Supervisors, and Operators

No findings of non-compliance; no recommendations

51. Hazard Management

Findings of non-compliance:

SFMTA MUNI does not always perform an Operational Hazard Analysis (OHA) when a hazard is identified. Further, there was an inconsistency in documentation linking corrective action plans to identified hazards.

Recommendations:

1. SFMTA MUNI should conduct an Operational Hazard Analysis (OHA) whenever a hazard is first identified and assign a risk index to that hazard. If found necessary, SFMTA MUNI should develop a corrective action plan to mitigate identified hazards in accordance with the SSPP (SY.PR.033).

APPENDICES

A. Abbreviation and Acronym List

B. SFMTA MUNI 2008 Triennial Safety Review Checklist Index

C. SFMTA MUNI 2008 Triennial Safety Review Recommendations List

D. SFMTA MUNI 2008 Triennial Safety Review Checklists

APPENDIX A

ABBREVIATION and ACRONYM LIST

Abbreviation / Acronym	Description
APTA	American Public Transportation Association
ATCS	Advanced Train Control System
CAP	Corrective Action Plan
CCB	Change Control Board
CFR	Code of Federal Regulations
Commission	California Public Utilities Commission
CPSD	Consumer Protection and Safety Division
CPUC	California Public Utilities Commission
DEM	Department of Emergency Management
DTIS	Department of Telecommunications and Information Services
EDSC	Executive Director's Ssafety Committee
EOP	Emergency Operations Plan
ERP	Emergency Response Planning
FTA	Federal Transit Administration
GO	General Order
H&S	Health and Safety
HAWG	Hazard Analysis Work Group
HOS	Hours of Service
HSC	Historic Streetcar
IIPP	Injury and Illness Prevention Program
ISA	Internal Safety Audit
LRV	Light Rail Vehicle
Manual	Manual for the Development of System Safety Program Plans
MME	MUNI Metro East
MRO	Metro Rail Operations

MTC	Metropolitan Transportation Commission
MUNI or Muni	San Francisco Municipal Railway
OCC	Operations Control Center
OCS	Overhead Catenary System
OEHU	Occupational & Environmental Health Unit
OES	Office of Emergency Services
OHA	Operational Hazards Analysis
OSRC	Operations Safety Review Committee
OTEO	On Track Equipment Operator
OTS	On Track Safety
PCC	Presidential Conference Car
PHA	Preliminary Hazard Analysis
PM	Preventive Maintenance
PMI	Preventive Maintenance Inspection
PU Code	Public Utilities Code
RCCB	Rail Change Control Board
RCES	Rail Crossing Engineering Section
ROSB	Rail Operations Safety Branch
RPC	Rules and Procedures Committee
RPC	Rules & Procedures Committee
RTCB	Rail Transit and Crossing Branch
RTSS	Rail Transit Safety Section
SAP	Substance Abuse Professional
SCC	Safety Certification Committee
SCP	Safety Certification Plan
SCVR	Safety Certification Verification Report
SFFD	San Francisco Fire Department
SFMTA	San Francisco Municipal Transportation Agency
SFPD	San Francisco Police Department
SOP	Standard Operating Procedure
SRC	Safety Review Committee

SSMP	Safety and Security Management Plan
SSP	System Security Plan
SSPP	System Safety Program Plan
Staff	Consumer Protection and Safety Division personnel
TESS	Time & Entry Scheduling System
TVA	Threat & Vulnerability Analysis
UPS	Uninterrupted Power Supply
USRB	Utilities Safety & Reliability Branch
VETAG	Vehicle Tagging System

APPENDIX B

2008 SFMTA MUNI TRIENNIAL SAFETY REVIEW CHECKLIST INDEX

Checklist No.	Department	Element/Characteristics
1	Track & Signal Maintenance	Metro Track Inspection
2	Cable Car Track Maintenance	Cable Car Track Inspection
3	SFMTA MUNI Metro Vehicle Maintenance	LRV Inspection
4	Geneva Vehicle Maintenance	Historic Streetcar Inspection
5	Cable Car Vehicle Maintenance	Cable Car Inspection
6	SFMTA MUNI Track & Signal	Train Control & Signal Inspection
7	Overhead Lines Department	Overhead Catenary System Inspections and Records
8	Service Delivery & Safety	Authority and Responsibility for System Safety Program
9	Health & Safety	System Safety Program Plan Administration
10	System Safety	Accident and Incident Reporting and Investigation
11	System Safety	Internal Safety Audit Program
12	Safety – Configuration Control; Fleet Engineering; Change Control Board	Change Control Management
13	Safety – Configuration Control; Fleet Engineering – Change Control Board	Configuration Management
14	Transportation Planning and Development; Office of Health & Safety	Safety Certification – SFMTA MUNI Metro East (MME)
15	Service Delivery – Rail Vehicle Maintenance, Overhead Lines, Track & Signal Maintenance	Measuring and Testing Equipment

Checklist No.	Department	Element/Characteristics
16	Service Delivery – Infrastructure Maintenance Stationary Engineering	Subway Station and Emergency Equipment Maintenance
17	Safety and Training	Drug and Alcohol Abuse Program
18	System Safety	Employee Safety Program
19	Service Delivery, Schedule Green Metro Operations	Operating Rules and Procedures - LRVs
20	SFMTA MUNI Rail Operations; Cable Car Division; OCC; Signal Maintenance Department	Hours of Service of Train Operators, Train Controllers, and Supervisors
21	System Safety	Hazardous Materials Management Program
22	Service Delivery – Green Metro Training, Metro Rail Operations (MRO), Maintenance Training, Operation Control Center	Training and Certification of HSC and LRV Operators, Rail Inspectors, On Track Equipment Operators, and Train Controllers
23	Service Delivery – Cable Car Training	Training and Certification of Cable Car Grip Persons, Conductors, and Inspectors
24	Service Delivery – Maintenance Training	Training and Certification of LRV and HSC Mechanics
25	Service Delivery – Track & Signal Maintenance, Maintenance Training	Track Maintenance Training and Certification
26	Service Delivery – Track and Signal Maintenance	Signal Maintenance Training and Certification
27	Service Delivery – Infrastructure Maintenance Motive Power Unit	Traction Power Maintenance Training and Certification
28	Service Delivery – Green Metro Training	Operating Rules and Procedures for Historic Streetcars
29	Service Delivery Cable Car Operations and Green Metro Operations	Program of Operational Evaluations – Metro and Cable Car Divisions
30	Service Delivery – Operations Central Control	Central Control Train Controllers Performance

Checklist No.	Department	Element/Characteristics
31	SFMTA MUNI Green Division	Metro LRV and Historic Streetcar Train Operator Performance
32	Service Delivery Cable Car Operations	Cable Car Operating Crew Performance
33	Cable Car Operations	Operating Rules and Procedures for Cable Cars
34	SFMTA MUNI Track Department	Metro Track Maintenance Program
35	Service Delivery, Green Metro Maintenance	LRV Maintenance Program
36	Service Delivery, Green Metro Maintenance, PCC and Historic Streetcar Maintenance	Historic Streetcar Maintenance Program
37	Service Delivery, Cable Car Maintenance	Cable Car Maintenance Program
38	Service Delivery, Cable Car Track and Machinery Maintenance	Cable Car Track and Cable Maintenance
39	SFMTA MUNI Signal Department	ATCS Maintenance Program
40	Maintenance of Way, Track Signal Maintenance	Signal Systems Maintenance Program Including Power Switch Machines
41	Service Delivery, Maintenance of Way Division, Motive Power	Substation and Overhead Lines Maintenance Program
42	Health and Safety	Safety Data Acquisition and Analysis
43	System Safety	Interdepartmental and Interagency Coordination
44	System Safety	Contractor Safety Program
45	Material Management Section	Procurement Control
46	Service Delivery	Chief Operating Officer's Safety Initiative
47	Health and Safety	SSPP Review and Modification
48	Transportation Planning and Development; Office of Health & Safety	Safety Certification - Central Subway Project

Checklist No.	Department	Element/Characteristics
49	Transportation Planning and Development; Service Delivery, Infrastructure Maintenance, Caltrans Liaison	Bridges and Structures Inspections and Reports
50	System Safety	Training of Executives, Directors, Senior Managers, Superintendents, Supervisors, and Operators
51	System Safety	Hazard Management

APPENDIX C

2008 SFMTA MUNI TRIENNIAL SAFETY REVIEW RECOMMENDATIONS LIST

No.	Recommendation	Checklist No.
1	SFMTA MUNI inspectors and foremen should inspect and maintain the track to the standards as outlined in SOP. Track that does not meet the minimum standards should be repaired or removed from service by SFMTA MUNI until safe operation is ensured (R.TR.PR.001).	1
2	SFMTA MUNI should develop a plan to conduct thorough and regular inspections of all the track components with a plan to repair all defects identified. Ultrasonic testing of the entire system should be conducted annually (GO 143-B Rule 14.05).	1
3	SFMTA MUNI Cable Car Division should adopt standards to measure and gauge car components for safe functional limits (i.e. wheel wear, brake shoe wear, side bearing clearance, journal and journal bearing wear, etc.) to ensure uniform maintenance criteria/standards (SSPP Section 4.14).	5
4	SFMTA MUNI should develop an SOP for the inspection of track bonds on a regular basis. SFMTA MUNI also should develop standards for bonding on switches and non-insulated track joints (SSPP Section 4.14).	6
5	SFMTA MUNI should undertake the following steps to improve the operation of the MME Facility (SSPP Section 4.14): a. SFMTA MUNI's SOP for track circuits requires the use of 0.06 ohm track shunt for testing purposes. Therefore, SFMTA MUNI should conduct this additional testing of MME signals to ensure safe operation of the signals (SOP # R.SM.PR.027, page 35). b. SFMTA MUNI staff should contact and work with CPUC crossing staff to conduct a hazard analysis of the crossing and evaluate the benefit/option of posting "No Right Turn" signs where needed. "No turn on red" signs should be considered even where there are two traffic lanes.	6
6	SFMTA MUNI should not only raise the OCS at the locations identified to meet the minimum height of 17 ft requirement as	7

No.	Recommendation	Checklist No.
	stated in CPUC Resolution # E-1492, but also inspect the remaining system to ensure OCS height compliance per GO 95, Rule 37.	
7	SFMTA MUNI should survey the entire system and develop a vegetation management plan to mitigate vegetation overgrowth conditions, as required under GO 95 Rule 35 - Table 1.	7
8	SFMTA MUNI has been in violation of providing timely transmittal of "required" documentation for accident investigations to CPUC. SFMTA MUNI must abide by the CPUC requirement in providing the "required" documents in a timely manner (SSPP Section 3.0).	8
9	SFMTA MUNI should organize and implement the Safety Review Committee (SRC) according to the SOP # SY.PR.038. SFMTA MUNI should hold the Executive Director's SRC on a regular basis.	8
10	SFMTA MUNI should complete the revision of the Operators Rule Book for its light rail vehicles. SFMTA MUNI should review and revise its rule book every three years as outlined in the Configuration Management SOP (A.PR.002).	9
11	SFMTA MUNI should review and revise SOPs to make them current per the scheduled review dates mentioned in the SOPs. Future revisions of the SSPP should incorporate references to the revised SOPS such as the Train Operator Compliance Program SOP and the Procurement SOP, in the relevant sections of the SSPP.	9
12	SFMTA MUNI should report, complete investigations and prepare reports for all open accidents per CPUC GO 164-D Section 8 and SFMTA MUNI Accident Incident Investigation & Reporting – All Modes SY.PR.0.044.	10
13	SFMTA MUNI should obtain internal approval and implementation agreement on corrective action plans (CAP) from the responsible department managers. The CAP should be entered and tracked in the Transit Safe System (SY.PR.044); upper management should be notified if CAPs are not closed in a timely manner (SFMTA Accident Incident Investigation & Reporting – All Modes SY.PR.0.044).	10
14	SFMTA MUNI should develop an approach with staff for verification and closing CAPs for reportable accidents/incidents and update the status of CAPs entered into the Transit Safe System	10

No.	Recommendation	Checklist No.
	(CPUC GO 164-D Section 9).	
15	SFMTA MUNI should follow its SSPP and audit all 21 SSPP elements required by GO 164-D Section 5.	11
16	SFMTA MUNI should submit all final versions of the internal safety audit reports to staff as required by GO 164-D Section 5.5.	11
17	SFMTA MUNI should ensure that all ISA CAPs status are recorded adequately in the TransitSafe Program and made available upon demand by CPUC auditors.	11
18	SFMTA MUNI should provide monthly reports of the ISA to staff as required by SOP SY.PR.036, Section 1.2c.	11
19	SFMTA MUNI RCCB should establish a process to notify the department requesting the changes that the change orders have been approved and are being implemented.	12
20	SFMTA MUNI should follow the SSPP and the appropriate Safety Review Committee (SRC) and Change Control Board SOPs to ensure a proper configuration management process (SSPP Section 4).	13
21	SFMTA MUNI should implement changes to rules, procedures, infrastructures, or vehicle equipment, and should go through the configuration management process (SRC or sub-committee), as specified in SSPP Section 4.17.2.	13
22	SFMTA MUNI should implement the changes (CAPs) approved by the SRC and these should be properly tracked through implementation and reviewed after completion (by means of TransitSafe & Internal Safety Audits), as specified in SRC SOP (SY.PR.038) Section 3.8.	13
23	SFMTA MUNI SRC should meet regularly to effectively approve CAPs as specified in SSPP Section 4.17.	13
24	SFMTA MUNI permanent SRC members should consistently participate in the SRC meetings to ensure that technical consideration is given to all related areas when a change is approved (SY.PR.038 Sections 4.3 and 4.4).	13
25	SFMTA MUNI should ensure the Hazardous Communications database should contain employee training history records for at	18

No.	Recommendation	Checklist No.
	least three years (OS.PR.100).	
26	SFMTA MUNI should perform a regular (annual) recap of all bulletins and develop a corrective action plan whereby in January of each year, for example, the Master Keeper of Records can identify the bulletins which are no longer active. The list of the inactive bulletins should be furnished to each Divisional Superintendent and placed in the master log (SY.PR.027).	19
27	SFMTA MUNI should revise the Hours of Service Rail Operations SOP to define: what are permissible on-duty hours; what these hours consist of; and, lastly, to clarify platform time and work time (GO 143-B and SY.PR.047).	20
28	SFMTA MUNI should retrain the dispatchers in the Cable Car Division to ensure that they understand the exact meaning of permissible on-duty hours for cable car operators (GO 143-B and SY.PR.047).	20
29	SFMTA MUNI should review the Hours of Service (HOS) records of all of the cable car operators, identify the causes of any non-compliance found, and take appropriate actions to remedy the same as per the requirements of GO 143-B.	20
30	SFMTA MUNI should review the HOS records of all of the MRO Inspectors, identify the causes of any non-compliance found and take appropriate actions (GO 143-B Sections 12.01 and 12.04). • SFMTA MUNI should be carefully checking the timesheets for all the MRO inspectors before their work deployment to ensure compliance with GO 143-B HOS rules.	20
31	SFMTA MUNI should develop controls in order to meet all the training and certification requirements of its rail operators (TN.MO.PL.025).	22
32	SFMTA MUNI should include maximum speed limits for sections of right-of-way in the rules for historic street cars (similar to the speed table in the rules for PCC cars) (Rulebook SF-1010 and TN.MO.MN.032).	28
33	SFMTA MUNI should review and revise its TN.MO.PR.019 – Rail Vehicle Transit Operator Compliance Program to improve and increase its frequency for a) surreptitious ride check of operators and b) "regular (standard)" testing of operators (SSPP 4.13).	29

No.	Recommendation	Checklist No.
34	SFMTA MUNI should review and revise its TN.MO.PR.019 Train Operator Compliance Program to improve its operational/efficiency testing procedures (TN.MO.PR.019).	31
35	SFMTA MUNI should train operators on required safety equipment and all rule book requirements. SFMTA MUNI should develop a training and discipline procedure for operators who do not follow the requirement. SFMTA MUNI should perform operations/efficiency testing including, but not limited to spot checks for safety equipment and rules books before operators depart yards. SFMTA MUNI should utilize its inspectors in performing street testing and issuing warnings. Training personnel should conduct operations/efficiency testing exercises on a higher frequency than the current practice of one test per operator each year (TN.MO.PR.019). Additionally the operators' personnel records should show a "failed operations test" (Rulebook SF-1010 and TN.MO.PR.019).	31
36	SFMTA MUNI should adhere to the procedures set forth in SY.PR.027 and Rule 2.2.8 requiring the signatures of operators on receipt of operational bulletins. This is of particular importance because operational bulletins frequently deal with safety issues, and the bulletins become operating rules. Operators currently sign for their Rulebooks and should also be required to sign for operation bulletins (SY.PR.027).	33
37	SFMTA MUNI should follow its Track Inspection and Maintenance SOP and allocate adequate resources (time, equipment, and number of workers) to inspect and maintain its tracks (R.TR.PR.001).	34
38	SFMTA MUNI should ensure that track defects are properly identified and corrected according to the priority rating as described in the SFMTA MUNI standards (R.TR.PR.001).	34
39	SFMTA MUNI should ensure that defects found during inspections are properly documented on work orders (L.PR.017).	35
40	SFMTA MUNI should adhere to its procedure L.PR.017, Section 4.2. Prior to performing preventive maintenance and inspections, work history reports should be compiled and reviewed using the readily available database (L.PR.017).	36
41	SFMTA MUNI should ensure that preventive maintenance and inspections occur at the proper mileage or time intervals per SOP L.PR.017.	36

No.	Recommendation	Checklist No.
42	SFMTA MUNI should ensure that the mileage and time information logged into its records for preventive maintenance and inspections is accurate and consistent (L.PR.017).	36
43	SFMTA MUNI should ensure that operators consistently submit the cable car defect cards to the cable car maintenance department for follow-up maintenance (CC.RR.001).	37
44	SFMTA MUNI Health and Safety Department should be involved in all corrective actions resulting from the safety data acquisition and trend analysis (SSPP and SY.PR.037).	42
45	SFMTA MUNI should include interagency coordination as an element of its internal safety audit program (SY.PR.036).	43
46	SFMTA MUNI should finalize, adopt, and implement its Contractor Safety Program SOP (SSPP Sections 4.16.4 & 4.18.2). Subsequent to this audit, per the e-mail dated December 4, 2008, sent by SFMTA MUNI's Health & Safety Manager, the SFMTA MUNI's Rules & Procedures Committee (RPC) approved the revised Contractor Safety Program SOP on December 1, 2008 (SSPP Sections 4.16.4 & 4.18.2).	44
47	SFMTA MUNI should complete and submit its Contractor Safety Program ISA at a minimum of once every three years per GO 164-D and SFMTA MUNI SSPP Section 4.12.	44
48	Although main responsibility of structural integrity of the bridge may lie with another agency such as Caltrans, SFMTA MUNI should take the responsibility of the oversight of the PM program and relevant documentation. SFMTA MUNI should accordingly develop a new standard operating procedure (SOP) mentioning the responsibility of preventive maintenance (PM) lying with another agency and SFMTA MUNI's role as providing an oversight of the PM of the structures including bridges (PU Code 29047).	49
49	SFMTA MUNI should conduct an Operational Hazard Analysis (OHA) whenever a hazard is first identified and assign a risk index to that hazard. If found necessary, SFMTA MUNI should develop a corrective action plan to mitigate identified hazards in accordance with the SSPP (SY.PR.033).	51

APPENDIX D

2008 SFMTA MUNI TRIENNIAL REVIEW CHECKLISTS

2008 CPUC SYSTEM SAFETY AUDIT CHECKLIST FOR SAN FRANCISCO MUNICIPAL RAILWAY

Checklist	**01**	**Metro Track Inspection**	
Date of Audit	**October 7 - 9, 2008**	Department	**Track & Signal Maintenance**
Reviewers / Inspectors	**Brian Dales**	Persons Contacted	**Tom Kennedy, Wai Tom, Michael Kirchanski**

REFERENCE CRITERIA

1. SFMTA MUNI System Safety Program Plan Section 4.14
2. CPUC General Order 164 Series
3. CPUC General Order 143-B, Section 14.05
4. SFMTA MUNI Track Maintenance and Inspection SOP, R.TR.PR 0.001

ELEMENT, CHARACTERISTICS, AND METHOD OF VERIFICATION

Metro Track Inspection

1. CPUC staff shall review and evaluate SFMTA MUNI's track maintenance program and track maintenance standards.
2. CPUC staff shall select and inspect a representative sample of surface and subway mainline turnouts, as well as curved and tangent sections of track. This will include subway, tunnel, and surface track.
3. CPUC staff shall select and inspect a representative sample of yard turnouts, as well as curved and tangent sections of track. Yard inspections will include: (1) Green Division, (2) Duboce (Mint) Yard, and (3) the new SFMTA MUNI Metro East (MME) facility.

ACTIVITIES, FINDINGS, AND RECOMMENDATIONS

Activities and Findings:

CPUC Staff conducted inspections of a number of sites throughout the SFMTA MUNI system. The following provides the activity/findings for each site followed by recommendations.

1. West Portal Station and the Tunnel

On October 7, 2008 the CPUC inspection team accompanied by SFMTA MUNI personnel started the inspection of the subway tunnel between West Portal Station and Control Point MMT1. This inspection included both inbound and outbound tracks along with 14 switches. The following defective conditions do not comply with the SFMTA MUNI Track Inspection and Maintenance SOP:

- Inbound track at marker 614, excessive flange depth allowing tread contact at the frog of Castro crossover switch C1B.
- Inbound track at marker 504, insecure heel block assembly created by excessively loose heel block bolts at Van Ness crossover switch V1B.
- Outbound track at marker 504, worn switch components allowing outer edge of wheel tread contacting gage side of stock rail and excessive metal flow at contact point of switch point and stock rail creating improper switch closure at Van Ness crossover switch V3B and spur track switch V9.
- Inbound track at marker 102, excessive flange depth allowing tread contact at the frog of Embarcadero crossover switch E3A. Insecure guard rail fastenings creating rail mismatch on crossover between E3A (inbound) and E3B (outbound) switches.
- Inbound track at marker ten, worn rail through curve contributing to excessive gage through curve between Embarcadero crossover and MMT1 control point.
- Near pocket track at marker nine, improper fit between switch point and stock rail created by new switch point installed against worn stock rail.

2. Saint Francis Circle to Stonestown Station (M line)

On October 8, 2008, a track compliance inspection was conducted by CPUC and SFMTA MUNI personnel of the surface tracks between the Saint Francis and Stonestown Stations. This inspection included both inbound and outbound tracks along with two switches at the beginning of the K line at Saint Francis control point. The following defective conditions do not comply with the SFMTA MUNI Track Inspection and Maintenance SOP:

- Outbound track at 19th Avenue and Rossmoor Drive grade crossing, center cracked or broken compromise joint bar.
- Outbound track at West St. Francis grade crossing, worn rail through curve contributing to excessive gage through curve on approach to road crossing.
- Both inbound and outbound track switches at St. Francis control point, excessive flange depth allowing tread contact at the frogs and track gage in excess of maximum SOP standards through turnouts (beginning K line).

- Inbound track at 19th Avenue and Eucalyptus Drive grade crossing, center cracked or broken compromise joint bar (two occurrences).

3. Sunset Tunnel (N line)

On October 8, 2008, a track compliance inspection was conducted by CPUC staff and SFMTA MUNI personnel of the surface and subway tracks on the approach and through the Sunset Tunnel. The following defective conditions do not comply with the SFMTA MUNI Track Inspection and Maintenance SOP:

- Both inbound and outbound tracks on both portal approaches to Sunset Tunnel show worn rail through curve contributing to excessive gage through curve on tunnel approaches.

4. 3rd Street freight crossings (T line)

On October 9, 2008, a track inspection was conducted by CPUC staff and SFMTA MUNI personnel of the freight crossings with Union Pacific Railroad and BNSF Railway on the 3rd Street line at the Carroll Way and Cargo Way grade crossings.

- All tracks entering interlocking comply with the minimum standards in the FRA Track Safety Standards Part 213 and the SFMTA MUNI Track Inspection and Maintenance SOP.

5. MME Facility (T line)

On October 9, 2008, an inspection of the MME facility was conducted by CPUC staff and SFMTA MUNI personnel.

- All tracks inspected comply with the minimum standards in the SFMTA MUNI Track Inspection and Maintenance SOP.

6. Church Street and Duboce Avenue

On October 9, 2008, CPUC staff conducted an inspection of the control point at Church Street and Duboce Avenue with SFMTA MUNI personnel. The following defective conditions do not comply with the SFMTA MUNI Track Inspection and Maintenance SOP:

All switches within the control point are beyond worn and do not comply with the following:

- Track gage beyond allowable through curves and turnouts.
- Switch stands not operating as intended.
- Worn rail through curves and turnouts contributing to excessive gage.
- Excessive flange depth allowing tread contact at the frogs.
- Switch components worn beyond maintainable conditions.
- Surface variations contributing to poor ride quality although within SOP standards.

7. Green Yard Facility

On the afternoon of October 9, 2008, CPUC staff conducted an inspection of the Green mechanical yard facility with SFMTA MUNI personnel. The following defective conditions do not comply with the SFMTA MUNI Track Inspection and Maintenance SOP.

- The majority of the switch leads are worn beyond allowable and do not comply with the following:
  - Track gage beyond allowable through curves and turnouts.
  - Worn rail through curves and turnouts contributing to excessive gage.
  - Excessive flange depth allowing tread contact at the frogs.
  - Switch components worn beyond maintainable conditions.

Recommendations:

1. SFMTA MUNI inspectors and foremen should inspect and maintain the track to the standards as outlined in SOP. Track that does not meet the minimum standards should be repaired or removed from service by SFMTA MUNI until safe operation is ensured (R.TR.PR.001).
2. SFMTA MUNI should develop a plan to conduct thorough and regular inspections of all the track components with a plan to repair all defects identified. Ultrasonic testing of the entire system should be conducted annually (GO 143-B Rule 14.05).

2008 CPUC SYSTEM SAFETY AUDIT CHECKLIST FOR SAN FRANCISCO MUNICIPAL RAILWAY

Checklist	02	Cable Car Track Inspection	
Date of Audit	**October 9 - 10, 2008**	Department	**Cable Car Track Maintenance**
Reviewers / Inspectors	**Brian Dales**	Persons Contacted	**John Sadorra, John Baker, Chris Hill, Fred Orantes**

REFERENCE CRITERIA

1. SFMTA MUNI System Safety Program Plan Section 4.15
2. CPUC General Order 164 Series
3. SFMTA MUNI Cable Car Track Maintenance and Inspection SOP C.PR. 0.002

ELEMENT, CHARACTERISTICS, AND METHOD OF VERIFICATION

Cable Car Track Inspection

1. CPUC staff shall review and evaluate SFMTA MUNI's cable car track maintenance program and track maintenance standards.
2. CPUC staff shall select and inspect a representative sample of mainline turnouts as well as curved and tangent sections of track.

ACTIVITIES, FINDINGS, AND RECOMMENDATIONS

Activities and Findings:

CPUC Staff conducted an inspection of cable car track and turnouts along with interview of cable car track maintenance personnel.

Track inspection and track maintenance personnel were knowledgeable and competent. No track non-compliances were noted during field inspection.

Recommendations:

None.

2008 CPUC SYSTEM SAFETY AUDIT CHECKLIST FOR SAN FRANCISCO MUNICIPAL RAILWAY

Checklist	03	LRV Inspection	
Date of Audit	**October 16, 2008 & October 24, 2008**	Department	**SFMTA MUNI Metro Vehicle Maintenance**
Reviewers / Inspectors	**Chris Ducote, Arun Mehta**	Persons Contacted	**John Sadorra, Larry Freed, Carol Wolther, Marcie Deerfield, Fred Orantes**

REFERENCE CRITERIA

1. SFMTA MUNI System Safety Program Plan Section 4.15
2. CPUC General Order 143-B, Sections 3, 4, 5, 6, and 14.04
3. CPUC General Order 164 Series
4. SFMTA MUNI Rail Vehicle Preventive Maintenance & Inspection Scheduling L.PR.017

ELEMENT, CHARACTERISTICS, AND METHOD OF VERIFICATION

LRV Inspection

Utilizing the services of CPUC/FRA qualified inspector from the Commission's Railroad Operations Safety Branch:

1. Review and evaluate the adequacy of SFMTA MUNI's LRV maintenance program.
2. CPUC staff shall select a representative sample of LRVs and inspect from the following components for compliance with maintenance requirements:
   a) Propulsion controller assemblies and components
   b) Traction motors
   c) Truck, axle, and wheel assemblies
   d) Brake systems
   e) Lighting
   f) Coupler and drawbar assemblies
   g) Passenger doors and step assemblies
   h) Passenger component and safety appliances
   i) Operator cab and appurtenances
   j) Pantograph assemblies and related traction power components, and;
   k) Public address and intercom systems.

ACTIVITIES, FINDINGS, AND RECOMMENDATIONS

Activities and Findings:

On October 16, and 24, 2008, CPUC staff performed a mechanical inspection, on the SFMTA MUNI LRV Breda cars. Staff conducted the inspection on two separate dates as more time was needed. Staff started this inspection with records check of the LRV's in the process of their Preventive Maintenance Inspection (PMI)'s. The records revealed that SFMTA MUNI was deferring sections of the PMI from the Geneva shops to the Green Yard shops. Furthermore, SFMTA MUNI was not recording deferred maintenance on the original PMI sheets. At this point, staff talked to the PMI supervisor at the Geneva shops and asked him to develop an action plan to correct this oversight and that staff would return to finish the LRV inspection when the plan was developed.

On October 24, 2008 Chris Ducote (staff) returned to continue and finish the inspection of the cars and to find out what action plan SFMTA MUNI will pursue to remedy the above problem of deferred maintenance with the PMI records.

For the problem with the records, John Sadorra, Manager of Maintenance, has issued a letter saying that SFMTA MUNI is in the process of correcting this systemic oversight. The letter also states that SFMTA MUNI's own internal safety reviewers also recommended a change to this same non-compliance in its records.

For the mechanical inspection, staff inspected Breda cars 1515 and the 1501, both in for ten kilometer mileage inspections, with no major defects to report.

Recommendations:

None.

2008 CPUC SYSTEM SAFETY AUDIT CHECKLIST FOR SAN FRANCISCO MUNICIPAL RAILWAY

Checklist	04	Historic Streetcar Inspection	
Date of Audit	**October 16, 2008 & October 24, 2008**	Department	**Geneva Vehicle Maintenance**
Reviewers / Inspectors	**Chris Ducote, Arun Mehta**	Persons Contacted	**Karl Johnson, Fred Orantes**

REFERENCE CRITERIA

1. SFMTA MUNI System Safety Program Plan Section 4.15
2. CPUC General Order 143-B, Sections 8 and 14.04
3. CPUC General Order 164 Series
4. SFMTA MUNI Rail Vehicle Preventative Maintenance and Scheduling L.PR.017

ELEMENT, CHARACTERISTICS, AND METHOD OF VERIFICATION

Historic Streetcar Inspection

Utilizing the services of CPUC/FRA qualified inspector from the Commission's Railroad Operations Safety Branch:

1. Review and evaluate the adequacy of SFMTA MUNI's Historic Streetcar maintenance program.
2. CPUC staff shall select a representative sample of Historic Streetcars (air cars and PCCs) and inspect from the following components for compliance with maintenance requirements:
   a) Propulsion controller assemblies and components
   b) Traction motors
   c) Truck, axle, and wheel assemblies
   d) Brake systems
   e) Lighting
   f) Coupler and drawbar assemblies
   g) Passenger doors and step assemblies
   h) Passenger component and safety appliances
   i) Operator cab and appurtenances, and;
   j) Trolley pole assemblies and related traction power components.

ACTIVITIES, FINDINGS, AND RECOMMENDATIONS

Activities and Findings:

On October 16, 2008, CPUC staff Chris Ducote assisted by Arun Mehta performed a mechanical inspection on the SFMTA MUNI Historic Streetcars. Staff returned on October 24, 2008, to finish the inspection.

Staff inspected Milan cars #1811, 1893 and 288.

Milan car #1811 was in the shop for its scheduled "A" PMI inspection. Staff found no major deviations or defects with the exception of the air compressor governor relay contact being burnt below the contact point. Staff then inspected the next car #288 (known as the Boat). This car was not scheduled for a PMI but was in the shop for storage and some minor modifications. Staff found some minor fraying of the HV throttle and braking resistor cable on this car. Staff also found the brake adjustment on the #1 brake to be at the limit of its travel and with no room for any more adjustment.

Staff then inspected car #1893. This car was outside the shop and on the ready tracks. The main purpose of inspecting this car was to see the condition of the air compressor governor relay contact. It was found to be in good shape and no side defects were found.

Recommendations:

None.

2008 CPUC SYSTEM SAFETY AUDIT CHECKLIST FOR SAN FRANCISCO MUNICIPAL RAILWAY

Checklist	**05**	**Cable Car Inspection**	
Date of Audit	**October 14, 2008, October 16, 2008, & October 24, 2008**	Department	**Cable Car Vehicle Maintenance**
Reviewers / Inspectors	**Chris Ducote, Arun Mehta**	Persons Contacted	**Patrick Ho, Frank Camilleri Tom Hidayat, Fred Orantes**

REFERENCE CRITERIA

1. SFMTA MUNI System Safety Program Plan Section 4.15
2. CPUC General Order 164 Series
3. SFMTA MUNI Cable Car Preventative Maintenance Inspection Schedules C.PR.0.001
4. SFMTA MUNI Cable Car Defect Card Procedure C.PR.001

ELEMENT, CHARACTERISTICS, AND METHOD OF VERIFICATION

Cable Car Inspection

1. Review and evaluate the adequacy of SFMTA MUNI's cable car maintenance program.
2. CPUC staff shall select a representative sample of at least four cable cars and inspect from the following list of components for compliance with minimum maintenance requirements:
   a. Grip Assembly;
   b. Truck, slewing, axle and wheel assemblies;
   c. Friction, track and slot braking systems;
   d. Lighting;
   e. Coupler and drawbar assemblies;
   f. Stanchions, and;
   g. Glazing and doors.

ACTIVITIES, FINDINGS, AND RECOMMENDATIONS

Activities and Findings:

On October 14, 16 and 24, 2008, CPUC staff performed a mechanical inspection on the SFMTA

MUNI cable car shops (known as the cable car barn). In the repair facility staff inspected three cars: car #59 (California Line Car), car #3 (Powell Street Line) and car #18 (Powell Street Line). The inspection included the following components: Grip Assembly; Truck, slewing, axle and wheel assemblies; Friction-track and slot braking systems; Lighting; Coupler and drawbar assemblies; Stanchions; Glazing and doors.

Car #59 was in the shop for its scheduled "B" PMI. Following SFMTA MUNI's PMI checklist (Document Number CC.CK.001.A) staff found that they performed all the inspections with no major exceptions.

Car #3 was in the shop for a scheduled "A" PMI inspection. Following SFMTA MUNI's PMI checklist (Document Number CC.CK.001.A) staff found that they had performed all the inspections with only one exception. Staff found that a bolt on the truck side which holds the journal support was missing on the R-2.

Car #18 was in the shop for other repairs and was not scheduled for a PMI. Staff inspected this car and found no major defects.

Overall, the cable car division is following its newly adopted "SOPs". The only area of recommendation, also made during the October 2005 Triennial Audit inspection, is for SFMTA MUNI Cable Car Division to adopt standards for measuring and gauging car components for safe functional limits (i.e. wheel wear, brake shoe wear, side bearing clearance, journal and journal bearing wear).

Recommendations:

1. SFMTA MUNI Cable Car Division should adopt standards to measure and gauge car components for safe functional limits (i.e. wheel wear, brake shoe wear, side bearing clearance, journal and journal bearing wear, etc.) to ensure uniform maintenance criteria/standards (SSPP Section 4.14).

2008 CPUC SYSTEM SAFETY AUDIT CHECKLIST FOR SAN FRANCISCO MUNICIPAL RAILWAY

Checklist	06	Train Control & Signal Inspection	
Date of Audit	**October 7 - 10, 2008**	Department	**SFMTA MUNI Track & Signal**
Reviewers / Inspectors	**Sherman Boyd**	Persons Contacted	**Tom Kennedy, Wai Tom**

REFERENCE CRITERIA

1. SFMTA MUNI System Safety Program Plan Section 4.15
2. CPUC General Order 143-B, Section 7.06
3. CPUC General Order 164 Series
4. SFMTA MUNI Automatic Train Control System Wayside Equipment Maintenance R.SM.0.026
5. SFMTA MUNI Highway –Railroad Grade Crossing Interlocking Inspection & Maintenance R.SM.027
6. SFMTA MUNI Vital Relays Testing R.SM.PR.0.019
7. SFMTA MUNI Metro Vehicle Tagging System (VETAG) Preventative Maintenance R. SM.PR. 0.029
8. ATCS Station Controller Subsystem Preventive Maintenance R.SM.PR.007
9. ATCS Wayside Uninterruptible Power Supply (UPS) Unit Preventive Maintenance R.SM.PR.002
10. Rail Transit Track Switch Control & Signal Interlocking (Surface Streets) R.SM.PR.017

ELEMENT, CHARACTERISTICS, AND METHOD OF VERIFICATION

Train Control & Signal Inspection

1. Review and evaluate the adequacy of SFMTA MUNI's train control and signal maintenance program and standards.
2. Perform detailed inspections of surface and subway mainline train control and signal systems and components selected by CPUC staff.

ACTIVITIES, FINDINGS, AND RECOMMENDATIONS

Activities and Findings:

CPUC Staff conducted inspections of the SFMTA MUNI system at a number of sites.

1. West Portal Station and the Tunnel: On October 7, 2008, the CPUC inspection team accompanied by SFMTA MUNI personnel started the inspection at the West Portal Station and continued into the tunnel. Staff inspected four power switches, 22 insulated joints and 12 signals, with no exceptions taken. While performing the inspection on switches, staff also inspected the track bonding as well. Staff found two broken track bonds and pointed these out to the SFMTA MUNI personnel. One of the bonds was for a regular joint and one was a cross bond that electrically connects two separate rails together. These bonds were on the crossover at Van Ness on switch V9. SFMTA MUNI does not have a Standard Operating Procedure (SOP) for routine bond inspections. SFMTA MUNI should develop a bonding standard for regular rail joints and for switches.

2. Fourth & King Interlocking: On October 7, 2008, staff performed an inspection at the interlocking at 4th Street and King Street.

This is a complicated interlocking with signals for various routes (N- and T-Lines). SFMTA MUNI should review the software program for this route and determine whether another priority, such as first-come, first-serve, may help alleviate unsafe conditions such as passengers pulling the emergency cord and darting out into traffic to get to the Caltrain station. LRV operators should understand how this interlocking works to avoid complications in operations.

Not all signals at this intersection are clearly identified. Additionally, some signals are undergoing repair and are bagged. These repairs should receive top priority to return all signals back to a functional state or be removed completely to eliminate confusion and congestion of the signals at this interlocking.

3. MME facility: On October 8, 2008, the CPUC inspection team accompanied by SFMTA MUNI personnel performed an inspection of the signal system and test procedures at the SFMTA MUNI Metro East Light Rail Maintenance & Operations Facility (MME). There are two separate interlockings incorporated into this facility. Staff reviewed the System Integration Test Procedures for both interlockings and found these to be thorough and easy to understand.

During the review of the test procedures (for safety certification), staff noted that SFMTA MUNI did not test and verify the individual track circuits using 0.06 ohm track shunt (SOP # R.SM.PR.027,

page 35, "…Confirm that each freight track detection circuit shall detect the application of a shunt of 0.06 ohm resistance when the shunt is connected across the track rails of any part of the circuit (234.229)"). This is a very important test and further SFMTA MUNI's SOP for track circuits requires the use of this shunt for testing purposes.

The test procedures were written by SFMTA MUNI's Construction Engineering Department personnel and tests were performed in conjunction with the installing contractor personnel. These test procedures were signed off by SFMTA MUNI's Construction Engineering Department and the contractor but not by SFMTA MUNI's Operations, Signal Maintenance or Safety group. Both interlockings are currently in service and are being used daily. CPUC staff was informed by the Signals Maintenance Supervisor, who has maintenance responsibility over the interlocking, that he did not yet have keys for the instrument cases.

At both interlockings at the MME facility, staff identified safety concerns in the design. Both interlockings have tracks that cross intersections with traffic signals where the signals used for train control are interconnected with the traffic signals. Movements of the LRVs are controlled by train signals going into and out of the facility. When an LRV enters or departs the facility, a route request must be entered while the LRV occupies either the section over a VETAG Loop or a track circuit. The proceed signal for the LRV is actually controlled by the DPT (traffic signal controller) and is given only after the traffic signals controlling vehicle movement across the intersection are red. The traffic signals are an essential element of the system, helping to prevent collisions between LRVs and motorists. Once the LRVs are given a proceed signal they have 45 seconds to complete the movement across the intersection. After 45 seconds have expired, the request times out and the traffic signals go back to normal operation. If for some reason the LRV does not clear the intersection, a green traffic signal will be displayed for oncoming motor vehicle traffic through the intersection. This time-out feature could lead to a collision between an LRV and a motor vehicle. Both intersections carry a high volume of industrial traffic.

At both locations of the MME facility, where the tracks cross at grade with Illinois Street there are traffic signals. CPUC staff observed industrial truck traffic making right turns on red signals onto the adjacent streets paralleling the tracks. In most instances the trucks fouled the tracks. This could lead to a collision between motor vehicles and LRVs.

SFMTA MUNI staff should contact and work with CPUC crossing staff to conduct a hazard analysis of the crossing and evaluate the benefit/option of posting "No Right Turn" signs where needed. "No turn on red" signs should be considered even where there are two traffic lanes. SFMTA MUNI should incorporate the necessary track circuits into the circuit design to prevent the timing out of the traffic control circuits while a LRV is in the intersection. The necessary track circuits and relays already exist. This would prevent the traffic signals from displaying green

signals to oncoming traffic to prevent a collision. In fact all signals across the intersection should remain red and all traffic prevented from entering the intersection until the LRV is clear of the intersection.

Recommendations:

1. SFMTA MUNI should develop an SOP for the inspection of track bonds on a regular basis. SFMTA MUNI also should develop standards for bonding on switches and non-insulated track joints (SSPP Section 4.14).
2. SFMTA MUNI should undertake the following steps to improve the operation of the MME Facility (SSPP Section 4.14):
    a. SFMTA MUNI's SOP for track circuits requires the use of 0.06 ohm track shunt for testing purposes. Therefore, SFMTA MUNI should conduct this additional testing of MME signals to ensure safe operation of the signals (SOP # R.SM.PR.027, page 35).
    b. SFMTA MUNI staff should contact and work with CPUC crossing staff to conduct a hazard analysis of the crossing and evaluate the benefit/option of posting "No Right Turn" signs where needed. "No turn on red" signs should be considered even where there are two traffic lanes.

2008 CPUC SYSTEM SAFETY AUDIT CHECKLIST FOR SAN FRANCISCO MUNICIPAL RAILWAY

Checklist	07	Overhead Catenary System Inspections and Records	
Date of Audit	**Oct 21, 2008**	Department	**Overhead Lines Department**
Reviewers / Inspectors	**Vincent Kwong, Dennis Lee, Colleen Sullivan**	Persons Contacted	**Ted Aranas, Rich Hahn, Tim Lipps, Daniel Murphy**

REFERENCE CRITERIA

1. SFMTA MUNI System Safety Program Plan Section 4.14.2
2. CPUC General Order 164-D
3. CPUC General Order 95
4. CPUC Resolution E-1492 Authorizing Deviation from Rule 37 of General Order 95
5. SFMTA MUNI Inspection of Overhead Lines OL.PR.0.008

ELEMENT, CHARACTERISTICS, AND METHOD OF VERIFICATION

Overhead Catenary System Inspections and Records

1. Using the services of a CPUC qualified GO 95 inspector:
   a) Select at least four different locations on at least three different SFMTA MUNI Metro surface operating lines and inspect at least .25 miles of Overhead Catenary System (OCS) lines at each location for compliance with the requirements of GO 95 and;
   b) Select at least four different SFMTA MUNI Metro subway stations and inspect the OCS lines running through each of those stations' passenger platform areas for compliance with the requirements of GO 95.
2. Determine the status of 2005 Audit Recommendation 5, which states: "MUNI should inspect its entire system, resolve the types of GO 95 violations noted in Checklist 7, and bring the system into compliance with Commission requirements."

ACTIVITIES, FINDINGS, AND RECOMMENDATIONS

Activities and Findings:

The following locations were inspected for GO 95 Compliance:

- N Line – Irving Street and 9th Avenue to Judah Street and 10th Avenue

- N Line – Judah Street from 30th Avenue to 32nd Avenue
- N Line – Judah Street from La Playa Avenue to 47th Avenue
- L Line – Taraval Street from 47th Avenue to 46th Avenue
- L Line – Taraval Street from Sunset Blvd to 36th Avenue
- L Line – Ulloa Street from Wawona Street to West Portal Avenue and Vicente Street
- M and K and L Line – West Portal Station
- M and K Line – St. Francis Circle
- K Line – Ocean Ave from Plymouth Ave to Granada Avenue
- T Line – around 25th Street and 3rd Street
- F Line – The Embarcadero from Folsom Street to Don Chee Way and Steuart Street
- F Line – Jones Street and Jefferson Street to Beach Street
- F Line – Market Street and 16th Street

GO 95 Rule 77.6A states – One insulator (preferably of the interlocking strain type) shall be placed in the span wire between four feet and five feet (measured along the span wire) from each hanger or point of support of the trolley contact conductor and its appurtenances which have electrical contact therewith.

A second insulator (preferably of the interlocking strain type) shall be placed in the span wire not less than six feet and not more than nine feet from the pole or structure.

The separation between the first and second insulators shall be at least four feet wherever practicable but where the distance between the pole or structure and the trolley contact conductor is less than 14 feet, the second insulator shall be not less than 15 inches from the surface of the pole or structure and outside of the climbing and work spaces.

Where the span wire is attached to a building, the second insulator shall be not less than three feet from the building.

Staff found the following GO 95 violations:

1. Out of running contact wire over shoofly turnout at 30th Ave between Judah Street and Irving Street
2. 2 span wires at the southeast corner of 25th Street and 3rd Street. (less than four feet from contact wire)

GO 95 Rule 37 – Resolution No. E-1492 – Resolution No. E-1492 authorized SFMTA MUNI to deviate from GO 95 Rule 37 to lower its trolley contact lines and span wires from the minimum 19 feet to 17 feet vertical ground clearance over the areas described in GO 95, Rule 37 – Table 1, Cases

2, 3, 4, and 5 on the J, L, M, and N light rail vehicle (LRV) lines.

Staff found violations at the following locations:

1. Irving Street and 8th Avenue (16 feet 10 inches)
2. Judah Street and 30th Avenue (16 feet 7 inches)
3. Judah Street and 31st Avenue (16 feet)
4. Taraval Street and 47th Avenue (15 feet 9 inches)

GO 95 Rule 37 – Table 1, Case No. 13, C states – Trolley contact lines shall have a radial clearance of 18 inches from tree branches or foliage.

Staff found violations at the following locations:

1. Two palm trees southbound side across from 291 Embarcadero Street
2. Two palm trees northbound side across from 188 Embarcadero Street
3. One palm tree northbound side across from 101 Embarcadero Street

The Overhead Lines Department Supervisor immediately requested that the crewmen correct the following violations:

Locations:

1. Out of running contact wire over shoofly turnout at 30th Ave between Judah Street and Irving Street
2. Irving Street and 8th Avenue (16 feet 10 inches)
3. Judah Street and 30th Avenue (16 feet 7 inches)
4. Judah Street and 31st Avenue (16 feet)

Recommendations:

1. SFMTA MUNI should not only raise the OCS at the locations identified to meet the minimum height of 17 ft requirement as stated in CPUC Resolution # E-1492, but also inspect the remaining system to ensure OCS height compliance per GO 95, Rule 37.
2. SFMTA MUNI should survey the entire system and develop a vegetation management plan to mitigate vegetation overgrowth conditions, as required under GO 95 Rule 35 - Table 1.

2008 CPUC SYSTEM SAFETY AUDIT CHECKLIST FOR SAN FRANCISCO MUNICIPAL RAILWAY

Checklist	08	Authority and Responsibility for System Safety Program	
Date of Audit	**October 21, 2008**	Department	**Service Delivery & Safety**
Reviewers / Inspectors	**Steve Espinal, Arun Mehta**	Persons Contacted	**Antonio Parra, Michael Kirchanski**

REFERENCE CRITERIA

1. SFMTA MUNI System Safety Program Plan
2. Commission Resolution ST-82
3. Attachment A to Resolution ST-82 (Checklists)
4. 2005 CPUC System Safety Audit for San Francisco Municipal Railway
5. CPUC General Order 164 Series
6. 49 CFR Part 659

ELEMENT, CHARACTERISTICS, AND METHOD OF VERIFICATION

Authority and Responsibility for System Safety Program

Interview appropriate senior executives of the San Francisco Municipal Transportation Agency concerning the scope and level of administrative involvement, coordination, and communication exercised in the implementation of corrective actions required by the Commission following the 2005 CPUC system safety audit:

1. Review compliance with the Commission's hours of service requirements.
2. Review compliance with submitting accident reports to CPUC within 60 days. In the event the report cannot be furnished in this time frame, updates should be provided every 30 days.
3. Review compliance with contractor safety program.
4. Review compliance of the Operations Safety Review Committee.
5. Review compliance with On Track & Trackside Safety Program.

ACTIVITIES, FINDINGS, AND RECOMMENDATIONS

Activities and Findings:

CPUC staff interviewed SFMTA MUNI Manager of Health & Safety (H&S) and SFMTA MUNI Director of Security, Safety and Enforcement, who attended the review only part of the time.

The H& S Manager provided a brief history of the CPUC triennial audits starting in 1999 and the formation of the Operations Safety Review Committee (OSRC) in 2000 which was later transformed into what is today known as the Safety Review Committee (SRC). It is this committee which tracks and implements the corrective action plans (CAPs) prepared in response to the CPUC triennial audit recommendations. SFMTA MUNI Chief Operating Officer is the chairperson of this committee and responsible for the implementation of the 2005 audit CAPs. SFMTA MUNI Director of Security, Safety and Enforcement will be responsible for the CAPs resulting from the 2008 triennial audit.

Progress of the CAPs from 2005 audit was discussed. According to Mr. Kirchanski, only two out of the 43 corrective action items remain open; these being: (1) Rulebook update – this is going through major revisions and should be done before the year-end; and (2) contractor safety SOP - incorporation of a clause for the contractors to abide by SFMTA MUNI safety protocol at a minimum in the contracts bid, is being negotiated with the city attorney's department.

Following are the findings from the review:

1) Starting in 2008, SFMTA MUNI H&S department is striving to provide accident investigation reports to CPUC staff within the 60-days period. Exceptions were noted by the CPUC staff where not only the 60-day requirement was not met, but the 30-day follow up status reporting requirements were also not met for prolonged periods. SFMTA MUNI agreed with these exceptions noting that they resulted from being understaffed in general and further due to an employee being out on a long term absence. SFMTA MUNI Health and Safety Department appears to be significantly understaffed per its organizational chart. There are two safety staff members on extended leave and six vacancies. There are only six safety employees assigned for all of the bus, rail and internal safety audits.
2) SFMTA MUNI requires all contractors to follow at the minimum contractor safety rules as specified in its standard operating procedure. Contractor safety compliance clause has not been incorporated in the SFMTA MUNI contractor bid document. This is being negotiated with the city attorney. However, SFMTA MUNI requires all the contractors to participate in its safety training before starting on the job. This particular contractor safety program is addressed in more detail in Checklist #46.
3) Operations Safety Review Committee, currently known as the Safety Review Committee (SRC), is not functioning per its SOP and objectives set forth therein. Questioning revealed lack

of participation from the executives at SFMTA MUNI. Staff found that the Executive Director's Safety Committee (EDSC) meetings are not taking place on a regular (quarterly at the minimum) basis as intended per the SOP.

4) SFMTA MUNI has a good track and trackside safety program as per its SOPs. They have done significant renovation of the tracks in the tunnels and subway. However, questions on track inspections and repairs, especially of the surface tracks, revealed non-compliances in the inspections and follow-up repairs in their track maintenance program. This finding is covered in more detail in Checklist #1.

Recommendations:

1. SFMTA MUNI has been in violation of providing timely transmittal of "required" documentation for accident investigations to CPUC. SFMTA MUNI must abide by the CPUC requirement in providing the "required" documents in a timely manner. (SSPP Section 3.0).
2. SFMTA MUNI should organize and implement the Safety Review Committee (SRC) according to the SOP # SY.PR.038. SFMTA MUNI should hold the Executive Director's SRC on a regular basis.

2008 CPUC SYSTEM SAFETY AUDIT CHECKLIST FOR SAN FRANCISCO MUNICIPAL RAILWAY

Checklist	09	System Safety Program Plan Administration	
Date of Audit	**October 21, 2008**	Department	**Health & Safety**
Reviewers / Inspectors	**Steve Espinal, Arun Mehta**	Persons Contacted	**Michael Kirchanski, Paul Petersen**

REFERENCE CRITERIA

1. SFMTA MUNI System Safety Program Plan
2. CPUC General Order 164 Series
3. CPUC Resolution ST-82
4. Attachment A to Resolution ST-82 (Checklists)
5. TN MO MN 007 - F-Line Operator Training Manual TN.MO.007
6. TN MO MN 031 - F-Line Milan Streetcar
7. TN MO MN 032 - Presidents Conference Committee (PCC) Historic Streetcar Vehicle Operations
8. TN MO MN 033 - Vintage Historic Streetcars

ELEMENT, CHARACTERISTICS, AND METHOD OF VERIFICATION

System Safety Program Plan Administration

Interview the responsible SFMTA MUNI representatives and review selected records to determine if:

1. Plans for the System Safety Program has been reviewed and, if necessary, updated or in the process of being updated.
2. Rules, procedures, reference manuals, training manuals and other documents have been periodically reviewed and updated.
3. Consistent and objective criteria have been adopted and implemented in order to determine the need for an update.
4. The Rules & Instructions Handbook has been periodically reviewed and updated.

ACTIVITIES, FINDINGS, AND RECOMMENDATIONS

Activities and Findings:

CPUC staff interviewed SFMTA MUNI Manager of Health & Safety (H&S) and SFMTA MUNI Manager of Training.

Following are the findings.

1) The F-Line Training Manual has been updated and signed by John Byrd on 10/1/08.
2) SFMTA MUNI has not yet completed revision of its rule book for operating a light rail vehicle. Management is in the process of revising and completing the rule book for light rail vehicles. The previous version combined the rail and rubber tire vehicle in one rule book. SFMTA MUNI does not have consistency in the design and operation of signals through its system. SFMTA MUNI's H&S Manager will send staff a draft of what factors are being considered for the revisions in the rule book and a date for the final revision. The current version of the rule book dates back to 2001 and has been out of compliance for many years including the last 2005 CPUC triennial audit.
3) SFMTA MUNI has completed revisions of 119 standard operating procedures (SOP). Twenty-five SOPs are in the process of being completed.
4) The current version of the SSPP does not include references to the SOPs such as the Train Operator Compliance Program SOP and the Procurement SOP, in the relevant sections of the SSPP.

Recommendations:

1. SFMTA MUNI should complete the revision of the Operators Rule Book for its light rail vehicles. SFMTA MUNI should review and revise its rule book every three years as outlined in the Configuration Management SOP (A.PR.002).
2. SFMTA MUNI should review and revise SOPs to make them current per the scheduled review dates mentioned in the SOPs. Future revisions of the SSPP should incorporate references to the revised SOPS such as the Train Operator Compliance Program SOP and the Procurement SOP, in the relevant sections of the SSPP.

2008 CPUC SYSTEM SAFETY AUDIT CHECKLIST FOR SAN FRANCISCO MUNICIPAL RAILWAY

Checklist	**10**	**Accident and Incident Reporting and Investigation**	
Date of Audit	**October 22, 2008**	Department	**System Safety**
Reviewers / Inspectors	**Rupa Shitole, Steve Espinal, Arun Mehta, Colleen Sullivan**	Persons Contacted	**Michael Kirchanski, Mary Ellen O'Brien, Jim Kelly**

REFERENCE CRITERIA

1. SFMTA MUNI System Safety Program Plan Section 4.8
2. Code of Federal Regulations, CFR 49 Parts 659.33 Accident notification, 659.35 Investigations, and 659.37 Corrective action plans
3. CPUC General Order 164-C (effective until May 2, 2007)
4. CPUC General Order 164-D (effective May 3, 2007)
5. SFMTA MUNI Accident Incident Investigation & Reporting – All Modes SY.PR.0.044
6. SFMTA MUNI Emergency Notification R.OC.PR.007

ELEMENT, CHARACTERISTICS, AND METHOD OF VERIFICATION

Accident and Incident Reporting and Investigation

Interview the SFMTA MUNI representatives responsible for accident reporting and review at least six immediately reportable incident reports submitted to the CPUC since May 3, 2007 (the effective date of General Order (GO) 164-D) to determine if:

1. SFMTA MUNI reported the accidents to the CPUC within two hours as required by GO 164-D, Section 7.2.
2. The immediately reportable incident reports contained all of the information required by GO 164-D, Section 7.3.
3. SFMTA MUNI filed monthly accident corrective action summary reports as required by GO 164-D, Section 7.6 and Section 9.1(a).
4. The accident investigations were conducted in accordance with the requirements of GO 164-D, Section 8.

ACTIVITIES, FINDINGS, AND RECOMMENDATIONS

Activities and Findings:

Staff interviewed SFMTA MUNI Operation Control Center (OCC) Manager. OCC is the first entity directly involved in incident/accident reporting to staff within the two hours as required by GO 164-D, Section 7.2. The following items were discussed:

1. All SFMTA MUNI accidents/incidents are reported to OCC.
2. OCC notifies staff via fax, telephone, and electronically by sending the accident details in a PDF copy of the Form MTA-R.
3. SFMTA MUNI has tested a new paging system (Send Word Now) and will soon implement it for accident notification.
4. SFMTA MUNI will modify its Form MTA-R slightly, with the approval of staff, in order to improve its accident reporting process.

Staff interviewed SFMTA MUNI Health & Safety Manager and Transit Safe Manager who are directly involved in incident/accident investigation. Staff randomly selected and reviewed the files from the following reportable accident reports since May 3, 2007:

1. LRV vs. Other (Passengers on board) at Castro Station that occurred on August 20, 2007. EZ Form was reviewed that had a Corrective Action Plan (CAP #813). The estimated completion date was January 1, 2008, but the CAP is still open.
2. LRV vs. Pedestrian at Ocean Avenue and Capitol Avenue intersection that occurred on December 28, 2007. The report was not available for review since all the documents from that file were missing.
3. LRV vs. Pedestrian at Judah Street & 28th Avenue intersection that occurred on January 16, 2008. The draft version of the report was reviewed and the report had no CAP.
4. LRV vs. Other (Passengers on board) at Church Street and Duboce Avenue intersection that occurred on March 19, 2008. The EZ Form was reviewed that had the same CAP #813 open that related to the August 20, 2007 incident. The CAP is the same for most incidents but no action has been taken to resolve the ongoing problem.
5. LRV vs. Automobile at Ocean Avenue and Brighton Avenue intersection that occurred on March 28, 2008. The EZ Form was reviewed and it had no CAP.
6. LRV vs. LRV at King Street and 4th Street intersection that occurred on June 14, 2008. The draft report was reviewed and the report had recommendations and the recommendations were closed.
7. Cable Car vs. Other (CC lurching) at Powell Street and California Street that occurred on June 23, 2008. The EZ Form was reviewed and the CAP was closed.

Listed below are the findings from the review:

a. SFMTA MUNI reported all of the above seven accidents to the staff within two hours as required by Section 7.1 of the General Order 164-D. OCC notifies CPUC staff within two hours of its knowledge of reportable accidents and completes Form MTA-R. However, based on the SFMTA MUNI R forms, SFMTA MUNI reported 30 accidents after the two hour reporting window in 2008. This is approximately a 22% non-compliance rate.

b. Some documents were missing from the files of some of the reportable accidents investigated by one of its System Safety investigators. Per SFMTA MUNI personnel, this investigator is on long-term leave of absence and did not return these documents to the accident files.

c. SFMTA MUNI does not submit Final Accident Investigation Reports to staff within 60 calendar days of the occurrence of the accident, as required by Section 8.3e of the General Order 164-D. The other accident investigation activities were in compliance with the reference criteria.

d. SFMTA MUNI does not have consistent documentation of corrective actions in its accident investigation files and its Transit Safe database system for each incident which is reportable under GO 164-D. Staff could not verify if a corrective action plan exists for each System Safety recommendation found in SFMTA MUNI major accident investigation reports.

e. The corrective action plans for some accidents are still uncompleted. (SY.PR.033).

f. SFMTA MUNI has not consistently obtained staff approval for closing accident-related corrective action plans. SFMTA MUNI personnel should notify and verify the CAPs with CPUC staff in compliance with GO 164-D Section 9.

g. SFMTA MUNI personnel indicated that, in the past, the Safety Review Committee approved and tracked corrective action plans in compliance with various SOPs. However, this procedure is not functioning at this time. CPUC staff, therefore, suggests that SFMTA MUNI revise the Safety Review Committee structure and function.

h. SFMTA MUNI Health and Safety Department appears to be significantly understaffed per its organizational chart. There are two safety employees on extended leave and six vacancies. There are only six safety employees for the bus, rail and internal safety audits. The safety department is functioning at approximately 43% strength. This finding has been brought out in Checklist #8 as well and shown as a recommendation.

Recommendations:

1. SFMTA MUNI should report, complete investigations and prepare reports for all open accidents per CPUC GO 164-D Section 8 and SFMTA MUNI Accident Incident Investigation & Reporting – All Modes SY.PR.0.044.
2. SFMTA MUNI should obtain internal approval and implementation agreement on corrective action plans (CAP) from the responsible department managers. The CAP should be entered and tracked in the Transit Safe System (SY.PR.044); upper management should be notified if

CAPs are not closed in a timely manner (SFMTA Accident Incident Investigation & Reporting – All Modes SY.PR.0.044).

3. SFMTA MUNI should develop an approach with staff for verification and closing CAPs for reportable accidents/incidents and update the status of CAPs entered into the Transit Safe System (CPUC GO 164-D Section 9).

Note: The reviewer of this checklist also recommends the revision and implementation of the Safety Review Committee function. However, this recommendation is already reported under Checklist #8 and not shown here to avoid repetition.

2008 CPUC SYSTEM SAFETY AUDIT CHECKLIST FOR SAN FRANCISCO MUNICIPAL RAILWAY

Checklist	11	Internal Safety Audit Program	
Date of Audit	**October 22, 2008**	Department	**System Safety**
Reviewers / Inspectors	**Rupa Shitole, Arun Mehta**	Persons Contacted	**Michael Kirchanski**

REFERENCE CRITERIA

1. SFMTA MUNI System Safety Program Plan Section 4.12
2. CPUC General Order 164 Series
3. SFMTA MUNI Internal Safety Audit Program SY.PR.036
4. SFMTA MUNI 's Audit Schedule 2006-2008

ELEMENT, CHARACTERISTICS, AND METHOD OF VERIFICATION

Internal Safety Audit Program

Interview the SFMTA MUNI representatives responsible for the Internal Safety Audit Program, review the audit procedure, and review the audit reports for the past three years to determine if:

1. Internal safety audits were performed in accordance with the applicable reference criteria.
2. All of the required safety program elements were addressed within the past three years.
3. Corrective action plans and schedules have been prepared, implemented, and tracked.

ACTIVITIES, FINDINGS, AND RECOMMENDATIONS

Activities and Findings:

Staff interviewed the SFMTA MUNI representative in charge of the Internal Safety Audit Program and reviewed the internal safety audit reports for the years 2006, 2007 and 2008 and found the following:

1. SFMTA MUNI prepared a 2006-2008 (three year cycle) schedule of the internal safety audit.
2. Not all of the required System Safety Program Plan (SSPP) elements were covered within the 2006 to 2008 three year audit cycle as required by GO 164-D Section 5. SFMTA MUNI did not audit the first five SSPP elements (Policy Statements & Authority for SSPP, Goals &

Objectives, Overview of Management Structure, SSPP Control and Update Procedure, SSPP Implementation Activities & Responsibilities).

3. The reports did not state reference criteria, but stated audit elements.
4. The review of all the selected checklists showed that they were audited by reviewers who were independent from the first line of supervision responsible for performance of the activity being audited.
5. SFMTA MUNI is responsible for submitting all Internal Safety Reports to staff by February 15th of each year, but it only submitted some Internal Safety Audit reports for the year 2007 to CPUC staff.
6. SFMTA MUNI did not prepare, track, or implement corrective action plan recommendations in a timely manner. For example, the internal safety audit report for track department dated August 14, 2008, had five non-compliances and the corrective action document was missing.
7. SFMTA MUNI did not provide signatures any of the internal safety audit reports even though the corrective action plan forms show them to be completed.
8. Most of the internal safety audit reports were in draft forms and had no final versions available.
9. Monthly reports of the ISA are not being provided to staff as required by SY.PR.036, Section 1.2c.

Recommendations:

1. SFMTA MUNI should follow its SSPP and audit all 21 SSPP elements required by GO 164-D Section 5.
2. SFMTA MUNI should submit all final versions of the internal safety audit reports to staff as required by GO 164-D Section 5.5.
3. SFMTA MUNI should ensure that all ISA CAPs status are recorded adequately in the TransitSafe Program and made available upon demand by CPUC auditors.
4. SFMTA MUNI should provide monthly reports of the ISA to staff as required by SOP SY.PR.036, Section 1.2c.

2008 CPUC SYSTEM SAFETY AUDIT CHECKLIST FOR SAN FRANCISCO MUNICIPAL RAILWAY

Checklist	**12**	**Change Control Management**	
Date of Audit	**October 22, 2008**	Department	**Safety – Configuration Control; Fleet Engineering; Change Control Board**
Reviewers / Inspectors	**Dain Pankratz**	Persons Contacted	**Elson Hao, Mark Goldstein**

REFERENCE CRITERIA

1. SFMTA MUNI System Safety Program Plan Section 4.6
2. SFMTA MUNI System Safety Program Plan Section 4.17
3. CPUC General Order 164 Series
4. SFMTA MUNI Procedure Development and Approval A.PR.002
5. SFMTA MUNI Change Control Board A.PR.015
6. SFMTA MUNI Hazard Analysis SY.PR.042
7. SFMTA MUNI Safety Review Committee SY.PR.038

ELEMENT, CHARACTERISTICS, AND METHOD OF VERIFICATION

Change Control Management

Interview the responsible SFMTA MUNI representatives and review records to determine if the change control management program:

1. Requires and assures that all proposed changes to SFMTA MUNI rail systems' property, equipment, designs, programs, and procedures are properly reviewed and approved by the Office of Safety and other affected agency entities;
2. Incorporates an effective hazard identification and resolution procedure into the review and approval process;
3. Includes provisions for the adoption of interim hazard mitigations pending implementation of approved changes, and:
4. Ensures approved changes are forwarded to the appropriate agency offices for configuration management.
5. Select at least four configuration changes to SFMTA MUNI property, equipment, designs, programs, or procedures, which have taken place in the past two years and determine if:

a. The proposed changes were submitted to the Change Control Board for review and approval;
b. The Change Control Board reviewed the proposed changes;
c. Comments and responses were addressed and documented;
d. The changes were formally authorized by the Change Control Board, and;
e. The approved changes were forwarded to the appropriate agency offices for configuration management.

ACTIVITIES, FINDINGS, AND RECOMMENDATIONS

Activities and Findings:

1. All changes to SFMTA MUNI's rail system are brought before the Change Control Board (CCB) and/or the Safety Review Committee (SRC) for approval prior to implementation. Once the approval is granted, the Corrective Action Plan (CAP) is tracked in the Transit Safe System.

2. SFMTA MUNI utilizes a number of methods to incorporate hazards into the safety review process. Hazard Input methods include safety meetings, accident investigations, regulatory resources and most accessible, web-based safety forms.

3. During the implementation of the CAP, interim hazard mitigations can be performed under the suggestion of the CCB & SRC, or mitigations can be developed by the requestor.

4. Once the change is submitted to the CCB, the requestor for the change is responsible for checking the approval status and completing the CAP.

5. Staff reviewed ten of the 54 total Change Requests submitted to the CCB during 2006-2008 time period. Staff reviewed the requestor's Change Request forms, CCB meeting minutes and CCB approval form. Staff found that documentation was complete for items 'a'-'d'; however, item 'e' (approved changes forwarded to appropriate agency office) was accomplished by using the inter-office mail with no assurance that the appropriate agency office received the document.

6. SFMTA MUNI has filed the CCB documents both electronically and hard copy form, allowing for quick retrieval for review. Auditor was unable to confirm that the change orders were received by the relevant parties and determine if implementation was monitored by the Rail Change Control Board (RCCB). According to SFMTA MUNI SOP A.PR.015., Section 10.0 entitled Record Change states: "The RCCB will monitor the implementation of the approved changes…"

CR Date	Oct-06	Oct-06	Oct-06	Nov-06	Dec-06	Aug-07	Sep-07	Jan-08	May- 08	Aug-08
Change Request # (CR#)	201	205	206	207	212	224	228	239	241	252
a. Change Request Submitted to CCB?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
b. CCB Reviewed Change requests?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
c. CCB Comments Addressed?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Tabled
d. CCB Formally Approve changes?	Yes	Yes	With Draw	Yes	Yes	Yes	Yes	Yes	Yes	Tabled
e. CCB Forward Approval? (1)	Yes	Yes	With Draw	Yes	Yes	Yes	Yes	Yes	Yes	Tabled

(1) CCB forwarded approval but does not have the proof (like an email) that it was received by the appropriate agency office.

Recommendations:

1. SFMTA MUNI RCCB should establish a process to notify the department requesting the changes that the change orders have been approved and are being implemented.

2008 CPUC SYSTEM SAFETY AUDIT CHECKLIST FOR SAN FRANCISCO MUNICIPAL RAILWAY

Checklist	13	Configuration Management	
Date of Audit	**October 29, 2008**	Department	**Safety – Configuration Control; Fleet Engineering – Change Control Board**
Reviewers / Inspectors	**Dain Pankratz**	Persons Contacted	**Michael Kirchanski, Mark Goldstein, Elson Hao**

REFERENCE CRITERIA

1. SFMTA MUNI System Safety Program Plan Section 4.17
2. CPUC General Order 164 Series
3. SFMTA MUNI Procedure Development and Approval A.PR.002
4. SFMTA MUNI Change Control Board A.PR.015
5. SFMTA MUNI Safety Review Committee SY.PR.038

ELEMENT, CHARACTERISTICS, AND METHOD OF VERIFICATION

Configuration Management

Interview the responsible SFMTA MUNI representatives who are responsible for configuration management.

1. Review records to determine if the configuration management program:
    a) Requires and ensures that all properly approved changes to SFMTA MUNI rail systems' property, equipment, designs, programs, and procedures are accurately and completely documented;
    b) Is effectively linked to SFMTA MUNI's change control program and process;
    c) Incorporates the changes into all appropriate documentation, and;
    d) Formally notifies all necessary parties or other entities within or outside the agency about the changes.

2. Select at least four configuration changes to SFMTA MUNI property, equipment, designs, programs, or procedures, which have taken place in the past two years and determine if:
    a) The changes were completely and accurately documented;
    b) The changes were formally authorized through the change control program and

process;

c) The changes were incorporated into all appropriate documentation, and;

d) All necessary parties or other entities within or outside the agency were properly notified about the changes.

ACTIVITIES, FINDINGS, AND RECOMMENDATIONS

Activities and Findings:

1. Staff reviewed the Safety Review Committee (SRC) meeting minutes and SOPs related to the configuration management program and determined:

   a) As specified by SRC SOP (SY.PR.038), SFMTA MUNI is supposed to enter the approved changes or Corrective Action Plans (CAPs) into the TransitSafe System for documentation; however, it does so for some and not all. Furthermore, SFMTA MUNI did not document other CAPS (such as CPUC 2005 triennial audit CAPs) in the TransitSafe System.

   b) The SRC oversees sub-safety committees such as the Change Control Board (CCB) and the Rules & Procedure Committee (RPC). The change requestor is responsible for obtaining SRC and/or subcommittee (CCB/RPC) approval. Once the CCB grants the change approval, then the requestor is responsible for updating the TransitSafe CAP. SFMTA MUNI did not update all the CAPs in TransitSafe.

   c) Individual SOPs determine the documentation needed for each change. Related SOPs such as CAPs, Procedure development & Approval, SSPP changes, etc. are referenced in the SRC SOP (SY.PR.038).

   d) SRC SOP details that the SRC members adequately represent the stakeholders necessary to approve the change. However, not all SRC members, needed to create a proper quorum, regularly attended meetings.
   Staff also reviewed SRC meeting minutes from the years 2006-2008. During this three year time period, the SRC did not meet July-Oct 2006, and no official SRC meetings were held in 2008. SFMTA MUNI may have implemented the changes made during this period without SRC approval, but may not have properly documented them.

2. Staff reviewed five changes to SFMTA MUNI programs taken place in the last two years and observed the implementation process.

Doc #	Description	Implementation Date
A.PR.002	SOP Dev & Approval	5/2/2008
OS.PR.013	Lockout/ Tagout Program	8/20/2008
MME.PL.001	MME Safety & Sec Cert Plan	9/3/2008
CPUC33 ID1426	LRV PMI Procedure Rev	Open
W.OL.PR.008	OCS Inspection	7/2/2008

a) SFMTA MUNI documented the approved procedures and posted the SOPs for employee access. However, it did not properly document all the changes such as CPUC triennial CAPs and accident CAPs (4th & King CAPs) as required by the SRC procedure.

b) SFMTA MUNI did not formally authorize all infrastructure changes implemented on the system. Not all CPUC CAPs from the 2005 triennial audit were approved by the Safety Review Committee as required in procedure SY.PR.038.

c) SFMTA MUNI did not track all changes to completion. It did not implement all the approved changes by the SRC and/or other safety subcommittee(s), and it did not properly document the CAP process.

d) When the SRC is in full-quorum, the SRC membership contains representatives from affected departments. The SRC meeting minutes email distribution list also contains internal and external (staff) stakeholders. However, SFMTA MUNI did not properly notify all the stakeholders of the change. It made some changes without SRC approval, particularly changes made in 2008.

Comments:

SFMTA MUNI utilizes the Safety Review Committee (SRC) and sub-committees for configuration management. It is a proficient process that has the ability to properly document and verify CAPs are completed in a safe and comprehensive manner. Staff recognizes that this well thought-out process can be a best-practice in the industry.

Recommendations:

1. SFMTA MUNI should follow the SSPP and the appropriate Safety Review Committee (SRC) and Change Control Board SOPs to ensure a proper configuration management process

(SSPP Section 4).

2. SFMTA MUNI should implement changes to rules, procedures, infrastructures, or vehicle equipment, and should go through the configuration management process (SRC or sub-committee), as specified in SSPP Section 4.17.2.
3. SFMTA MUNI should implement the changes (CAPs) approved by the SRC and these should be properly tracked through implementation and reviewed after completion (by means of TransitSafe & Internal Safety Audits), as specified in SRC SOP (SY.PR.038) Section 3.8.
4. SFMTA MUNI SRC should meet regularly to effectively approve CAPs as specified in SSPP Section 4.17.
5. SFMTA MUNI permanent SRC members should consistently participate in the SRC meetings to ensure that technical consideration is given to all related areas when a change is approved (SY.PR.038 Sections 4.3 and 4.4).

2008 CPUC SYSTEM SAFETY AUDIT CHECKLIST FOR SAN FRANCISCO MUNICIPAL RAILWAY

Checklist	14	Safety Certification – SFMTA MUNI Metro East (MME)	
Date of Audit	**October 21, 2008**	Department	**Transportation Planning and Development; Office of Health & Safety**
Reviewers / Inspectors	**Dain Pankratz**	Persons Contacted	**Roger Nguyen, Dan Rosen, Michael Kirchanski**

REFERENCE CRITERIA

1. SFMTA MUNI System Safety Program Plan Section 4.5
2. General Order 164 Series, Safety Certification
3. SFMTA MUNI Metro East Safety & Security Certification Plan MME.PL.001

ELEMENT, CHARACTERISTICS, AND METHOD OF VERIFICATION

Safety Certification – SFMTA MUNI Metro East (MME)

Interview SFMTA MUNI department representatives and review SFMTA MUNI Metro East (MME) project records to establish:

1. A MME safety certification procedure or plan for the project has been established, implemented, and, if necessary, updated;
2. A safety certification committee with representatives from all affected SFMTA MUNI departments was actively and regularly involved in the safety certification process including reviewing and commenting on project safety critical decision making activities;
3. The safety critical design elements were being tracked and verified with regular status reports being provided to the Safety Certification Committee (SCC);
4. Members of the safety certification committee or their designated representatives regularly attended committee meetings and participated in the oversight of the safety certification process;
5. Audits were performed to determine the validity of the safety certification verification process;
6. Appropriate hazards analyses of design and construction modifications was performed;
7. Safety certification was administered by the SFMTA MUNI Health and Safety Department or other safety professionals not subordinate to the project (Construction

Division) management.

8. All safety certification activities were thoroughly documented throughout the life of the project to substantiate that safety elements, safety criteria, final design, construction, testing, operating and emergency procedures, and training aspects of the project were implemented in the completed project.
9. Review six SCC meeting attendance sheets to establish attendance by members of key departments. Review minutes of meetings and action items.

ACTIVITIES, FINDINGS, AND RECOMMENDATIONS

Activities and Findings:

1. The Chief Operating Officer (COO) of SFMTA approved the MME Safety Certification Plan (SCP), Document MME.PL.001, effective on 9/3/2008. Prior to approval of the MME SCP, MME safety certification was discussed in the Safety Cert Program Manual (July 2000).

2. The MME Safety Certification Committee (SCC) was actively involved in the process, and met regularly. The SCC held meetings, at least quarterly in the 2006-2008 time period. Staff reviewed six sign-in sheets and found that members from various SFMTA MUNI departments along with CPUC staff attended the SCC meetings.

3. The SCC tracked the MME Safety Critical elements in the meeting minutes and removed the elements from the minutes once they were completed.

4. Affected departments such as Facilities Maintenance, Operations, MME Project, Wayside, Safety, Track, Signal, and staff regularly attended SCC meetings. Meeting minutes' and meeting agendas' e-mail distribution list also included affected departments.

5. SFMTA MUNI personnel regularly discussed safety concerns at the SCC meetings. However, SCC did not regularly perform internal audits of specifications, design criteria or construction conformance checklists.

6. SFMTA MUNI performed the Preliminary Hazard Analysis (PHA) and Threat & Vulnerability Analysis (TVA). It thoroughly documented that the hazards are mitigated by construction approval process. The construction open activities list (Punch-list) did not contain any safety critical elements for MME at the time of MME revenue service.

7. The Safety Certification is administered by the Health & Safety Manager who is independent of construction division.

8. The Final Safety Certification Verification Report (SCVR) dated September 12, 2008, was approved by the CPUC CPSD director by a letter dated September 19, 2008.

9. Staff reviewed six SCC meeting minutes, action items and sign-in sheets including: Aug 16, 2006, Nov 30, 2006, Dec 18, 2006, March 27, 2007, Sept 20, 2007, and June 26, 2008. The key members attended the meetings and the meeting minutes were well-documented.

Comments:

The construction approval process is well-documented (multiple binders with approval sign-offs) and is very effective for mitigating hazards, unfinished items and tracking the contractor work completed.

Recommendations:

None.

2008 CPUC SYSTEM SAFETY AUDIT CHECKLIST FOR SAN FRANCISCO MUNICIPAL RAILWAY

Checklist	15	Measuring and Testing Equipment	
Date of Audit	**October 23, 2008**	Department	**Service Delivery – Rail Vehicle Maintenance, Overhead Lines, Track & Signal Maintenance**
Reviewers / Inspectors	**Joey E. Bigornia Colleen Sullivan**	Persons Contacted	**Carol Wolther, Wai Tom, Tim Lipps, Hoy Wong, Don Haagstad, Henry Ridgell, Franklin Johnson**

REFERENCE CRITERIA

1. System Safety Program Plan
2. CPUC General Order 164 Series
3. SFMTA MUNI Calibration of Measurement and Test Equipment L.PR.018
4. SFMTA MUNI Calibration of Test Instruments R.SM.PR 013
5. SFMTA MUNI Overhead Lines Equipment Calibration and Certification W.OL.PR 0.159

ELEMENT, CHARACTERISTICS, AND METHOD OF VERIFICATION

Measuring and Testing Equipment

Interview responsible SFMTA MUNI representatives from the selected departments, review records, examine equipment storage facilities, and perform inspections of not less than eight pieces of measuring or testing equipment to determine if:

1. The selected gauges, micrometers, calipers, torque wrenches, multi-meters, etc. are properly inventoried, stored, distributed for use, calibrated at prescribed intervals, and marked, tagged or otherwise identified to show current calibration status;
2. The next scheduled testing/calibration due date is shown on each instrument;
3. Tools and instruments requiring calibration are addressed in department procedures.

ACTIVITIES, FINDINGS, AND RECOMMENDATIONS

Activities and Findings:

1. Staff reviewed the following list of equipment identified by model and serial number for each

department:

A. Service Delivery – Rail Vehicle Maintenance
   1. Digital Multimeter
      a. S/N 80330467, Calibrated 7/31/08, Next Due Date: 7/31/09
      b. S/N 80230349, Calibrated 7/31/08, Next Due Date: 7/31/09
      c. S/N 71990138, Calibrated 4/23/08, Next Due Date: 4/23/09
      d. S/N 68700287, Calibrated 6/5/08, Next Due Date: 6/5/09

   2. Pressure Gauge
      a. MS3-G, Calibrated 7/29/08, Next Due Date: 7/29/09
      b. MS5-G, Calibrated 7/29/08, Next Due Date: 7/29/09
      c. MS15-G, Calibrated 10/7/08, Next Due Date: 10/7/09
      d. MS16-G, Calibrated 10/7/08, Next Due Date: 10/7/09

   3. Torque Wrenches
      a. EMS-0034, Calibrated 5/22/08, Next Due Date: 5/22/09
      b. EMS-0035, Calibrated 5/22/08, Next Due Date: 5/22/09
      c. WBL 43959, Calibrated 5/22/08, Next Due Date: 5/22/09

B. Overhead Lines
   1. Relay Test Set, S/N 25606, Calibrated 4/14/08, Next Due Date: 4/14/09
   2. Recorder, S/N 99J0116,Calibrated 4/8/08, Next Due Date: 4/8/09

C. Track & Signal Maintenance
   1. Digital Multimeter
      a. S/N 86540164, Calibrated 12/7/07, Next Due Date: 12/7/08
      b. S/N 87130205, Calibrated 12/7/07, Next Due Date: 12/7/08
      c. S/N AA00170298, Calibrated 8/15/08, Next Due Date: 8/15/09
      d. S/N 86820284, Calibrated 9/17/08, Next Due Date: 9/17/09

2. Each measuring device reviewed had a sticker identifying the calibration date and the next scheduled calibration due date. Staff did not note any exceptions.
3. Certificates for each device above were reviewed to confirm calibration occurred at the annual

frequency. Staff did not note any exceptions.

Recommendations:

None.

2008 CPUC SYSTEM SAFETY AUDIT CHECKLIST FOR SAN FRANCISCO MUNICIPAL RAILWAY

Checklist	**16**	**Subway Station and Emergency Equipment Maintenance**	
Date of Audit	**October 21, 2008**	Department	**Service Delivery – Infrastructure Maintenance Stationary Engineering**
Reviewers / Inspectors	**Howard Huie**	Persons Contacted	**Tom Kennedy, Ted Aranas, Leo Martinez, Ernesto Williams, Stephen Newman**

REFERENCE CRITERIA

1. SFMTA MUNI System Safety Program Plan Section 4.15
2. CPUC General Order 164 Series
3. SFMTA MUNI Subway Emergency Ventilation Fan System Inspection & Maintenance W.BG.PR 006
4. SFMTA MUNI Fire Protection System Inspection and Maintenance W.BG.PR.014
5. Batteries, Emergency Power Backup R.SM.PR/PM .001
6. Subway Emergency Telephone R.SM.PR/PM .002
7. Subway Emergency Lighting W.BG.PR.009

ELEMENT, CHARACTERISTICS, AND METHOD OF VERIFICATION

Subway Station and Emergency Equipment Maintenance

1. Interview the designated SFMTA MUNI representatives responsible for subway station and emergency equipment maintenance, review procedures and records to determine if procedures for preventive maintenance, inspection and testing programs are current and are being implemented for the following items:
   a) Station emergency telephones
   b) Station fire alarms, smoke and heat detectors
   c) Station sprinkler systems
   d) Under-car deluge system
   e) Emergency trip switches
   f) Trackway standpipes and associated pumps between stations
   g) Emergency ventilation fans

h) Station battery room
i) Emergency lighting
j) SF Fire Dept. stored fire fighting equipment
k) Emergency exit doors

2. Select two or more subway stations, including the adjacent subway equipment, to determine if the above listed items were all inspected and tested, as specified by the SOP, during the past 24 months.
3. Determine if the required PM activities were documented on standardized report forms.
4. Determine if repairs to correct defects and non-compliances noted on the PM report forms were completed and signed off in a timely manner.
5. Determine if any safety critical equipment modifications were implemented and, if so, were approved by the Change Control Board.
6. Review PM checklists for accuracy and completion such as dates and signature.

ACTIVITIES, FINDINGS, AND RECOMMENDATIONS

Activities and Findings:

1. Rail Systems Fire Protection Inspection and Maintenance is not up-to-date. However, SFMTA MUNI currently has updated the draft of Preventive Maintenance (PM), which is under review and is expected to be approved and implemented in the near future. Final changes are being reviewed for senior staff approval.
2. Staff found all other PMs listed above in the reference criteria to be current, up-to-date, and implemented.
3. Fire Control Panel for Castro Station is non-operational. SFMTA MUNI issued a work order to replace the fire control panel with compliant panel and issued a corrective action plan. SFMTA MUNI has already installed temporary fire detectors and has been testing them on a weekly basis. Removal and installation of new fire control panels are under new project proposal.
4. Staff reviewed two subway stations, Van Ness and Church, for 24 month compliance, from January 2006 to December 2007, against SOP for PM, repairs, maintenance and supervisor signatures, consistency in reporting and form use. Staff found no discrepancies in fire protection, ventilation, emergency power backup, and emergency lighting. SFMTA MUNI completed and signed off all activities and reports/work orders in a timely and efficient manner.
5. Staff found MMT and Embarcadero Stations to have problems with Centrex Telephone

wiring. Phone wiring was to be repaired by Department of Telecommunications and Information Services (DTIS). DTIS took over 16 months to repair damaged phone lines.

Comments:

MMT and Embarcadero stations had numerous outages between January 2007 and September 2008. SFMTA MUNI repaired various lines but the same lines would show up again in later repair PMs.

When a problem is found with a Centrex phone line, SFMTA MUNI notifies DTIS via email. DTIS has its own escalation tree. If the phone problem has not been resolved as found during the PM check, SFMTA MUNI will reinitiate it again using the same work order number. SFMTA MUNI uses the Centrex portion of the phone systems for non-emergency outside calls. The Centrex system does not affect the emergency phone system in any way.

Recommendations:

No recommendations.

2008 CPUC SYSTEM SAFETY AUDIT CHECKLIST FOR SAN FRANCISCO MUNICIPAL RAILWAY

Checklist	17	Drug and Alcohol Abuse Program	
Date of Audit	**October 27, 2008**	Department	**Safety and Training**
Reviewers / Inspectors	**Vincent Kwong**	Persons Contacted	**Reggie Smith**

REFERENCE CRITERIA

1. SFMTA MUNI System Safety Program Plan Section 4.20
2. General Order 164 Series
3. 49 CFR Part 655
4. 49 CFR Part 40
5. Policy and Procedures Handbook (Rev. 3, July 2002)
6. D & A Policy & Procedures - 8.5.08 DRAFT

ELEMENT, CHARACTERISTICS, AND METHOD OF VERIFICATION

Drug and Alcohol Abuse Program

1. Interview the SFMTA MUNI representative in charge of the Drug and Alcohol Abuse Program and review the report from the most recent FTA audit of the Program and determine if any corrective actions resulting from FTA recommendations are still open.
2. For each rail transit employee who tested positive for drugs or alcohol in the past three years and is also currently employed in a safety-sensitive position, review the appropriate records to determine whether or not:
    a) The employee was evaluated and released to duty by a Substance Abuse Professional (SAP).
    b) The employee was administered a return-to-duty test with verified negative results.
    c) Follow-up testing was performed as directed by the SAP according to the required follow-up testing frequencies of the reference criteria after the employee has returned to duty.
    d) Consequences for repeat offenders were carried out as required by the reference criteria.

ACTIVITIES, FINDINGS, AND RECOMMENDATIONS

Activities and Findings:

1. SFMTA MUNI has revised the current Policy and Procedures Handbook (Rev. 3 July 2002) with new procedures for observed testing of employees, and the handbook is currently undergoing a commenting period. There are no noted open recommendations from the FTA Audit Report and Compliance dated July 29 through July 30, 2002. With respect to Federal requirements, Drug and Alcohol testing is limited to the following:
    - Alcohol
    - Marijuana
    - Amphetamines
    - Opiates
    - PCP
    - Cocaine
2. Staff reviewed the records of rail transit safety-sensitive employees who tested positive for 2005-2008. Safety sensitive employees include those from maintenance and operators. Results indicate that there were seven positive results in 2005, 9 in 2006, 5in 2007, and two in 2008. No individual employee tested positive more than once during this period. Employees may be tested for any of the following reasons:
    - Pre-employment
    - Post accident
    - Reasonable suspicion
    - Random
    - Return to Duty
    - Follow Up

    a. According to the chart "Positive Rail Transit Employees Summary, January 1, 2005 to October 27, 2008", SFMTA MUNI evaluated those employees who tested positive within 30 days by the SAP.

    b. SFMTA MUNI tested employees prior to return to duty. If an employee tests positive on two accounts, he/she may resign or be dismissed due to non-compliance. Therefore, prior to the date released to duty, employees must test negative.

    c. By FTA standards, rail transit agencies must perform follow up testing at a minimum of six tests per year. However, according to the SAP, SFMTA MUNI may perform more than six tests at different times within that year. The summary also indicates these test dates; if there is an empty spot, the Comments column shows the reason

why the follow-up tests were not completed.

d. As shown in the Comments column, employees who tested positive on two occasions are subject to disciplinary action. Although the employees may choose to resign, which is also shown in the comments along with the date, they may undergo dismissal as well.

Recommendations:

None.

2008 CPUC SYSTEM SAFETY AUDIT CHECKLIST FOR SAN FRANCISCO MUNICIPAL RAILWAY

Checklist	18	**Employee Safety Program**	
Date of Audit	**October 22, 2008**	Department	**System Safety**
Reviewers / Inspectors	**Howard Huie**	Persons Contacted	**Antonio Parra, Michael Kirchanski, Phil Calhoun, Franklin Johnson, Agripino Medina**

REFERENCE CRITERIA

1. SFMTA MUNI System Safety Program Plan Section 4.16.3
2. SFMTA MUNI System Safety Program Plan Section 4.18.1
3. CPUC General Order 164 Series
4. Injury and Illness Prevention Program IIPP OS.PR.001
5. Hazard Communication Program – Chemical Product Approval, Use &Training OS.PR.100
6. SFMTA MUNI Division Safety Committee OS.PR.005

ELEMENT, CHARACTERISTICS, AND METHOD OF VERIFICATION

Employee Safety Program

Interview the responsible SFMTA MUNI representatives and at least two safety committee employee representatives and also review the employee safety program records to determine if:

1. SFMTA MUNI's Hazard Communication Program has been regularly reviewed and updated;
2. The use of an appropriate procedure and reporting form is being implemented and is periodically distributed to all employees to effectively report safety hazards in the work place;
3. SFMTA MUNI Safety Committees have addressed all employee-identified safety hazards reported in the last 24 months by developing and implementing appropriate corrective action plans and schedules;
4. Required corrective actions have either been satisfactorily completed or are being actively tracked and documented, and;
5. SFMTA MUNI Safety Committees held regularly scheduled meetings during the past 24

months to facilitate implementation of the Employee Safety Program and to perform joint safety inspections of the facilities;

6. Review SFMTA MUNI's Hazard Communication Program database for accuracy and implementation.

ACTIVITIES, FINDINGS, AND RECOMMENDATIONS

Activities and Findings:

1. Staff reviewed SFMTA MUNI's Hazard Communication Program – Chemical Product Approval, Use & Training, Hazardous Materials and Hazardous Waste Management Program, and Injury and Illness Prevention Program and found them to be regularly reviewed and current.
2. SFMTA MUNI requires training for all employees who handle or work in the proximity of these chemicals.
3. The Injury and Illness Prevention Program (IIPP) includes Employee Hazard Identification Form, Tailgate Safety Discussion Form and Accident Investigation Report forms. Hazards, Safety Concerns and Accident Investigation can be resolved from the Supervisors' level, Safety Committee's level and the Health and Safety Department's level. SFMTA MUNI issues each supervisor in each division or department with a current copy of the IIPP via e-mail.
4. Monthly Safety Committee meetings are held by Transportation Safety Specialist. Each of the 22 Divisions in SFMTA MUNI has at least one representative that attends each Safety Committee meeting. New and ongoing safety items and issues are discussed in the meeting. In the event that a safety issue needs to be addressed, SFMTA MUNI issues a work order or creates and sends out a Corrective Action Plan to the appropriate division to be resolved. Upon completion of the safety issue, the division in question will bring it up in the next Safety Committee meeting where the item in question closes out the item and is recorded in the minutes of the Safety Committee meeting.
5. SFMTA MUNI tracks all Corrective Action Plans from beginning to completion.
6. The Safety Committee meets once a month. Safety issues and concerns are discussed at these meetings. A Corrective Action Plan or work order may be created to correct or address safety concerns.
7. SFMTA MUNI has implemented a functioning version of the Hazardous Communications database. However, the data in the database is limited to a few months' worth of training records. Database entry history is less than six months. Anything spanning further than 6 months is not likely to be in the database.

Recommendations:

1. SFMTA MUNI should ensure that the Hazardous Communications database contains employee training history records for at least three years (OS.PR.100).

2008 CPUC SYSTEM SAFETY AUDIT CHECKLIST FOR SAN FRANCISCO MUNICIPAL RAILWAY

Checklist	19	Operating Rules and Procedures - LRVs	
Date of Audit	**October 24, 2008**	Department	**Service Delivery, Schedule Green Metro Operations**
Reviewers / Inspectors	**Gail Davis, Arun Mehta**	Persons Contacted	**John Byrd, Samuel Lau, Pacifico Paculba, Brian Cunningham, Sarita Britt**

REFERENCE CRITERIA

1. SFMTA MUNI System Safety Program Plan Section 4.13
2. CPUC General Order 164 Series
3. Master File Bulletin Work File SY.PR.027

ELEMENT, CHARACTERISTICS, AND METHOD OF VERIFICATION

Operating Rules and Procedures - LRVs

Review operating rules and procedures and examine records to determine if:

1. Interim mandatory operating directives ("bulletins") are issued separately from non-operating directives or informational notifications ("notices");
2. There is a procedure describing the purpose of each, limitations of use, and how each is prepared, approved, distributed, signed for, posted and recalled or annulled, etc.
3. The bulletins and notices, when issued, are entered on a master log to control issuance and distribution as well as to track the active/inactive status of each notice and bulletin;
4. That a record is maintained for each bulletin issued and each employee receiving a copy of that bulletin;
5. The active bulletins and notices are posted at SFMTA MUNI specified locations and;
6. Inactive bulletins and notices are removed from those posting locations.
7. Select a sample of six or more mandatory directive operating "bulletins" issued to operating personnel within the last two years. Review records to determine whether or not each required operating employee has received those bulletins.

ACTIVITIES, FINDINGS, AND RECOMMENDATIONS

Activities and Findings:

Staff interviewed the Master Records Keeper for all bulletins and notices. It is the Master Records Keeper's duty to issue all General Bulletins (system-wide). He is not involved in Divisional bulletins other than keeping both a log and a copy of them for archival purposes. The Master Records Keeper explained the hierarchy of written authority, bulletins and notices as follows:

1. Rule Book takes precedence over all Bulletins.
2. General Bulletins are issued system-wide from Mr. Cunningham's office and are operational in nature. They can pertain to rail and/or bus.
3. Divisional Bulletins are issued on the Divisional level by each Divisional Superintendent and copies are kept in the Master file archive.
4. Notices, issued by Mr. Cunningham's office, are informational (non-operational) and refer to special events, parades, police activity, and other events.
5. Special Operations Orders are issued to Divisional senior management and are event-specific.

The Master File for All Rules SY.PR.027 describes the process of issuance of bulletins/notices as well as the purposes for each. The general bulletins are authored by Master Records Keeper's office at the request of the initiating party and issued under the signature of senior SFMTA MUNI management. The bulletin is written, sent to senior management, signed by management, scanned and sent back to Master Records Keeper's office in a .PDF file for distribution.

The method of distribution for all General Bulletins/Notices from Master Records Keeper's office is e-mail for those with SFMTA MUNI email accounts and paper copies to those that do not have company e-mail. They work from distribution lists. Electronic mails go to Superintendents, assistant superintendents, and training departments at each division. It is the divisions' responsibility to distribute and/or post the bulletins/notices to line personnel as well as maintain necessary signatures.

There is currently no process in place used to recall a general bulletin.

SFMTA MUNI enters the general bulletins/notices on a log noting date of issuance, bulletin number, title of bulletin, and active or inactive status. There is no date on the log associated with the inactivation of a bulletin.

The records of each employee obtaining the bulletin are kept on a divisional level and bulletins are posted in specified sites at each division by the divisional superintendent. The superintendent of each division also has responsibility for removing inactive bulletins.

Staff reviewed bulletins and notices from 2007 and 2008 as well as the logs associated with the bulletins/notices. Staff questioned how divisional superintendents know when to remove inactive general bulletins. There is currently no process in place that gives the Divisional Superintendents authority to take down a general bulletin (that does not have time specified in the body of the bulletin.)

Staff also noted that currently there is not a process out of the Operations/Rules department as to when and how to inform the Master Keeper of Records that a rule change bulletin has been incorporated into the rules and can be made inactive. CPUC staff will pursue this issue with Senior Operations personnel at SFMTA MUNI.

Recommendations:

1. SFMTA MUNI should perform a regular (annual) recap of all bulletins and develop a corrective action plan whereby in January of each year, for example, the Master Keeper of Records can identify the bulletins which are no longer active. The list of the inactive bulletins should be furnished to each Divisional Superintendent and placed in the master log (SY.PR.027).

2008 CPUC SYSTEM SAFETY AUDIT CHECKLIST FOR SAN FRANCISCO MUNICIPAL RAILWAY

Checklist	**20**	**Hours of Service of Train Operators, Train Controllers, and Supervisors**	
Date of Audit	**October 21, 27, & 30, 2008**	Department	**SFMTA MUNI Rail Operations; Cable Car Division; OCC; Signal Maintenance Department**
Reviewers / Inspectors	**Jimmy Xia, Steven Espinal**	Persons Contacted	**Sarita Britt, Doretha Cross, John Byrd, Frank Lum, Rudolph Parson, Agripino Medina, Jim Kelly, David Banbury, Josh Sadorra, Fred Orantes, Brendan Scanlan, Richard Ng, Tom Kennedy, Mary Ellen O'Brien**

REFERENCE CRITERIA

1. SFMTA MUNI System Safety Program Plan Section 4.13.4
2. CPUC General Order 143-B – Section 12.04
3. CPUC General Order 164 Series
4. Hours of Service Rail Operations SY.PR.047

ELEMENT, CHARACTERISTICS, AND METHOD OF VERIFICATION

Hours of Service of Train Operators, Train Controllers, and Supervisors

1. Select ten individuals from each of the rosters of Historic Street Cars (HSC), Light Rail Vehicles (LRV), and cable car operators, train controllers, and rail inspectors and supervisors. Review the "time on duty" records prepared during a six-month period within the past two years for the selected operating employees and determine if:
   a) They complied with the requirement that employees in safety- sensitive positions may not remain on duty for more than 12 consecutive hours, or for more than 12 hours spread over a period of 16 hours, and;
   b) The initial on duty status for each of these employees only began after eight consecutive hours off duty.

ACTIVITIES, FINDINGS, AND RECOMMENDATIONS

Activities and Findings:

Staff interviewed the SFMTA MUNI representatives and reviewed applicable "time on duty" records of randomly selected LRV, historic streetcar (HSC), and cable car operators, Operations Control Center (OCC) train controllers, Metro Rail Operations (MRO) supervisors, and signal

maintenance technicians. Staff found the following:

Findings from the Green and Geneva Divisions for LRV and HSC Operators:

1. SFMTA MUNI uses a computerized tracking method called the Trapeze Dispatch System software to track the work hours of LRV, HSC, and cable car operators. The system has rules that prevent dispatching which will cause a rail operator to exceed the hours of service (HOS) limits.

2. The hours worked per day by a Train Operator (T/O) is measured in "platform time" and "work time" as shown in the Trapeze HOS records. Platform time is a count of the actual time spent operating a rail vehicle. Work time is the total number of hours on duty including lunch hours.

3. SFMTA MUNI uses the payroll system called TESS to maintain the HOS records for other safety- sensitive employees who are not rail vehicle operators.

4. Staff reviewed the SFMTA MUNI's Trapeze HOS records, covering a six month period from 4/1/08 to 9/30/08, of 12 LRV operators and 10 HSC operators who were randomly selected from the roster of LRV and HSC operators provided by the Green Geneva Divisions. The daily work hours of all the 12 LRV operators and 10 HSC operators selected were within the 12 hour limit as stated in CPUC GO 143-B Rule 12.04 without exceptions. Also, all of their resting periods between shifts for the six month period selected were eight hours or more without exceptions.

Findings from the Cable Car Division:

1. Staff reviewed the Trapeze HOS records, covering a six month period from 4/1/08 to 9/30/08, of 12 cable car operators who were randomly selected from the roster of cable car operators. Staff identified the following three instances where the CPUC GO 143-B hours of service rules were non-compliant.
   - The HOS records for one cable car operator on 5/5/08 showed total work time of 13 hours and 22 minutes, exceeding the daily 12 hour limit by one hour and 22 minutes.
   - For another cable car operator, total work times were 12 hours and two minutes everyday on both 9/22/08 and 9/23/08.

2. All the work hours and resting periods of the other ten cable car operators selected within the six month period in 2008 were in full compliance with CPUC GO 143-B hours of service rules without exceptions.

Findings from the OCC Division:

1. Staff reviewed the TESS timesheets, covering a six-month period from 4/1/08 to 9/30/08, of four OCC train controllers who were randomly selected from the roster of OCC train controllers.

The daily work hours of all the four train controllers selected were within the 12 hour limit as stated in CPUC GO 143-B Rule 12.04 without exceptions. Also, all of their resting periods between shifts for the six-month period selected were eight hours or more without exceptions.

Findings from the MRO Division:

1. SFMTA MUNI's MRO managers create, approve, and review a daily work schedule using a computer software template for the MRO supervisors/inspectors. The daily detail sheet then gets posted in the MRO office in the Green Division and OCC.

2. Staff reviewed the TESS timesheets, covering a six-month period from 4/1/08 to 9/30/08, of 21 MRO supervisors/inspectors who were randomly selected from the roster of MRO supervisors. Staff identified the following three instances where the CPUC hours of service rules were non-compliant:

   Non-compliance #1: The "time on duty" records for one MRO inspector showed that on 4/8/08, his total hours worked was 13 hours spread over a period of 16 hours, exceeding the daily 12 hour limit.

   Non-compliance #2: The "time on duty" records for the same MRO inspector mentioned above showed that on 6/20/08, his total hours worked was 13.5 hours spread over a period of 16 hours, exceeding the daily 12 hour limit.

   Non-compliance #3: The "time on duty" records for another MRO inspector showed that on 6/19/08, his total hours worked were 13 hours spread over a period of 16 hours, exceeding the daily 12 hour limit.

3. The rest of the daily work hours for these two MRO inspectors within the six-month period selected were within the 12 hour limit as stated in CPUC GO 143-B without exceptions. The daily work hours of all the 19 other MRO supervisors selected were within the 12 hour limit as stated in CPUC GO 143-B without exceptions. No violations of the eight hour minimum resting period between shifts were identified on the HOS records of all of the 21 MRO inspectors selected within the six-month period.

4. SFMTA MUNI department manager stated that he was short of personnel to cover emergencies (such as late San Francisco Giants baseball games running overtime) that happen late at nights and early in the mornings. SFMTA MUNI stated the reason for this is because it currently does not have enough resources to hire more inspectors. The non-compliances mentioned above occurred during emergencies at the end of the responding inspectors' shifts, making their work hours beyond the daily 12-hour limit. Currently, SFMTA MUNI is in the process of hiring

approximately ten more supervisors for the MRO division, which will immediately alleviate the problems of supervisors working beyond the daily limit of 12 work hours.

Findings from the Signal Maintenance Division:

1. Staff reviewed the following records.
   - The "time on duty" records for a seven month period from 4/19/08 to 10/17/08 of six signal maintenance technicians
   - The "time on duty" records for a period from 4/19/08 to 7/12/08 of three signal maintenance technicians
   - The "time on duty" records for a period from 7/12/08 to 10/17/08 of one signal maintenance technician

   No CPUC GO 143-B hours of service non-compliance were found from staff's review of these records.

Comments:

1. SFMTA MUNI's Hours of Service Rail Operations SOP (effective date of 8/6/08) section 4.1 has the heading "Permissive On-Duty Hours (Safety Sensitive Employees)", but it only defines safety-sensitive employees and does not define what are permissive on-duty hours. Also, this SOP does not clarify platform time and work time, which are shown in the Trapeze HOS records.
2. Several follow-up phone calls to a dispatcher in the SFMTA MUNI Cable Car Division and other SFMTA MUNI personnel revealed that confusion exists in the meaning of on-duty hours between work time and platform time among its personnel.

Recommendations:

1. SFMTA MUNI should revise the Hours of Service Rail Operations SOP to define: what are permissible on-duty hours; what these hours consist of; and, lastly, to clarify platform time and work time (GO 143-B and SY.PR.047).
2. SFMTA MUNI should retrain the dispatchers in the Cable Car Division to ensure that they understand the exact meaning of permissible on-duty hours for cable car operators (GO 143-B and SY.PR.047).
3. SFMTA MUNI should review the Hours of Service (HOS) records of all of the cable car operators, identify the causes of any non-compliance found, and take appropriate actions to remedy the same as per the requirements of GO 143-B.
4. SFMTA MUNI should review the HOS records of all of the MRO Inspectors, identify the causes of any non-compliance found, and take appropriate actions (GO 143-B Sections 12.01 and 12.04).
   - SFMTA MUNI should be carefully checking the time sheets for all the MRO inspectors before their work deployment to ensure compliance with GO 143-B HOS rules.

2008 CPUC SYSTEM SAFETY AUDIT CHECKLIST FOR SAN FRANCISCO MUNICIPAL RAILWAY

Checklist	21	Hazardous Materials Management Program	
Date of Audit	**October 22, 2008**	Department	**System Safety**
Reviewers / Inspectors	**Noel Takahara**	Persons Contacted	**Antonio Parra, Michael Kirchanski, Phil Calhoun, Franklin Johnson**

REFERENCE CRITERIA

1. SFMTA MUNI System Safety Program Plan Section 4.19
2. CPUC General Order 164 Series
3. Hazard Communication Program – Chemical Product Approval, Use &Training OS.PR.100

ELEMENT, CHARACTERISTICS, AND METHOD OF VERIFICATION

Hazardous Materials Management Program

1. Interview the SFMTA MUNI representatives in charge of hazardous materials management at the LRV and HSC vehicle maintenance shops and review records to determine if:
   a) Standard operating procedures describing SFMTA MUNI's program for identifying, handling, storing, using and disposing of hazardous materials in the LRV and HSC vehicle maintenance shops have been regularly reviewed, modified if necessary, and approved for use;
   b) Training and emphasizing the safe handling of hazardous materials have been provided to all affected employees;
   c) Monthly inspections were performed and documented during the past 12 months to ensure that all hazardous materials in the shops are properly identified and stored in designated areas and;
   d) Hazardous materials' discharge/spill reports for incidents, which occurred during the past two years, have been prepared and are on file at the LRV and/or HSC maintenance shops.

ACTIVITIES, FINDINGS, AND RECOMMENDATIONS

Activities and Findings:

Staff held discussions with the Occupational & Environmental Health Unit (OEHU) of SFMTA MUNI with regard to its Hazardous Materials Management Program. The OEHU works with several City and State agencies and maintains required permits with: Cal/OSHA, Bay Area Air Quality Management, San Francisco PUC, Federal Environmental Protection Agency, California State Board of Equalization, California Department of Toxic Substance Control, and San Francisco Hazardous Materials Unified Program Agency.

SOP OS.PR.100 titled "Hazard Communication Program" and SOP XX.PR.000 titled "Hazardous Materials and Hazardous Waste Management Program" describe SFMTA MUNI's program for identifying, handling, storing, using, and disposing of hazardous materials. SFMTA MUNI revised the documents on 5/2/08 and 5/17/07, respectively.

The OEHU is in the process of providing all relevant personnel with hazard communication or "Hazcom" training. The OEHU maintains clear records that show which personnel took the Hazcom training and which personnel still needs to. Staff reviewed records showing that over 300 SFMTA MUNI personnel completed the Hazcom training in the month of September 2008.

Staff learned through discussion that OEHU plans to implement a comprehensive program that would manage and maintain training records for all relevant classifications of personnel. The program would make use of software to link training records with Human Resource records and track the training received and needed by each individual employee. With over 84 classifications ranging from Sheet Metal Worker to Senior Power House Operator, roughly 47 types of training programs altogether, and the occasional classification change or the hiring of a new employee, the reviewer would consider successful implementation of this program to be the result of continuous effort to improve the safety of the employees.

Staff reviewed records showing that monthly inspections have been taking place to ensure that hazardous materials are being properly identified and stored in designated areas.

Staff learned through discussion that there have been no major incidents at SFMTA MUNI involving hazardous wastes in the past two years; therefore, there is nothing to report.

Recommendations:

None.

2008 CPUC SYSTEM SAFETY AUDIT CHECKLIST FOR SAN FRANCISCO MUNICIPAL RAILWAY

Checklist	**22**	**Training and Certification of HSC and LRV Operators, Rail Inspectors, On Track Equipment Operators, and Train Controllers**	
Date of Audit	**October 21, 2008 & October 23, 2008**	Department	**Service Delivery – Green Metro Training, Metro Rail Operations (MRO), Maintenance Training, Operation Control Center**
Reviewers / Inspectors	**Raed Dwairi**	Persons Contacted	**David Banbury, Paul Petersen, York Kwan, Fred Orantes, Frank Lum, David Chan, Liana Kastina, Rudolph Parson Jr.**

REFERENCE CRITERIA

1. SFMTA MUNI System Safety Program Plan Section 4.16.1
2. CPUC General Order 143-B, Section 13.03
3. CPUC General Order 164 Series
4. Metro Rail Operations Training Program Plan I.Pl.001
5. LRV 35 Day Training Class Syllabus
6. Rail Car Operation Training Program Plan TN.MO.PL.025
7. Training Program Plan for Restricted LRV Operator Training For Maintenance Workers TN.MT.PR. 018
8. On-Track Equipment Operations Training Program Plan TN.MT.PR.013

ELEMENT, CHARACTERISTICS, AND METHOD OF VERIFICATION

Training and Certification of HSC and LRV Operators, MRO Transit Supervisors, Rail Inspectors, On Track Equipment Operators, and Train Controllers

1. Interview the department representatives and review the appropriate documents and records to determine if:
   a) The training plan, as well as corresponding refresher training plan, and certification program plans for HSC and LRV Operators, MRO Transit Supervisors Rail Inspectors, On Track Equipment Operators, and Train Controllers specify:
      i. The purpose, scope and objectives of each training and certification program;

ii. The elements (applicable SFMTA MUNI rules and procedures) to be addressed and the presentation sequence;

iii. The minimum number of hours for the entire training program as well as each segment;

iv. The requirement for ensuring lesson plans and information are current.

v. The requirements for the number of periodic examinations to be given, when each should be given, as well as the type and the scope of information assessed by each;

vi. Which examinations assess the employee's knowledge about rules and procedures as well as those that assess the ability to perform required tasks according to rules and procedures and;

vii. The minimum requirements, including both knowledge and performance, which must be demonstrated by the employee to attain certification.

b) There are designated position(s) or department(s) responsible for custody of all training and certification records.

c) That refresher training and re-certification of each operating employee is performed at least once every two years.

2. Select at least ten individuals from the rosters of LRV and HSC operators and at least two employees for each of the other classifications. Review the training and certification records for each employee selected to determine if:

a) Each successfully completed the required initial operations training for their position;

b) Each successfully passed the testing for knowledge and ability to perform the operating duties required for certification and:

c) Each successfully completed refresher training and re-certification, as appropriate, within the past two years.

ACTIVITIES, FINDINGS, AND RECOMMENDATIONS

Activities and Findings:

Staff interviewed SFMTA MUNI representatives and reviewed appropriate training and certification records for a number of randomly selected employees and found the following:

1. For the Historic Streetcar (HSC) and Light Rail Vehicle (LRV) operators selected, SFMTA MUNI provided all the required training and certification, but there were instances of missed refresher training for some operators. The Rail Training Manager explained that the Human Resources Department does not provide the training department with this information. Furthermore, he has to obtain it himself on a daily basis from the dispatcher, which makes it difficult to keep refresher training requirements current particularly when

overseeing approximately 360 operators. He agreed with the need to develop the controls necessary to provide his department with operator status information in order to meet all training and certification requirements.

2. For the MRO Transit Supervisors, SFMTA MUNI provided all required training and certification in 2008. SFMTA MUNI did not provide any records for the years 2006 & 2007.
3. For the On Track Equipment Operators, SFMTA MUNI provided all required training and certification; however, labor issues prevented recertification in 2007.
4. For Train Controllers, SFMTA MUNI provided all required training and certification for the year 2008. SFMTA MUNI provided few records for controller training for the years 2006 & 2007 due to insufficient training resources during those years.
5. Training and certification requirements for each of the aforementioned departments are specified in the relevant training programs with minimum requirements for experience, training and testing to confirm appropriate knowledge of rules and procedures and the ability to perform corresponding duties in conformance with those rules and procedures.
6. Staff found no exceptions regarding the training and certification requirements for MRO Transit Supervisors Rail Inspectors, On Track Equipment Operators, and Train Controllers.
7. Staff found one exception regarding the refresher training requirements of Rail Operators as noted above.

Recommendations:

1. SFMTA MUNI should develop controls in order to meet all the training and certification requirements of its rail operators (TN.MO.PL.025).

2008 CPUC SYSTEM SAFETY AUDIT CHECKLIST FOR SAN FRANCISCO MUNICIPAL RAILWAY

Checklist	**23**	**Training and Certification of Cable Car Grip Persons, Conductors, and Inspectors**	
Date of Audit	**October 21, 2008**	Department	**Service Delivery – Cable Car Training**
Reviewers / Inspectors	**Susan Feyl**	Persons Contacted	**John Byrd, Paul Petersen, York Kwan, Brendan Scanlan, Wesley Valaris**

REFERENCE CRITERIA

1. SFMTA MUNI System Safety Program Plan Section 4.16.1
2. CPUC General Order 164 Series
3. Cable Car Operator Training Program Plan TN.MO.PL.014
4. Cable Car Guide Book TN.CC.PL 0.004

ELEMENT, CHARACTERISTICS, AND METHOD OF VERIFICATION

Training and Certification of Cable Car Grip Persons, Conductors, and Inspectors

Interview cable car training representatives and review the appropriate training and certification program plans to determine if they specify:

1. Certification requirements for the cable car Grip Person, Conductors, and Inspectors and include minimum requirements for experience, training and testing to confirm appropriate knowledge of rules and procedures and the ability to perform operating duties in conformance with those rules and procedures;
2. Refresher training and re-certification for the same positions and include comparable training program and testing requirements and;
3. That refresher training and re-certification of the operating employee is performed at least once every two years.

Select the names of four or more employees assigned to each of these cable car classifications. Review the training and certification records for each employee selected to determine if they:

1. Successfully completed the required initial skill and safety related training;
2. Are currently certified to perform their assigned operating duties and;
3. Have successfully completed a refresher training and re-certification program within the

past two years.

ACTIVITIES, FINDINGS, AND RECOMMENDATIONS

Activities and Findings:

Staff reviewed documents as well as training records:(a) for gripmen and conductors – Cable Car Operator Training Program Plan and (b) for inspectors - the Inspector Training Program Plan and found that:

1. Staff found certification requirements in Section 4.5 of the Training Program Plan. They include minimum classroom and line instruction for each job category. The Inspector Training Program follows the Operator Training program and addresses the same requirements. Staff found minimum experience, training, and testing requirements in Section 4. These included driver's license, verification of transit training document, attendance, quiz performance and safe operation of the cable car.
2. Staff found that refresher training and recertification requirements were outlined in Section 4.4.2. These training requirements included a refresher class and passing a test with a minimum passing grade.
3. SFMTA MUNI performs refresher and training recertification every two years according to Section 4.4.2 of the Training Program Plan.

Staff randomly reviewed training records for four employees from each of the three job classifications and found that:

1. Initial training was successfully completed for all selected employees. Some employees had taken return to work training and some had random drug testing performed.
2. All selected employees are currently certified to perform their duties.
3. All selected employees are recertified according to the SFMTA MUNI's requirements.

Staff went beyond the limits of the checklist to inquire about the derailment that occurred on the Powell-Mason line at Powell and Washington on July 14, 2008, and how it affected training. In this derailment, the cable car started rolling away from the conductor and gripman. As a consequence, SFMTA MUNI issued a new, unapproved bulletin, number 08-005, called push procedures. It covers turntables and states that gripmen should push from the front or call control for help if unable to move the car. There have been no new training classes since the derailment which would have incorporated this bulletin.

Comments:

Staff suggests that SFMTA MUNI finalize the bulletin as soon as possible and incorporate lessons learned from the derailment into the training curriculum.

Recommendations:

None.

2008 CPUC SYSTEM SAFETY AUDIT CHECKLIST FOR SAN FRANCISCO MUNICIPAL RAILWAY

Checklist	**24**	**Training and Certification of LRV and HSC Mechanics**	
Date of Audit	**October 29, 2008**	Department	**Service Delivery – Maintenance Training**
Reviewers / Inspectors	**Raed Dwairi**	Persons Contacted	**David Chan, Frank Lum, Fred Orantes.**

REFERENCE CRITERIA

1. SFMTA MUNI System Safety Program Plan Section 4.16.1
2. General Order 164 Series
3. LRV Maintainer Training Program Plan L.PL.021

ELEMENT, CHARACTERISTICS, AND METHOD OF VERIFICATION

Training and Certification of LRV and HSC Mechanics

Interview the vehicle maintenance training representatives and review the training and certification program documents and records to determine if they specify:

1. Training and certification requirements for each vehicle maintenance position;
2. Minimum requirements for experience, training and testing to confirm appropriate knowledge of rules and procedures and the ability to perform vehicle maintenance duties in conformance with those rules and procedures and;
3. The maintenance of records, including test scores, training dates and certification status for each vehicle maintenance employee.

Select at least four employees from each vehicle maintenance classification; also, review the training and certification procedures and records for the persons sampled to determine if:

1. There is a training and certification program and procedures describing SFMTA MUNI's requirements for training and certifying the selected employee's position;
2. Each employee has successfully completed the training and certification program;
3. Training, certification and refresher training records for each selected employee is complete and in compliance with SFMTA MUNI's requirements and;
4. The training each employee received corresponds to the maintenance activities the person is certified to perform.

ACTIVITIES, FINDINGS, AND RECOMMENDATIONS

Activities and Findings:

Staff interviewed the SFMTA MUNI representatives and reviewed appropriate training and certification records for a number of randomly selected employees from each of the vehicle maintenance classifications and found the following:

1. All the selected vehicle maintenance employees completed the required Unrestricted PCC/Milan Training & Recertification course (LRV2/3).
2. An outside contractor provided a four day LRV 2 & 3 Knorr Brake Training on 04/12/07.
3. SFMTA MUNI provided Vapor Door & Step Training on 03/09/07.
4. The department will schedule training & certification classes in January 2009. This will satisfy the refresher training requirements for all vehicle maintenance classifications.
5. SFMTA MUNI has improved its record-keeping significantly since the last time staff conducted this audit.
6. Training and certification requirements for each vehicle maintenance position are specified in the training program with minimum requirements for experience, training and testing to confirm appropriate knowledge of rules and procedures and the ability to perform vehicle maintenance duties in conformance with those rules and procedures.
7. Staff noted no exceptions.

Recommendations:

None.

2008 CPUC SYSTEM SAFETY AUDIT CHECKLIST FOR SAN FRANCISCO MUNICIPAL RAILWAY

Checklist	25	Track Maintenance Training and Certification	
Date of Audit	**October 30, 2008**	Department	**Service Delivery – Track & Signal Maintenance, Maintenance Training**
Reviewers / Inspectors	**Raed Dwairi**	Persons Contacted	**David Chan, Fred Orantes**

REFERENCE CRITERIA

1. SFMTA MUNI System Safety Program Plan Section 4.16.1
2. CPUC General Order 164 Series
3. Track Maintenance Unit Training Program Plan R.TR.PL.012

ELEMENT, CHARACTERISTICS, AND METHOD OF VERIFICATION

Track Maintenance Training and Certification

Interview the track maintenance training representatives and review the training and certification program documents and records to determine if they specify:

1. Training and certification requirements for each track maintenance position;
2. Minimum requirements for experience, training and testing to confirm appropriate knowledge of rules and procedures and the ability to perform track maintenance duties in conformance with those rules and procedures and;
3. The maintenance of records, including test scores, training dates and certification status, etc. for each vehicle maintenance employee.

Select at least four employees from each track maintenance classification and review the training and certification procedures and records for each employee selected to determine if:

1. There is a training and certification program and procedures describing SFMTA MUNI's requirements for training and certifying the selected employee's position;
2. The training each employee received corresponds to the track maintenance activities the employee is certified to perform.
3. Each selected employee has successfully completed the appropriate training and certification program and;
4. Training and certification records for each selected employee are complete and in compliance with SFMTA MUNI's requirements.

ACTIVITIES, FINDINGS, AND RECOMMENDATIONS

Activities and Findings:

Staff interviewed SFMTA MUNI representatives and reviewed appropriate track maintenance training and certification records for a number of randomly selected employees from each of the track maintenance classifications and found the following:

1. All the selected track maintenance employees completed the required On Track Safety and biennial track maintenance training on 07/26/06 & 06/25/08. SFMTA MUNI completed Rulebook training in early October 2008.
2. Record-keeping has improved significantly since the last time staff conducted this audit.
3. Training and certification requirements for each track maintenance position are specified in the track maintenance training program with minimum requirements for experience, training and testing to confirm appropriate knowledge of rules and procedures and the ability to perform track maintenance duties in conformance with those rules and procedures.
4. Staff noted no exceptions

Recommendations:

None.

2008 CPUC SYSTEM SAFETY AUDIT CHECKLIST FOR SAN FRANCISCO MUNICIPAL RAILWAY

Checklist	26	Signal Maintenance Training and Certification	
Date of Audit	**October 22, 2008**	Department	**Service Delivery – Track and Signal Maintenance**
Reviewers / Inspectors	**Jimmy Xia**	Persons Contacted	**Tom Kennedy, Wai Tom, David Chan, Steve Newman, Josh Sadorra, Kevin Mai**

REFERENCE CRITERIA

1. SFMTA MUNI System Safety Program Plan Section 4.16.1
2. CPUC General Order 164 Series
3. Signal & Communications Maintenance Unit Training Program Plan R.SM.PL.001

ELEMENT, CHARACTERISTICS, AND METHOD OF VERIFICATION

Signal Maintenance Training and Certification

Interview the appropriate signal maintenance training representatives and review selected training and certification program documents and records to determine if they specify:

1. Training and certification requirements for each signal maintenance position;
2. Minimum requirements for experience, training and testing to confirm appropriate knowledge of rules and procedures and the ability to perform the signal maintenance duties in conformance with those rules and procedures and;
3. The maintenance of training and certification records, including test scores, training dates and certification status, for each signal maintenance employee.

Select at least four signal maintenance employees from each signal maintenance classification and review the training and certification procedures and records for the employees sampled to determine if:

1. There is a training and certification program and procedures describing the requirements for training and certifying the selected employee's position;
2. Each selected employee has successfully completed the training and certification program;
3. Training, certification and refresher training records for each selected employee is complete and in compliance with SFMTA MUNI's requirements and;
4. The training each employee received corresponds to the signal maintenance activities they are

certified to perform.

ACTIVITIES, FINDINGS, AND RECOMMENDATIONS

Activities and Findings:

Staff interviewed the appropriate signal and communications maintenance training representatives and reviewed the following items:

- The SFMTA MUNI's Signal & Communications Maintenance Unit Training Program Plan (TPP) with an effective date of July 2, 2008.
- A Microsoft Excel spreadsheet developed by the Maintenance Training Personnel that shows the summary of the signal maintenance training history for all of the SFMTA MUNI's signal maintenance employees.
- The SFMTA MUNI's Transit Safe database that the SFMTA MUNI's Maintenance Training personnel uses to enter each signal maintenance employee's training records.

Also, Staff selected four Signal Technicians and all three Supervisors from the roster of signal & communication maintenance employees provided by the department and reviewed the training and certification procedures and records for them.

Summary of the findings is as follows**:**

1. SFMTA MUNI provides the new Signal Maintenance Technicians formal classes and on the job training for three years in order for them to become certified as technicians and obtain the authority to sign off signal maintenance work.

2. Whenever SFMTA MUNI completes a special project such as constructing a new facility or installing new signal equipment, all of the Signal Technicians receive training on the new signal equipment. This training is given by the project's contractor. For example, all the technicians received the new SFMTA MUNI Metro East (MME) rail facility signal training provided by the MME project contractor a few days before the revenue service started. Other training includes the 4th Street interlock signal training, T-line signal training, West Portal Vetag training, and West Portal Track & Signal Training.

3. SFMTA MUNI's Maintenance Training Personnel maintains a training file folder containing the training and certification records. These training and certification records include test scores, training dates, and certification status for each signal maintenance employee.

4. SFMTA MUNI hired Canac Inc., a company that specializes in training for rail companies, to give recertification training to the Signal Technicians every two years since 2004. Since 2004, all

Signal Technicians receive recertification training every two years instead of every three years as mentioned in SFMTA MUNI's Signal & Communications Maintenance Unit TPP. Per the department representatives, the biennial Canac signal recertification training class is the most important training class that the technicians need to take. The Canac signal recertification training class trains the technicians on various switch machines, basic signal systems, and track circuits, etc.

5. The training, certification, and refresher training records for all the selected employees are complete, properly filed in their individual training folders, and entered into the Transit Safe database, and are in compliance with the SFMTA MUNI's training requirements.

6. As of the date of the review, one of the employees missed the Canac signal training class in October 2008 because he was on vacation, another one was on worker's compensation, and the third one was a new employee who hasn't completed three years of on the job training yet and was not available to take that signal training class. SFMTA MUNI personnel stated that they will reschedule these three employees for the training when they report back to work.

Recommendations:

None.

2008 CPUC SYSTEM SAFETY AUDIT CHECKLIST FOR SAN FRANCISCO MUNICIPAL RAILWAY

Checklist	27	Traction Power Maintenance Training and Certification	
Date of Audit	**October 22, 2008**	Department	**Service Delivery – Infrastructure Maintenance Motive Power Unit**
Reviewers / Inspectors	**Raed Dwairi**	Persons Contacted	**David Chan, Robb Bury**

REFERENCE CRITERIA

1. SFMTA MUNI System Safety Program Plan Section 4.16.1
2. CPUC General Order 164 Series
3. SFMTA MUNI Motive Power Unit Training Program Plan W.MP.PR.157

ELEMENT, CHARACTERISTICS, AND METHOD OF VERIFICATION

Traction Power Maintenance Training and Certification

Interview the overhead lines maintenance training representatives and review the training and certification program documents and records to determine if they specify:

1. The training, certification, retraining, and recertification requirements for each overhead lines maintenance position;
2. Minimum requirements for experience, training and testing to confirm appropriate knowledge of rules and procedures and the ability to perform maintenance duties of overhead lines in conformance with those rules and procedures and;
3. The maintenance of records, including test scores, training dates and certification status for each maintenance employee of overhead lines.

Select at least four employees from each maintenance classification of overhead lines and review the training and certification procedures and records for the persons sampled to determine if:

1. Each employee has successfully completed the training and certification programs necessary for performance of job responsibilities;
2. Training, certification and refresher training records for each selected employee are complete and in compliance with the SFMTA MUNI's requirements and;
3. Complete training and certification records are in the custody of the specifically identified department or other entity responsible.

ACTIVITIES, FINDINGS, AND RECOMMENDATIONS

Activities and Findings:

Staff interviewed the SFMTA MUNI representatives and reviewed appropriate traction power and overhead training and certification records for a number of randomly selected employees from each of the traction power maintenance classifications and found the following:

1. All the selected traction power maintenance employees completed the required triennial training in 2005 & 2008.
2. SFMTA MUNI provided Traction Power Substation training from 07/10/06 – 07/14/06 for the employees selected.
3. SFMTA MUNI provided 3rd Street traction power training on the Impulse Substations in July 2006.
4. Mitchell Engineering provided a Ventilation System Training course to all the employees selected on 04/20/06 at the Illinois Traction Power Substation.
5. Abbett Electric Corp. provided a Fiber Optic System & Security System Training on 04/20/06 also at Illinois Traction Power Substation.
6. Record-keeping has improved significantly since the last time staff conducted this review.
7. SFMTA MUNI provided Overhead Refresher Training on modules 1 through 12 in 2008 for all employees selected.
8. Training and certification requirements for each maintenance position of overhead lines are specified in the maintenance training program with minimum requirements for experience, training, and testing to confirm the appropriate knowledge of rules and procedures and the ability to perform the maintenance duties of overhead lines in conformance with those rules and procedures.
9. Staff noted no exceptions.

Recommendations:

None.

2008 CPUC SYSTEM SAFETY AUDIT CHECKLIST FOR SAN FRANCISCO MUNICIPAL RAILWAY

Checklist	28	Operating Rules and Procedures for Historic Streetcars	
Date of Audit	**October 21, 2008**	Department	**Service Delivery – Green Metro Training**
Reviewers / Inspectors	**Gail Davis, Anton Garabetian**	Persons Contacted	**John Byrd, Paul Petersen, York Kwan, Harlan Lee**

REFERENCE CRITERIA

1. SFMTA MUNI System Safety Program Plan Section 4.13
2. CPUC General Order 143-B, Sections 1 and 8
3. CPUC General Order 164 Series
4. F-Line Operator Training Manual TN.MO.MN.007
5. Milan Streetcar Operating Procedures TN.MO.MN.007
6. Presidents Conference Committee (PCC) Historic Streetcar Vehicle Operations TN.MO.MN.032
7. Vintage/Historic Streetcars Operation TN.MO.MN.033

ELEMENT, CHARACTERISTICS, AND METHOD OF VERIFICATION

Operating Rules and Procedures for Historic Streetcars

Interview the responsible operating rules and procedures representative and review the applicable documents to determine if:

1. Operating rules and procedures for historic streetcars have been prepared, approved for use and issued to all historic streetcar operators, rail inspectors, and central control operators;
2. The appropriate change control activities and processes were followed for updating the rules and procedures;
3. The rules contain a listing of the maximum authorized speeds for each section of right-of-way where historic streetcars may be operated;
4. SFMTA MUNI established the use of specific operating rules and procedures, in a form separate from its historic streetcar operations training manuals, for each type of historic streetcar; and
5. The historic streetcar rules and procedures have been reviewed, updated and administered consistent with the SFMTA MUNI's existing practices for other operating rules and procedures.

ACTIVITIES, FINDINGS, AND RECOMMENDATIONS

Activities and Finding:

Staff reviewed the operating rules and procedures for historic streetcars. These documents were authored by the Training Department and SFMTA MUNI will incorporate them into the new rules. These rules will become effective by December 1, 2008, according to the SFMTA MUNI Training Department.

Note:

Staff received an e-mail on 10/27 from SFMTA MUNI stating that they won't be able to meet the December 1 date because the configuration control representative wants to make all changes at one time and not "piece-meal". The Training Department Manager stated that he would let staff know the new timeline sometime in the next week. Staff has not heard from the Training Department on this issue as of 1/12/09.

Staff reviewed the change control activities and processes which were followed for updating the rules. SFMTA MUNI will incorporate amended train spacing electric car rule (4.26.3) bulletin requiring 250 feet spacing between all the SFMTA MUNI rail vehicles, including the historic street car and PCC cars, into the new historic street car and PCC rules.

The F-line rules contain maximum authorized speeds for PCC cars. This speed table was not in the historic streetcar rules.

F-line PCC and other historic streetcars have separate training manuals. Operators learn first to operate PCC cars and then later certify on historic street cars. The training department stated that once the PCC streetcar operation is mastered, it is easier to learn the more complex operation of the historic streetcars.

Staff reviewed the Field Training Protocol for all rail cars. The protocols for historic street cars and PCC cars differ according to the equipment. SFMTA MUNI teaches all streetcar operators the use of "slugging" or deployment of emergency braking. Operators learn about the technique in the classroom and then have the occasion to practice it in the field one time. They perform this function only one time due to the fact that "slugging" a streetcar is not good for the equipment.

Recommendations:

1. SFMTA MUNI should include maximum speed limits for sections of right-of-way in the rules for historic street cars (similar to the speed table in the rules for PCC cars) (Rulebook SF-1010 and TN.MO.MN.032).

2008 CPUC SYSTEM SAFETY AUDIT CHECKLIST FOR SAN FRANCISCO MUNICIPAL RAILWAY

Checklist	**29**	**Program of Operational Evaluations – Metro and Cable Car Divisions**	
Date of Audit	**October 23, 2008**	Department	**Service Delivery Cable Car Operations and Green Metro Operations**
Reviewers / Inspectors	**Gail Davis, Anton Garabetian**	Persons Contacted	**John Byrd, Brendan Scanlan, Sarita Britt**

REFERENCE CRITERIA

1. SFMTA MUNI System Safety Program Plan Section 4.13
2. CPUC General Order 143-B, Section 13.0
3. General Order 164 Series
4. Rail Vehicle Transit Operator Compliance Program TN.MO.PR 019

ELEMENT, CHARACTERISTICS, AND METHOD OF VERIFICATION

Program of Operational Evaluations – Metro and Cable Car Divisions

1. Interview the Operating Department representatives in charge of the subject program and review supporting documents and records to determine if a program of operational evaluations, with appropriate written procedures and record forms, has been developed and implemented for:
   a. Cable car crews;
   b. Historical streetcar operators and;
   c. LRV operators.
2. Determine if the required periodic surreptitious observations of LRV, HSC, and cable car crews' performance has been formally added to the program of operations evaluations and is being properly implemented.
3. Determine if the results of those surreptitious observations have been analyzed to determine the need for improvements to:
   a. The SFMTA MUNI's training programs, including clarifying meaning and application of rules and procedures, and;
   b. The adequacy of operations supervision programs and existing rules and procedures.

4. Select at least four cable car crewmembers, four historic streetcar operators and eight LRV operators and review the program records to determine:
   a. The number of performance evaluations performed for each selected crew or operator;
   b. The operating standards evaluated;
   c. The performance observed and;
   d. The findings and subsequent actions taken.

ACTIVITIES, FINDINGS, AND RECOMMENDATIONS

Activities and Findings:

Staff interviewed the Operating/Training department representatives to review documents and records supporting its process of operational evaluation for LRV and streetcar operators at the Green Division and then reviewed the same with the Cable Car Division. Per TN.MO.PR 019, the following evaluation processes are to be followed to determine and measure rule compliance:

1. A yearly compliance check – the operator is aware of the instructor or manager's presence and demonstrates his or her job knowledge while operating the vehicle.
2. A surreptitious ride check – there is no requirement for each operator to have a yearly ride check. Per TN.MO. PR019, the number of surreptitious ride checks must be 20% of the total number of operators. These are randomly done and an operator can go for years without ever having a ride check.
3. Follow-up ride check – SFMTA MUNI provided various reasons for conducting "follow-up ride checks". In the Green yard, it is a follow-up to a rules violation or another problem. In the Cable Car division, it is a form of efficiency testing and provided as a response to anecdotal information about an operator.

Staff reviewed the records at Green Division.

Staff interviewed Green Division training instructor. Staff reviewed supporting documents and records to determine if SFMTA MUNI has developed and implemented a program of operational evaluations with appropriate written procedures and record forms.

1. SFMTA MUNI Green Division developed a Standard Operating Procedure (SOP) No. TN-MO-PR-019 for program of operational evaluations, with appropriate written procedures and record forms and is implementing it for Green Division train operators (T/O). SFMTA MUNI developed F Line and Light Rail Vehicle (LRV) Car Observation Check forms for operators. SFMTA MUNI SSPP does not refer to the SOP MO-PR-019 for T/O operational evaluations.

2. SFMTA MUNI Green Division formally added periodic surreptitious observations of F Line and LRV T/O performance to the program of operations evaluations and is implementing it properly.
3. SFMTA MUNI analyzes the results of those surreptitious observations to determine the need for improvements. If training instructor observation evaluation of the cable car operators requires operation improvement, the training instructor communicates with the operator on areas to improve and how to improve the operation. If the evaluation is unsafe, the instructor completes a form, which is a notice of unsafe operation, and sends it to the superintendent. The superintendent prescribes the appropriate corrective action.

Staff reviewed records for four streetcar operators. There were records of surreptitious rides only for 2008. Per the MUNI Training Superintendent, the records for previous years are located at the Presidio Building in the Training Manager's office, while the rest of the evaluation records are at the Green Yard location. In an e-mail dated 10/27/2008, the Training Manager advised there were no surreptitious rides for 2006 and 2007. Based on SFMTA MUNI's SOP # TN.MO.PR 019, Section 3.5, "Training and Development is responsible for scheduling at least 20% of the LRV and cable car operators for an irregular, anonymous check every year or whenever requested by a division operation superintendent or senior management."

Historic Street Car Operators reviewed (names withheld):

a. – F-Line Operator. Compliance Check 01/07/08 Follow-up ride checks 02/02/07 and 08/07/08. (newly trained in early 2007)
b. – F-Line Operator. Compliance Check 04/01/08 on the F-Line Compliance Check 07/11/07 on LRV (newly trained)

LRV operators reviewed:

a. – LRV. Compliance 05/16/08. Newly certified on 05/08/08.
b. – LRV. Compliance checks: 01/29/08, 3/14/07, 3/29/06
c. – LRV. Compliance checks: 05/16/08, 03/02/07, 03/30/07
d. – LRV. Compliance check: 05/16/08. Newly trained.
e. – LRV. Compliance checks: 02/29/08, 06/15/07; follow-up- testing dates: 08/07/08, 08/20/08, 10/16/07, 12/14/07, 12/17/08
f. – LRV. Compliance checks: 08/01/08, 08/22/07, 08/30/07, 11/10/06; follow-up testing: 08/31/07, 04/11/06

Cable Car operators (Gripmen) reviewed:

a. – Cable Car; Annual Compliance check – 03/29/06 and 03/09/06. There was no 2007

compliance check. Follow up checks – 03/29/06 and 03/09/06. Surreptitious checks - 05/08/08, 05/22/08, -0923/08, 07/24/08, 06/26/08, 05/12/08, 05/21/08, 06/09/08, 09/26/08

b. – Cable Car; Annual Compliance Check – 07/08/08, 2/16/06; follow-up testing – 8/1/08, 07/03/08, 05/28/08, 12/02/07; Surreptitious ride checks - -5/14/08, 05/12/08, 05/21/08, 06/09/08, 08/26/08.

c. – Annual Compliance check 02/04/09; requalification 04/02/07; follow-up – 10/25/07; surreptitious ride checks – 05/22/08, 06/29/08, 05/29/08, 9/28/08.

d. – Annual Compliance Check- 03/23/07, 01/11/08, 2/15/06. Follow-up 4/18/06, 6/6/08, 03/21/07, 02/27/08, 02/05/08, 03/28/06, 02/13/06. Surreptitious checks – 05/15/08, 09/03/08, 05/20/08, 07/23/07.

Staff also reviewed records for 14 additional employees.

The major push by the Cable Car Division this past year for more operating testing is a result of a Divisional Bulletin issued by the Operations Superintendent of the Cable Car Division. The bulletin 08-002 issued May 9, 2008, states that, starting immediately, inspectors will perform at least three daily Observation Checks and will perform Surreptitious ride checks when possible. Training instructors and assistant superintendents will also do checks when possible.

The records of several Cable Car employees reviewed had no 2007 Annual Compliance Check. The Superintendent explained that the training department during that period of time was not managed well, and that if they did have them, the former manager did not file them.

Recommendation:

1. SFMTA MUNI should review and revise its TN.MO.PR.019 – Rail Vehicle Transit Operator Compliance Program to improve and increase its frequency for a) surreptitious ride check of operators and b) "regular (standard)" testing of operators (SSPP 4.13).

2008 CPUC SYSTEM SAFETY AUDIT CHECKLIST FOR SAN FRANCISCO MUNICIPAL RAILWAY

Checklist	30	Central Control Train Controllers Performance	
Date of Audit	**October 28, 2008**	Department	**Service Delivery – Operations Central Control**
Reviewers / Inspectors	**Gail Davis, Colleen Sullivan**	Persons Contacted	**John Byrd, Jim Kelly, David Banbury**

REFERENCE CRITERIA

1. SFMTA MUNI System Safety Program Plan Section 4.13
2. CPUC General Order 143-B, Section 13.0
3. General Order 164 Series
4. OCC Compliance Check Program R.OC.PR.028
5. List of OCC Procedures

ELEMENT, CHARACTERISTICS, AND METHOD OF VERIFICATION

Central Control Train Controllers Performance

Using a combination of direct observations, document reviews, and interviews with Central Control Train Controllers, determine if:

1. They perform their duties in accordance with the governing rules, procedures, bulletins, notices, etc.;
2. They have the applicable reports, logs and other records they are required to prepare and maintain current and available for review and;
3. Are knowledgeable and understand the procedures for dealing with fires, floods, earthquakes, injury accidents and coordination with BART.

ACTIVITIES, FINDINGS, AND RECOMMENDATIONS

Activities and Findings:

1. Staff observed train controllers at the OCC and found them to be performing their duties in accordance with current rules and procedures. SFMTA MUNI management at the OCC operates out of the Controller Rulebook and a book of bulletins for 2008. Any bulletin that is

a carryover from a previous year is reissued in the current year so that all rules are accessible in two manuals and not spread over several years of bulletins. The bulletins were well-organized and accessible to controllers. This is a best practice. The OCC controller manual is redone every three years with permanent bulletins incorporated.

2. Staff reviewed logs, reports, bulletins, radio transmission slips and other pertinent forms and found them all readily available and well-organized.
3. There are procedures in the OCC Controller Manual for emergency procedures including floods, earthquakes, etc. The training manager at OCC has taken a proactive step, and, in addition to biennial certification, has created and administered a "Non-communicating train Hazard" test for controllers. This covers the scenarios they may present themselves in case of a train in the subway losing communication with the automatic train system. SFMTA MUNI has several MOUs with BART and has an excellent working and coordinating relationship with BART management and SFMTA MUNI personnel with regard to the Market Street subway corridor including providing bus bridges for BART when practicable. OCC has only one radio channel for rail, which keeps the radio controller completely occupied. Emergency calls do get a priority status. Due to the physical limitations of the current outdated radio system, SFMTA MUNI is getting funded to update its radio system by 2012.

Recommendations:

None.

2008 CPUC SYSTEM SAFETY AUDIT CHECKLIST FOR SAN FRANCISCO MUNICIPAL RAILWAY

Checklist	31	Metro LRV and Historic Streetcar Train Operator Performance	
Date of Audit	**October 21, 2008**	Department	**SFMTA MUNI Green Division**
Reviewers / Inspectors	**Gail Davis, Susan Feyl**	Persons Contacted	**John Byrd, Sarita Britt, York Kwan, Frank Lum**

REFERENCE CRITERIA

1. SFMTA MUNI System Safety Program Plan Section 4.13
2. CPUC General Order 143-B, Section 13.04
3. CPUC General Order 164 Series
4. Metro Rail Operations Inspector Manual
5. Rules and Instructions Handbook
6. Rail Vehicle Transit Operator Compliance Program

ELEMENT, CHARACTERISTICS, AND METHOD OF VERIFICATION

Metro LRV and Historic Streetcar Train Operator Performance

Yard Operations:

1. Reviewers should observe train operations in the Green and Geneva Yards for at least two hours to determine if:
   a) Trains are being operated in compliance with applicable SFMTA MUNI operating rules and procedures:
   b) The train operators, with trains departing the yards to enter revenue service, correctly perform pre-departure checks;
   c) Coupling and uncoupling actions are performed safely and according to rules and procedures;
2. Interview at least two departing train operators to determine if they have all of the required safety items including flashlights, rule books, radios, etc. in proper working order.
3. Select and interview at least four HSC or LRV train operators to evaluate their knowledge and understanding of SFMTA MUNI's operating rules and procedures for yard operations.

Mainline Operations:

Observe, on-board, the operations of at least four LRV trains in both subway and street

operations and at least four HSC trains in street operation to determine if:

a) Each train operator performs in compliance with the governing orders, rules and procedures, etc. and;
b) Each operator possesses the required on-board safety equipment.

Interview at least four LRV and four HSC train operators to evaluate their knowledge and understanding of SFMTA MUNI's rules and procedures related to LRV mainline operations.

ACTIVITIES, FINDINGS, AND RECOMMENDATIONS

Activities and Findings:

Staff reviewed random observations /violations cited by SFMTA MUNI inspectors of their own operations. Not many records were readily available. The available record for one month showed that SFMTA MUNI gave only one citation for noisy horn blowing. SFMTA MUNI was supposed to send additional citation copies, but CPUC staff has not received them as of 1/12/09.

Staff observed that trains were operated according to SFMTA MUNI operating rules in the Green Yard. Staff interviewed one yard operator regarding rules. He stated that trains must move slowly at 5 mph in the yard and 3 mph on curves, and that he didn't do reverse moves unless someone protects the rear of the LRV. He stated that it was not his job to check sand as maintenance personnel are responsible for that.

Staff observed three operators in the Green Yard regarding required safety items. One operator that was waiting to depart the yard stated that his rulebook and flashlight were in another vest, which he retrieved from his motorcycle. Also noted, when staff approached this same operator on an LRV in the control compartment, the operator had a "Jawbone" Bluetooth apparatus in his ear. He advised staff that he does not use it when operating on the street. A member of management advised staff that if an operator is at the controls of the LRV awaiting departure from the yard, he should not have electronic apparatus in use as he is on duty. Another operator had his rulebook and flashlight in his possession as prescribed by rule. His cab contained a dash mounted radio. The third operator also left his rulebook in another vest.

Staff observed four operators performing pre-departure checks. Operators sounded the horn and gong and checked door openings. One operator did a particularly thorough job. He tested everything twice, checked the steps, looked for water spills - a tripping hazard, looked for sand,

and checked that the signs worked. He had maintenance personnel fill his sand reservoirs as two of them were nearly empty.

Staff observed one coupling/uncoupling maneuver and did not observe anything unusual.

Staff attempted to observe operations and review operators in the Geneva Yard but was unsuccessful because most all of the trains had already departed by the afternoon when the review was scheduled. This yard houses the "one of a kind" streetcars and Milan cars which do not have evening departures.

Staff observations at King Street and Fourth Street showed no rule violations.

Staff observed traffic signal lights at the 3rd Street and 16th Street intersection. There may be inadequate/confusing signage for controlling illegal left turns by motorists at this intersection.

These findings appear to be similar to the violations such as stop sign running and cell phone usage, which were involved in accidents that occurred on June 14, 2008 (16 injuries-cell phone usage), August 20, 2008 (1 fatality, ran double X stop), and September 24, 2008 (1 fatality, ran stop).

Recommendations:

1. SFMTA MUNI should review and revise its TN.MO.PR.019 Train Operator Compliance Program to improve its operational/efficiency testing procedures (TN.MO.PR.019).
2. SFMTA MUNI should train operators on required safety equipment and all rule book requirements. SFMTA MUNI should develop a training and discipline procedure for operators who do not follow the requirement. SFMTA MUNI should perform operations/efficiency testing including, but not limited to spot checks for safety equipment and rules books before operators depart yards. SFMTA MUNI should utilize its inspectors in performing street testing and issuing warnings. Training personnel should conduct operations/efficiency testing exercises on a higher frequency than the current practice of one test per operator each year (TN.MO.PR.019). Additionally the operators' personnel records should show a "failed operations test" (Rulebook SF-1010 and TN.MO.PR.019).

2008 CPUC SYSTEM SAFETY AUDIT CHECKLIST FOR SAN FRANCISCO MUNICIPAL RAILWAY

Checklist	**32**	**Cable Car Operating Crew Performance**	
Date of Audit	**October 29, 2008**	Department	**Service Delivery Cable Car Operations**
Reviewers / Inspectors	**Gail Davis, Colleen Sullivan**	Persons Contacted	**John Byrd, Brendan Scanlan**

REFERENCE CRITERIA

1. SFMTA MUNI System Safety Program Plan Section 4.13
2. CPUC General Order 164 Series
3. Rail Operations Rule book
4. Cable Car Guidebook Training Manual

ELEMENT, CHARACTERISTICS, AND METHOD OF VERIFICATION

Cable Car Operating Crew Performance

Observe, on-board or wayside, the operations of not less than six cable cars being operated on all three lines to determine if:

1. Each crew member performs in compliance with the governing rules and procedures.
2. Each crew member possesses the required on-board safety equipment.
3. Interview at least six cable car crewmembers to evaluate their knowledge and understanding of SFMTA MUNI's cable car operating rules and procedures.

ACTIVITIES, FINDINGS, AND RECOMMENDATIONS

Activities and Findings:

1. Staff observed cable cars on all lines and rode the Powell Line, the Hyde Line and the California Line. Staff observed the bell ringing between the gripman and the conductor to be in accordance with rules when stopped and moving. Gripmen and conductors were knowledgeable about their duties and answered operations questions correctly. Staff observed a complete pre-operation check including checking and adjusting both brake and foot brake, checking sanders, checking looseness or stiffness of grip and adjusting any

anomaly for safe operation, checking track brakes for cracks, checking lights, checking doors, and checking the running boards to make sure there were no structural safety issues.

2. All six gripmen and conductors interviewed were in possession of required personal equipment including rulebooks and personal protective equipment.
3. Staff posed questions such as what process should be followed if the grip "welds" to the rope, how to handle a car with new dies, or how to handle a new rope. Also discussed were precautions and handling in wet weather. Gripmen and conductors interviewed had a mastery of their duties and the handling of the cars. One particular gripman explained and demonstrated exactly when to apply braking after cresting a hill.

Recommendations:

None.

2008 CPUC SYSTEM SAFETY AUDIT CHECKLIST FOR SAN FRANCISCO MUNICIPAL RAILWAY

Checklist	**33**	**Operating Rules and Procedures for Cable Cars**	
Date of Audit	**October 22, 2008**	Department	**Cable Car Operations**
Reviewers / Inspectors	**Gail Davis**	Persons Contacted	**John Byrd, Brendan Scanlan**

REFERENCE CRITERIA

1. SFMTA MUNI System Safety Program Plan Section 4.13
2. CPUC General Order 164 Series
3. Master File for Bulletins SOP

ELEMENT, CHARACTERISTICS, AND METHOD OF VERIFICATION

Operating Rules and Procedures for Cable Cars

Interview the responsible SFMTA MUNI cable car operating representative, review cable car operating rules and procedures and examine records as well as bulletin and notice postings to determine if current program requirements and practices include:

1. That, at a minimum, there is a procedure, which is being implemented, for issuing interim or permanent mandatory operating directives ("bulletins") and a separate provision for issuing non-operating directives and advisory or informational notifications ("notices");
2. A formal description of the purpose of each ("bulletin" or "notice") and what each is used for;
3. An explanation on the limitations of use, and how each is prepared, approved, distributed, signed for, posted and recalled or annulled, etc.
4. That bulletins and notices, when issued, are entered on a master log to control issuance and distribution as well as to track the active/inactive status of each notice and bulletin;
5. That a record is maintained for each bulletin issued and each employee receiving a copy of that bulletin;
6. The active bulletins and notices are posted at SFMTA MUNI specified locations;
7. No non-current bulletins are posted at the SFMTA MUNI designated locations and;
8. Inactive bulletins and notices are removed from those posting locations, and the affected employees are notified the directive is no longer in effect.

Select a sample of six or more cable car mandatory directive operating "bulletins" issued to cable car personnel within the last two years. Review records to determine whether or not:

1. Each affected operating employee has received those bulletins;
2. Affected employees were notified when any bulletin is no longer in effect.
3. The bulletins are posted at selected locations identified by SFMTA MUNI;
4. No non-current bulletins are posted at the SFMTA MUNI designated locations.

Select a sample of six or more cable car operating "notices" issued to cable car personnel within the last two years. Review records to determine if any mandatory interim or permanent operating directive is issued on an "operating notice" form.

ACTIVITIES, FINDINGS, AND RECOMMENDATIONS

Activities and Findings:

Staff interviewed the Operations Superintendent at the Cable Car Division to review records of bulletins and notices and discuss their handling with reference to operating practices. The SFMTA MUNI personnel were very forthcoming and transparent in discussion of the division's operating practices.

1. The procedure being used at the division is the SY.PR.027 – Master File for All Rules, revision 03. The procedure in this file pertains to handling all aspects of bulletins and notices. SY.PR.027 is a system document and is used by all rail divisions of SFMTA MUNI.
2. There is a description of both "Notices" and "Bulletins" and a definition of each in SY.PR.027 Section 3.0.
3. SY.PR.027 section 4.3 details how each bulletin is prepared, approved, distributed, signed for, posted and recalled or annulled. All areas pertaining to these requirements are mentioned and addressed in general fashion.
4. SFMTA MUNI files each year's bulletins and notices in a folder that has a master log title. This log shows when the bulletin was issued, when and how it was distributed, and also shows the status of the bulletin, whether active or inactive.
5. SFMTA MUNI maintains a record for each bulletin. However, SFMTA MUNI does not keep any records on the majority of bulletins in terms of which individual employee received them. Cable Car personnel advised that they were instructed not to require signatures from individual operators when receiving the bulletins due to union concerns regarding this practice. Note that SY.PR.027 section 4.3 states that, "Division Superintendents shall obtain signatures from all employees whose duties are prescribed by General Bulletins…when they are issued." The same section also states, "The Division Superintendent will verify against

division rosters that all active employees receive and sign for General Bulletins…Employees on leave will receive and sign off for General Bulletins when they are processed to return to work." Additionally, the Rules and Instructions Handbook for San Francisco Municipal Railway (the current rulebook) in section 2.2.8, states, "Employees receiving bulletins or orders from the proper authority must formally acknowledge their receipt and understanding of the document." A formal receipt would at the minimum require a signature.

6. The SY.PR.027 section 4.3 prescribes that the Divisional Superintendent post bulletins and notices on the divisional bulletin board. The Cable Car division is doing this. Additionally, they are posted on clipboards accessible to all of the Cable Car operators.
7. The non-current bulletins are removed from the bulletin board by the Divisional Superintendent.
8. SY.PR.027 section 4.3 designates responsibility for the removal of all expired bulletins. Staff discussed with the superintendent various ways to advise operators that bulletins were no longer in effect, including putting a starting and ending date on the bulletin before issuance if the ending date is known in advance.

After reviewing the bulletin procedures, Staff then reviewed a sampling of six bulletins issued to Cable Car personnel during the past two years. Staff examined the bulletins and master log to determine if the procedures set forth in SY.PR.027 had been utilized.

1. Staff found only one bulletin where signatures of the operators had been obtained. The superintendent explained at that time that he was instructed by senior management to stop requiring operator signatures due to union objections.
2. SFMTA MUNI notifies affected employees when the bulletins became inactive. (There was only one example as the rest of the reviewed bulletins are still in effect.)
3. SFMTA MUNI posts the bulletins in the location as specified by the procedure.
4. There were no inactive bulletins posted on the bulletin board.

Recommendations:

1. SFMTA MUNI should adhere to the procedures set forth in SY.PR.027 and Rule 2.2.8 requiring the signatures of operators on receipt of operational bulletins. This is of particular importance in that operational bulletins many times deal with safety issues and the bulletins become operating rules. Operators currently sign for their Rulebooks and should also be required to sign for operation bulletins (SY.PR.027).

Note: The reviewer's recommendation regarding regular revision of the operator rulebook has been already incorporated in checklist #9.

2008 CPUC SYSTEM SAFETY AUDIT CHECKLIST FOR SAN FRANCISCO MUNICIPAL RAILWAY

Checklist	34	Metro Track Maintenance Program	
Date of Audit	**October 22, 2008**	Department	**SFMTA MUNI Track Department**
Reviewers / Inspectors	**Vincent Kwong**	Persons Contacted	**Wai Tom** **Ken Butori** **Fred Orantes**

REFERENCE CRITERIA

1. SFMTA MUNI System Safety Program Plan Section 4.14
2. CPUC General Order 143-B, Section 14
3. CPUC General Order 164-D, Section 3
4. Track Inspection and Maintenance (Effective 8/21/08)

ELEMENT, CHARACTERISTICS, AND METHOD OF VERIFICATION

Metro Track Maintenance Program

Interview the SFMTA MUNI representative responsible for track maintenance and review the track maintenance program, procedures, selected records and standards, to determine if:

1. A current standard operating procedure or program manual, describing SFMTA MUNI's preventive maintenance program for mainline track and a comprehensive set of track standards with inspection and measurement acceptance criteria have been prepared, approved, and issued for use.
2. All surface mainline track and special work was inspected at the specified frequencies required by SFMTA MUNI's standards;
3. All mainline tracks in the SFMTA MUNI Metro subway were inspected at the specified frequencies during the past 12 months as required by SFMTA MUNI's standards;
4. The required inspections were documented on standardized track inspection report forms and;
5. Repairs to correct defects and non-compliances noted on the track inspection report forms were completed and signed off in a timely manner.
6. SFMTA MUNI is ensuring that the track maintenance crews are given adequate nighttime access and resources to complete their work.

ACTIVITIES, FINDINGS, AND RECOMMENDATIONS

Activities and Findings:

1. The current standard operating procedure titled Track Inspection and Maintenance (Effective 8/21/08) provides an overview of responsibilities and procedures for maintenance program including the following:
    a. General preventive track inspection and maintenance response with acceptable schedules.
    b. Prioritization of conditions based on measurement acceptance criteria for mainline track.
2. Staff reviewed the following records of inspections on the surface track and switches for frequency as required by SFMTA MUNI's standards in the last three years:
    a. Inspection and Defect Tracking Database – lists out the inspection number attached to the data with date, Inspector, Line Inspected, and Open/Closed status of defects.
    b. September 2007 - Track Maintenance – Surface Track Inspections and Switch Maintenance Log
    c. July 2008 Track Maintenance – Surface Track Inspections and Switch Maintenance Log

Track Inspection and Maintenance – Section 4.6 – Inspection of yard track and yard switches should occur once each month, with at least 20 calendar days between inspections.

Non-compliances:

- SFMTA MUNI did not record any inspections for the month of September 2007 in the Geneva and Metro Yard.

3. Staff reviewed the following records of inspections on the subway track and switches for frequency as required by SFMTA MUNI's standards in the last three years:
    a. Inspection and Defect Tracking Database – lists out the inspection number attached to the data with date, Inspector, Line Inspected, and Open/Closed status of defects
    b. September 2007 Track Maintenance – Subway Track Inspections and Switch Maintenance Log
    c. July 2008 Track Maintenance – Subway Track Inspections and Switch Maintenance Log

Track Inspection and Maintenance – Section 4.6 – Inspection of track in the subway lines should occur once a week with three days minimum between inspections.

Non-compliances:

- There is no record of track inspections occurring in Van Ness/Duboce, Duboce/Church, Church/Castro, Castro/Eureka, Eureka/Forest Hill, Forest Hill/W. Portal, W. Portal, and Sunset Tunnel during the week of July 7-11, 2008
- There is record of only two track inspections completed for MMT in July 2008.

4. Track and switch inspectors record the results and information onto a form that is located in the Track Inspection and Maintenance (Effective 8/21/08), Appendix A. However, previous versions of the report form correspond to the respective standard operating procedure revision.
5. Staff reviewed the following records of work-orders for timely completion for the last three years:
    a. August 2006 Track Maintenance – Inspection Defect/Work Orders
    b. Surface and Subway Track Maintenance Work-Order Tracking Form (10/21/08)
    c. Current Inspection Reports Database available

Track Inspection and Maintenance – Section 4.7 – During routine and/or special inspections, SFMTA MUNI ranks track conditions with Priority 1 as the highest ranking and reports them when there is an immediate hazard. Priority 6 is the lowest ranking, to be designated when an item shall be added to upcoming routine maintenance. Maintenance response is also designated for each priority with Priority 1 being immediate and Priority 6 not applicable.

Non-compliances:

- Many of the current open work orders do not have priority assigned to them.
- On the M Line, an inspection report dated 9/19/07 at various locations along 19th Avenue shows needed tamping and re-spiking as well as concrete and paving. The priorities assigned to these are five which require a maintenance response of 120 days. This item is still open as of 10/22/08.
- On the Van Ness SW V3A section, an inspection report dated 7/24/08 shows worn rail with priority three. The required maintenance response for a priority three is 30 days. This item is still open as of 10/22/08.
- On the Eureka TL, an inspection report dated 7/16/08 shows needed attention for build frog with priority three. The required maintenance response is 30 days. This item is still open as of 10/22/08.
- On the Sunset Tunnel at Duboce mark 521, an inspection report dated 3/12/02 shows worn rail with a priority of 3. The required maintenance response is 30 days. This item is still open as of 10/22/08.

6. According to SFMTA MUNI representatives there are two crews which complete work

orders for surface track during the daytime. A night crew is responsible for track maintenance of the subway with only a three to four hour window during non-revenue service. As shown above by the backlog of defects and non-compliances noted on work order report forms, SFMTA MUNI does not provide adequate time or resources to meet the maintenance needed throughout the system.

7. According to the inspection reports from 2007 – 2008, several maintenance defects identified have not been addressed and are overdue. Also, the maintenance defects were not prioritized.

Following are additional findings:

1. The Track Maintenance Daily Procedure has been superseded by the new Track Inspection and Maintenance Manual (Effective 8/21/08)
2. Health and Safety Department does not have the most updated track inspection standard operating procedures.
3. The Track Department does not perform inspections on the track along the Cable Car Lines but provides assistance when there is a request.
4. Geneva and Metro Yard inspectors inspect the trackway daily but do not complete reports for them.
5. Ultrasonic testing occurred in September 2007. SFMTA MUNI completed maintenance repairs to correct the defects found in the results of the ultrasonic testing.
6. The Track Department maintenance personnel reduced from approximately 70 to 56 workers. They are responsible for track maintenance despite the recent opening of the SFMTA MUNI Metro East maintenance facility and the Third Street Extension Line as well as increased wear due to increased ridership.
7. Following up with the previous 2005 SFMTA MUNI Safety Audit, the database functions used for tracking non-compliances and work orders associated with inspections are acceptable. However, MUNI has not provided adequate resources to perform track maintenance.

Recommendations:

1. SFMTA MUNI should follow its Track Inspection and Maintenance SOP and allocate adequate resources (time, equipment, and number of workers) to inspect and maintain its tracks (R.TR.PR.001).
2. SFMTA MUNI should ensure that track defects are properly identified and corrected according to the priority rating as described in the SFMTA MUNI standards (R.TR.PR.001).

2008 CPUC SYSTEM SAFETY AUDIT CHECKLIST FOR SAN FRANCISCO MUNICIPAL RAILWAY

Checklist	**35**	**LRV Maintenance Program**	
Date of Audit	**October 22, 2008**	Department	**Service Delivery, Green Metro Maintenance**
Reviewers / Inspectors	**Joey E. Bigornia**	Persons Contacted	**John Sadorra, Jamie Young, Larry Field, Josh Sadorra**

REFERENCE CRITERIA

1. SFMTA MUNI System Safety Program Plan Section 4.15
2. CPUC General Order 143-B, Section 14.04
3. CPUC General Order 164 Series
4. Rail Vehicle Preventive Maintenance & Inspection Scheduling L.PR.017

ELEMENT, CHARACTERISTICS, AND METHOD OF VERIFICATION

LRV Maintenance Program

1. Select at least six LRVs and review the respective preventive maintenance, inspection and repair records prepared during the past ten or more months to determine if:
   a) The Preventive Maintenance Inspection procedures are current and consistent with all LRV modifications;
   b) The required inspections and other maintenance activities were performed at the specified frequencies;
   c) The responsible maintenance workers properly documented the inspection and maintenance activities;
   d) Defects and non-compliances identified during the PM inspections were properly documented, corrected, and closed out in a timely manner and;
   e) No LRV with safety defects was returned to service until all safety defects were repaired.

ACTIVITIES, FINDINGS, AND RECOMMENDATIONS

Activities and Findings:

1. Staff reviewed maintenance records for the following LRVs:

a. Car No. 1420 dated 2/6/08, 5/2/08, 7/28/08 and 10/20/08
b. Car No. 1462 dated 2/19/08, 6/14/08, and 9/11/08
c. Car No. 1470 dated 1/31/08, 5/15/08, and 8/25/08
d. Car No. 1478 dated 1/29/08, 5/13/08, and 9/1/08
e. Car No. 1490 dated 2/12/08, 5/29/08, and 9/9/08
f. Car No. 1520 dated 1/28/08, 5/16/08, and 9/17/08

2. SFMTA MUNI performed vehicle maintenance at the required frequency intervals.
3. The inspection forms identified defects and non-compliances found during the inspections.
4. Maintenance workers documented on work order repairs closure of all defects found on inspections with the exception of:
    a. Car No. 1462 inspection record dated 2/19/08; one defect not recorded to work order #1197296.
    b. Car No. 1470 inspection dated 5/15/08; one defect not recorded to work order #1225538.
    c. Car No. 1478 inspection record dated 1/29/08; one defect not recorded to work order #1194410.
    d. Car No. 1490 dated 9/9/08; two defects not recorded to work order #1266304.
5. SFMTA MUNI did not release any LRVs (those selected for review) with safety defects into revenue service.

Recommendations:

1. SFMTA MUNI should ensure that defects found during inspections are properly documented on work orders (L.PR.017).

2008 CPUC SYSTEM SAFETY AUDIT CHECKLIST FOR SAN FRANCISCO MUNICIPAL RAILWAY

Checklist	36	Historic Streetcar Maintenance Program	
Date of Audit	**October 21, 2008**	Department	**Service Delivery, Green Metro Maintenance, PCC and Historic Streetcar Maintenance**
Reviewers / Inspectors	**Noel Takahara**	Persons Contacted	**John Byrd, John Sadorra, Phil Guterman, Karl Johnson, Josh Sadorra**

REFERENCE CRITERIA

1. SFMTA MUNI System Safety Program Plan Section 4.15
2. CPUC General Order 143-B, Sections 8 and 14.04
3. CPUC General Order 164 Series
4. Rail Vehicle Preventive Maintenance & Inspection Scheduling L.PR.017

ELEMENT, CHARACTERISTICS, AND METHOD OF VERIFICATION

Historic Streetcar Maintenance Program

1. Select at least three Milan cars, three PCC cars, and three other historic cars. By interview with SFMTA MUNI historic streetcar maintenance representatives and review of the respective preventive maintenance, inspection and repair records prepared for at least a six-month period during the past year, determine if:
   a) The required inspections and other maintenance activities were performed at the specified frequencies;
   b) The responsible maintenance workers properly documented the inspection and maintenance activities;
   c) Defects and non-compliances identified during the PM inspections were properly documented, corrected, and closed out in a timely manner and;
   d) No historic streetcars with safety defects were returned to service unless all safety defects were repaired.

ACTIVITIES, FINDINGS, AND RECOMMENDATIONS

Activities and Findings

The reviewer evaluated the historic streetcar maintenance program by discussing SOP L.PR.017 with the maintenance supervisor and also by reviewing the maintenance records of nine randomly

selected cars over a period of six months. The reviewer selected three Milano, three PCC, and three Historic cars to determine whether the Preventive Maintenance and Inspections (PMI) were performed according to SOP L.PR.017. The car numbers are: 1052, 1061, 1056, 0130, 0228, 0952, 1807, 1856, and 1893.
SFMTA MUNI does not follow section 4.2 of the procedure. The reviewer found several instances where PMI was not taking place at the required 2500 mile interval. SFMTA MUNI conducted late PMI on car 1052 (on 3/29/08) after 3216 miles and on car 1061 (on 6/13/08) after 3078 miles. Staff found discrepancy in data between handwritten records and data logged into the database system. The database for car 1061 showed that PMI was conducted at the proper 2500 mile intervals on 6/13/08, even though it was actually performed at the interval of 3078 miles per the handwritten records.

Summary of the findings is provided below:

1. SFMTA MUNI is not reviewing the work history of each car prior to performing preventive maintenance and inspections. Section 4.2 of L.PR.017 requires that each car's work history, open work orders, and car records be reviewed before finally performing the preventive maintenance and inspections. SFMTA MUNI is not running the work history reports.
2. There are instances where preventive maintenance and inspections are not taking place at the proper interval.
3. There is a discrepancy in data. Although the database may show that preventive maintenance and inspections occurred at the proper mileage interval, other records will show that it occurred at a non-compliant interval.

Recommendations:

1. SFMTA MUNI should adhere to its procedure L.PR.017, Section 4.2. Prior to performing preventive maintenance and inspections, work history reports should be compiled and reviewed using the readily available database (L.PR.017).
2. SFMTA MUNI should ensure that preventive maintenance and inspections occur at the proper mileage or time intervals per SOP L.PR.017.
3. SFMTA MUNI should ensure that the mileage and time information logged into its records for preventive maintenance and inspections is accurate and consistent (L.PR.017).

2008 CPUC SYSTEM SAFETY AUDIT CHECKLIST FOR SAN FRANCISCO MUNICIPAL RAILWAY

Checklist	37	Cable Car Maintenance Program	
Date of Audit	**October 21, 2008**	Department	**Service Delivery, Cable Car Maintenance**
Reviewers / Inspectors	**Noel Takahara**	Persons Contacted	**John Byrd, John Sadorra, Tom Hidayat, Josh Sadorra**

REFERENCE CRITERIA

1. SFMTA MUNI System Safety Program Plan Section 4.15
2. CPUC General Order 164 Series
3. Cable Car Preventive Maintenance Inspection & Scheduling CC.RR.001

ELEMENT, CHARACTERISTICS, AND METHOD OF VERIFICATION

Cable Car Maintenance Program

Interview the responsible SFMTA MUNI cable car maintenance representative and review selected documents to determine if the cable car maintenance program is current and comprehensive.

1. Select at least three California Street cable cars and three Powell Street cable cars and review the completed preventive maintenance, inspection, and repair records prepared during the past year or more to determine if:
   a) The required inspections and other maintenance activities were performed at the specified frequencies;
   b) The responsible maintenance workers properly documented the inspection and maintenance activities;
   c) Defects and non-compliances identified during the PM inspections were properly documented, corrected, and closed out in a timely manner and;
   d) Any cable cars with safety defects were not released to operate in revenue service before those defects were repaired.

ACTIVITIES, FINDINGS, AND RECOMMENDATIONS

Activities and Findings

The focus of this checklist is to ensure that preventive maintenance and inspections of the cable cars is taking place at the required intervals and that any safety defects found are being dealt with appropriately. The reviewer evaluated the Cable Car maintenance program by discussing SOP CC.RR.001, CC.PR.004, and the SSPP with the Cable Car Maintenance Department. The reviewer also reviewed the maintenance records of six randomly selected cars over a one year period. The reviewer selected three California Street and three Powell Street cable cars. The car numbers are 4, 19, 28, 49, 56, and 60.

Through discussion and review of procedures, the reviewer found that cable car preventive maintenance and inspections (PMI) are required at the interval of every 15 days of revenue service. The reviewer learned that SFMTA MUNI maintains roughly 40 cars, of which two to three are put through PMI daily. After review of records, the reviewer found that the required PMI is being performed at the specified frequencies and that PMI activities are being properly documented. The reviewer found that defects found during PMI activities were corrected and closed out in a timely manner.

Through discussion of SOP CC.PR.004 titled "Cable Car Defect Card," the reviewer found a non-compliance by SFMTA MUNI in adhering to the SOP. The defect card is filled out by the Operator at the end of his run to relay any problems with the car to either the next shift or to maintenance personnel. According to the subject SOP, whenever a cable car is returned to the yard after a run the Cable Car operator should turn in a completed defect card to a yard person whether or not any issues are present. After reviewing the records, the reviewer found several instances where the defect cards were not being submitted or collected. If operators do not turn in defect cards after a run, then there is a risk that safety critical information will not be relayed to the maintenance department.

Recommendations:

1. SFMTA MUNI should ensure that operators consistently submit the cable car defect cards to the cable car maintenance department for follow-up maintenance (CC.RR.001).

2008 CPUC SYSTEM SAFETY AUDIT CHECKLIST FOR SAN FRANCISCO MUNICIPAL RAILWAY

Checklist	38	Cable Car Track and Cable Maintenance	
Date of Audit	**October 23, 2008**	Department	**Service Delivery, Cable Car Track and Machinery Maintenance**
Reviewers / Inspectors	**Susan Feyl**	Persons Contacted	**John Byrd, John Sadorra, Chris Hill, John Baker**

REFERENCE CRITERIA

1. SFMTA MUNI System Safety Program Plan Section 4.15
2. CPUC General Order 164 Series
3. C PR 002 Cable Car Track Maintenance Inspection C.PR.002
4. C.PR.015 Rev 3 Cable Splicing & Maintenance C.PR.015

ELEMENT, CHARACTERISTICS, AND METHOD OF VERIFICATION

Cable Car Track and Cable Maintenance

1. Interview the SFMTA MUNI representative who is responsible for cable car track and cable maintenance and review the track maintenance program, procedures, records and standards, to determine if:
   a) A standard operating procedure or program manual, describing SFMTA MUNI's preventive maintenance program for mainline track and a comprehensive set of updated track standards with inspection and measurement acceptance criteria have been prepared, approved, and issued for use;
   b) The track standards establish requirements for gage, curve, and rail wear measurements in its cable car system track maintenance standards;
   c) Data concerning track conditions is collected to effectively address preventive maintenance planning;
   d) All cable car mainline track and special work was inspected at the specified frequencies required by SFMTA MUNI's standards during the past twelve months;
   e) The required inspections were documented on standardized track inspection report forms and;
   f) Repairs to correct defects and non-compliances noted on the track inspection report forms were completed and signed off in a timely manner.

ACTIVITIES, FINDINGS, AND RECOMMENDATIONS

Activities and Findings:

Staff had previously reviewed this area during the last audit and in this audit found much more documentation than in the previous audit. Staff reviewed cable car maintenance program, procedures, and records and came up with the following findings:

a) There is a Cable Car Railway Track Inspection & Maintenance Manual issued 6/1/02.

b) SFMTA MUNI has established standards for "gauge and curve" on page 12 and for "rail wear" in Table B in the above referenced document.

c) SFMTA MUNI collects the track data daily.

d) SFMTA MUNI inspects the Cable car track at specified frequencies as stated on the respective inspection forms in the appendix.

e) SFMTA MUNI uses and stores inspection forms in loose-leaf binders.

Recommendations: None.

2008 CPUC SYSTEM SAFETY AUDIT CHECKLIST FOR SAN FRANCISCO MUNICIPAL RAILWAY

Checklist	**39**	**ATCS Maintenance Program**	
Date of Audit	**October 23, 2008**	Department	**SFMTA MUNI Signal Department**
Reviewers / Inspectors	**Vincent Kwong**	Persons Contacted	**Wai Tom, Kevin Mai, Stephen Newman, Agripino Medina**

REFERENCE CRITERIA

1. SFMTA MUNI System Safety Program Plan Section 4.15
2. CPUC General Order 143-B, Section 14.05
3. CPUC General Order 164-D, Section 3.2
4. Automatic Train Control System (ATCS) Wayside Equipment Preventive Maintenance Reference Guide (Effective 9/22/08)

ELEMENT, CHARACTERISTICS, AND METHOD OF VERIFICATION

ATCS Maintenance Program

Interview the SFMTA MUNI representative responsible for ATCS maintenance and review ATCS procedures, manuals, and records to determine if:

1) A standard operating procedure describing SFMTA MUNI's comprehensive preventive maintenance program for the ATCS is current, approved, and implemented;
2) The ATCS was inspected and tested at the specified frequencies during the past 12 months;
3) The required PM activities were documented on standardized inspection report forms;
4) Defects and non-compliances noted on the inspection report forms were corrected and signed off in a timely manner and;
5) All ATCS safety related anomalies that have been identified have also been rectified.

ACTIVITIES, FINDINGS, AND RECOMMENDATIONS

Activities and Findings:

1. The current standard operating procedure titled Automatic Train Control System (ATCS)

Wayside Equipment Preventative Maintenance Reference Guide (Effective 9/22/08) provides an overview of the preventive maintenance program including the following:

a. Identification of the facilities and equipment subject to inspection and testing.
b. Inspection procedures and acceptable frequency by periodicity in weeks.

2. Staff reviewed the following records of inspections for various equipment which meet the set frequency for the last 3 years:

a. ATCS Axle Counter PM Log Book (R.SM.CK.006) - Frequency (52 weeks)

Counts how many wheels go through and how many exit

- Embarcadero (TL)
  - 1/15/08 – Location ER-01 – OK
  - 2/7/07 – Location ER-01 – OK
  - 1/13/06 – Location ER-01 – OK
- Van Ness (TL)
  - 12/17/07 – Location VL-09 – OK
  - 12/05/06 – Location VL-09 – OK
  - 12/5/05 – Location VL-09 – OK
- Castro (TR)
  - 5/30/08 – Location CR-01 – OK
  - 7/26/07 – Location CR-01 – OK
  - 6/27/06 – Location CR-01 – OK
- Consistent to plan of 52 weeks periodicity

b. ATCS Emergency Stop Button PM Check Sheets (R.SM.CK.003) - Frequency (12 weeks)

Checks for functionality of platform emergency buttons

- OCC Tests section applies to only OCC
- Montgomery
  - 2008
    - 9/10/08 – OK
    - 5/28/08 – OK
    - 2/29/08 – OK
  - 2007
    - 12/15/07 – OK
    - 8/9/07 – OK
    - 5/15/07 – OK
    - 2/5/07 – OK
  - 2006
    - 11/3/06 – OK
    - 8/30/06 – OK

        - 5/5/06 – OK
        - 2/17/06 – OK
    - Consistent to plan of 12 weeks periodicity

c. ATCS Switch Machine Model 55E PM Check Sheets (R.SM.CK.032) - Frequency (2 weeks for MMT and Duboce/4 weeks for all else)

Checks for functionality of automatic switches – usually immediate defects are fixed

- West Portal 1B
    - 2008
        - 10/22/08 – OK
        - 9/22/08 – OK
        - 9/1/08 – OK
        - 8/8/08 – OK
        - 7/6/08 – OK
        - 6/7/08 – OK
        - 5/10/08 – OK
        - 4/14/08 – OK
        - 3/31/08 – OK
        - 2/10/08 – OK
        - 1/16/08 – OK
    - 2007
        - 12/19/07 – OK
        - 11/9/07 – OK
        - 10/26/07 – OK
        - 9/30/07 – OK
        - 8/29/07 – OK
        - 8/4/07 – OK
        - 7/7/07 – OK
        - 6/9/07 – OK
        - 5/8/07 – OK
        - 4/14/07 – OK
        - 3/12/07 – OK
        - 1/24/07 – adjusted clutch current
- MMT – T-5B
    - October 2008
        - 10/11/08 – OK
        - 10/3/08 – OK
    - February 2008
        - 2/26/08 – OK
        - 2/5/08 – OK

- April 2007
  - 4/17/07 – adjusted clutch to increase obstruction current
  - 4/4/07 – OK
- January 2007
  - 1/29/07 – Remove/replace tap ring lock
  - 1/13/07 – OK

d. ATCS Relay Test Record - Frequency (104 weeks)

Checks for functionality of the vital relays

- Castro-Castro M
  - 9/21/08 – OK
  - 9/30/06 – OK

3. Staff found that SFMTA MUNI repairs any defects found adequately and records the repair work in the inspection forms properly.
4. The Health and Safety Department did not have the latest revision of the Standard Operating Procedures for ATCS Preventive Maintenance.
5. Staff found no ATCS safety-related anomalies.

Recommendations:

None.

2008 CPUC SYSTEM SAFETY AUDIT CHECKLIST FOR SAN FRANCISCO MUNICIPAL RAILWAY

Checklist	**40**	**Signal Systems Maintenance Program Including Power Switch Machines**	
Date of Audit	**October 21, 2008**	Department	**Maintenance of Way, Track Signal Maintenance**
Reviewers / Inspectors	**Joey E. Bigornia**	Persons Contacted	**Tom Kennedy, Wai Tom, Stephan Newsome, Donaldson Shumpert**

REFERENCE CRITERIA

1. SFMTA MUNI System Safety Program Plan Section 4.15
2. CPUC General Order 164 Series
3. R.SM.PR.017 Rail Transit Track Switch Control & Signal Interlocking (Surface Streets)

ELEMENT, CHARACTERISTICS, AND METHOD OF VERIFICATION

Signal Systems Maintenance Program Including Power Switch Machines

Interview the SFMTA MUNI representative responsible for interlocking plant maintenance and review Signal Department procedures, manuals and records to determine if:

1. A standard operating procedure or other directive describing SFMTA MUNI's preventive maintenance program for interlocking plants is current, has been approved, and is being implemented;
2. The two surface mainline interlocking plants were inspected and tested at the specified frequencies during the past 12 months;
3. The SFMTA MUNI Metro subway interlocking plants were inspected and tested at the specified frequencies during the past 12 months;
4. The required PM activities were documented on standardized inspection report forms and;
5. Defects and non-compliances noted on the inspection report forms were corrected and signed off in a timely manner.

ACTIVITIES, FINDINGS, AND RECOMMENDATIONS

Activities and Findings:

1. SFMTA MUNI has implemented Standard Operating Procedure RSM.PR.017 for Track

Switch Control & Signal Interlockings with an effective date of 7-2-08.

2. Staff reviewed the following mainline interlocking maintenance records for:
   a. 3rd / 4th and King Street dated 4-6-05 and 5-5-07.
   b. 19th Avenue, North of Holloway Platform dated 4-6-05 and 4-11-07.

   SFMTA MUNI conducted the mainline interlocking inspections at the required frequency interval; SFMTA MUNI properly documented and closed out the defects found. Staff did not note exceptions.
3. SFMTA MUNI tested subway interlocking plants on a scheduled daily basis during a 24 hour period. SFMTA MUNI's computer database for interlockings isolates the time, date and results of the test which is typically ten minutes. SFMTA MUNI repaired the defects found during the daily tests. Checklist #41 identifies specific inspection records staff reviewed. Staff did not note any exceptions.

Recommendations:

None.

2008 CPUC SYSTEM SAFETY AUDIT CHECKLIST FOR SAN FRANCISCO MUNICIPAL RAILWAY

Checklist	41	Substation and Overhead Lines Maintenance Program	
Date of Audit	**October 22, 2008**	Department	**Service Delivery, Maintenance of Way Division, Motive Power**
Reviewers / Inspectors	**Joey E. Bigornia**	Persons Contacted	**Dan Murphy, Tim Lipps, Ted Aranas, Hoy Wong, Don Haagstad, Henry Ridgell**

REFERENCE CRITERIA

1. SFMTA MUNI System Safety Program Plan Section 4.15
2. CPUC General Order 164 Series
3. CPUC General Order 95
4. Overhead Lines Inspection
5. Motive Power Inspection & Maintenance Manual

ELEMENT, CHARACTERISTICS, AND METHOD OF VERIFICATION

Substation and Overhead Lines Maintenance Program

1. Interview the SFMTA MUNI representative responsible for substation maintenance and review procedures and records to determine if:
   a. SFMTA MUNI's preventive maintenance program standard operating procedures for SFMTA MUNI Metro Substations are current, approved and are being implemented;
   b. Each of at least three reviewer-selected SFMTA MUNI Metro Substations were inspected at the specified frequencies during the past 12 months as required by the SOP;
   c. The required substation preventive maintenance activities were documented as required on the standardized inspection report forms and;
   d. Any defects or non-compliances noted on the inspection report forms were corrected and signed off in a timely manner.
2. Interview the SFMTA MUNI representative responsible for overhead lines maintenance and review procedures and records to determine if:
   a. SFMTA MUNI's preventive maintenance program standard operating procedures for Metro Overhead Lines are current, approved and are being effectively implemented;
   b. Each of at least three reviewer-selected SFMTA MUNI Metro operating lines had the overhead traction electrification system inspected at the specified frequencies during the

past 12 months as required by the SOP;

c. The required overhead lines preventive maintenance activities were documented as required on the standardized inspection report forms and;

d. Any defects or non-compliances noted on the inspection report forms were corrected and signed off in a timely manner.

ACTIVITIES, FINDINGS, AND RECOMMENDATIONS

Activities and Findings:

1. Substation Review
   a. SFMTA MUNI's maintenance program for substation maintenance is identified in its SOP with an effective date of 7/11/08.

   b. Circuit Breaker Maintenance Records dated 9/07 – 9/08
      1. SFMTA MUNI performs circuit breaker maintenance on a monthly basis by the number of counts a substation generates. When a substation reaches a minimum of 200 counts, SFMTA MUNI schedules the substation for the SCADA Communication Lines Test and Measurement inspection (See Item d below).
      2. SFMTA MUNI performs monthly inspections at the required maintenance interval.

   c. False RTU Indications dated 9/07 -9/08
      1. SFMTA MUNI performs the monthly inspections at the required maintenance interval.

   d. SCADA Communication Lines Test and Measurement – dated 1/08 – 9/08
      SFMTA MUNI performs this test after the Circuit Breaker reaches a minimum of 200 counts.
      1. Staff reviewed the records for the following substations:
         a. Civic Center – dated 2006-2008.
         b. Fillmore – dated 2006-2008.
         c. Outer Mission – dated 2006 -2008.
         d. Taraval – dated 2006-2008.

   e. Station Fire Alarm Batteries & Security Panel dated 2005-2008
      1. SFMTA MUNI performed the biennial inspections on 8/6/2005 and 5/11/2007. The

next scheduled inspection is 2009.

f. SFMTA MUNI performed the inspections above at the required frequency interval, corrected the defects noted and properly documented them on the inspection forms

2. Overhead Catenary Review

a. SFMTA MUNI maintenance program for the maintenance of overhead lines is identified in its SOP with an effective date of 7/2/08.

b. Staff reviewed the following on-deck visual and mechanical inspection records:

1. J-Line: 8/9 – 8/22/07 and 8/6 – 9/9/08
2. M-Line: 7/7 – 7/18/07 and 8/28 – 9/18/08
3. N-Line: 3/27 – 6/27/07 and 5/8 – 7/15/08

c. Staff reviewed the following on-ground walking inspection records:

1. J-Line: 3/22 - 3/30/07 and 5/8 – 5/13/08
2. M-Line: 5/17 – 5/24/07 and 6/2 – 6/6/08
3. N-Line: 5/29 – 6/5/07 and 6/9 – 6/13/08

d. SFMTA MUNI performed the inspections above at the required frequency interval, corrected the defects noted, and properly documented them on the inspection forms.

Recommendations:

None.

2008 CPUC SYSTEM SAFETY AUDIT CHECKLIST FOR SAN FRANCISCO MUNICIPAL RAILWAY

Checklist	42	Safety Data Acquisition and Analysis	
Date of Audit	**October 21, 2008**	Department	**Health and Safety**
Reviewers / Inspectors	**Anton Garabetian**	Persons Contacted	**Mary Ellen O'Brien, Michael Kirchanski**

REFERENCE CRITERIA

1. SFMTA MUNI System Safety Program Plan Section 4.7
2. CPUC General Order 164 Series
3. Corrective Action Plans SY.PR.042
4. Safety Data Acquisition & Analysis SY.PR.037
5. Hazard Analysis SY.PR.033

ELEMENT, CHARACTERISTICS, AND METHOD OF VERIFICATION

Safety Data Acquisition and Analysis

Interview the SFMTA MUNI representative responsible for safety data acquisition and analysis, review the safety data acquisition and analysis program requirements as well as records and reports to determine if:

1. The data collected includes, at a minimum, information concerning SFMTA MUNI rail transit accidents and incidents, employee performance failures, equipment failures, software failures, procedural non-compliances, external factors, environmental factors, fatalities, injuries, property damage and environmental damage;
2. Safety data is supplied by and collected from all departments including risk management. (SFMTA MUNI does not have a risk management unit – hazard analysis and resolution is handled primarily by the Office of Health and Safety. The City Attorney's Office has a Risk Management Office This portion of this checklist will take place during the afternoon session at the City Attorney's Office.);
3. Safety data that is collected is analyzed and incorporated into SFMTA MUNI's hazard identification and resolution process and;
4. The safety data collected and the resulting analyses are made available to all SFMTA MUNI departments for use in planning its safety-related activities.

ACTIVITIES, FINDINGS, AND RECOMMENDATIONS

Activities and Findings:

Staff interviewed the SFMTA MUNI representatives responsible for safety data acquisition and analysis. Staff also reviewed the safety data acquisition and analysis program requirements as well as records and reports.

1. SFMTA MUNI does an excellent job in collecting data and analyzing it, which includes information concerning SFMTA MUNI rail transit accidents and incidents, fatalities, injuries, property damage and environmental damage.
2. Hard copy safety data is supplied by and collected from all the SFMTA MUNI departments. SFMTA MUNI does not have a Risk Management Department. SFMTA MUNI inputs data in the TransitSafe program, files and saves hardcopies, and collects data on a separate MS Excel spread sheet. Staff reviewed Incident No. FY 08-07553 dated 4/27/08, a rail collision. All the required reports were in place. SFMTA MUNI tracks pedestrian collisions with trains separately. Staff reviewed Incident No. FY09-0613, a property damage collision with a garbage truck.
3. SFMTA MUNI utilizes TransitSafe software program to analyze the collected data. SFMTA MUNI incorporates the data into its hazard identification database, but staff could not verify if it is part of the SFMTA MUNI hazard resolution process.
4. SFMTA MUNI Health and Safety Department provides the safety data collected and the resulting analyses and trends to all managers and departments through the SFMTA MUNI Safety Review Committee Meetings. Per SFMTA MUNI, these meetings were not held regularly until recently. SFMTA MUNI Health and Safety personnel are not aware if their safety trend analyses result in corrective actions.
5. SFMTA MUNI System Safety Program Plan (SSPP) and Safety Data Acquisition and Analysis SOP do not address the link between safety data acquisition and analysis and implementation of system safety program.

Recommendations:

1. SFMTA MUNI Health and Safety Department should be involved in all corrective actions resulting from the safety data acquisition and trend analysis (SSPP and SY.PR.037).

2008 CPUC SYSTEM SAFETY AUDIT CHECKLIST FOR SAN FRANCISCO MUNICIPAL RAILWAY

Checklist	43	Interdepartmental and Interagency Coordination	
Date of Audit	**October 22, 2008**	Department	**System Safety**
Reviewers / Inspectors	**Anton Garabetian**	Persons Contacted	**Michael Kirchanski**

REFERENCE CRITERIA

1. SFMTA MUNI System Safety Program Plan Section
2. CPUC General Order 164 Series
3. System Security Plan

ELEMENT, CHARACTERISTICS, AND METHOD OF VERIFICATION

Interdepartmental and Interagency Coordination

Interview the SFMTA MUNI representative(s) responsible for interdepartmental and interagency coordination and review the coordination requirements as well as those audit reports and other records to determine if:

1. The interdepartmental and interagency communications process, procedures, and requirements are clearly defined and explained in detail;
2. The communications are properly documented and filed;
3. Interdepartmental and interagency communications are an element of SFMTA MUNI's internal safety audit program;
4. Any deviations from the approved procedure, identified during an internal safety audit or by any other means, are brought to the attention of the general management and;
5. SFMTA MUNI monitors, reports and acts to correct any deviation from its communications policies with emergency responders and other affected agencies.

ACTIVITIES, FINDINGS, AND RECOMMENDATIONS

Activities and Findings:

On October 22, 2008, staff did not find any safety documents for interagency coordination at the SFMTA MUNI Security Department. Later, SFMTA MUNI Health and Safety Department

provided the required documents by e mail.

1. SFMTA MUNI SSPP Section 4.11 Emergency Response Planning/Coordination/Training refers to several Standard Operating Procedures (SOPs), such as Evacuations, Fire, Earthquakes, and Floods. These SOPs define how SFMTA MUNI communicates with other agencies, such as the San Francisco Fire Department (SFFD). The Security and Enforcement Division coordinates and schedules emergency drills and exercises. Checklist No. 43 contains additional information on Emergency Response Drills.
2. SFMTA MUNI documents the communications, but these documents are kept at various locations.
3. SFMTA MUNI did not provide any documents to show interagency coordination is an element of SFMTA MUNI's internal safety audit program. Checklist No. 11 contains additional information on SFMTA MUNI's Internal Audit Program.
4. Staff could not verify if any deviations from the approved procedure, identified during an internal safety audit or by any other means, are brought to the attention of the general management.
5. SFMTA MUNI monitors, reports and acts to correct any deviation from its communications policies with emergency responders and other affected agencies. SFMTA MUNI documented corrective actions from the BART M17 fire and near misses that SFMTA MUNI had with the San Francisco Fire Department. These corrective actions included changes in SFMTA MUNI communication protocols and implementation of SFMTA MUNI Incident Command procedures. The BART/SFMTA MUNI Emergency MOU documents new communication protocols with BART.

Recommendations:

1. SFMTA MUNI should include interagency coordination as an element of its internal safety audit program (SY.PR.036).

2008 CPUC SYSTEM SAFETY AUDIT CHECKLIST FOR SAN FRANCISCO MUNICIPAL RAILWAY

Checklist	44	Contractor Safety Program	
Date of Audit	**October 23, 2008**	Department	**System Safety**
Reviewers / Inspectors	**Jimmy Xia**	Persons Contacted	**Michael Kirchanski, Napoleon Khalilnaji, Gerald Williams**

REFERENCE CRITERIA

1. SFMTA MUNI System Safety Program Plan Section 4.16.4
2. SFMTA MUNI System Safety Program Plan Section 4.18.2
3. CPUC General Order 164 Series
4. On Track & Trackside Safety Program
5. Contractor Safety Procedures

ELEMENT, CHARACTERISTICS, AND METHOD OF VERIFICATION

Contractor Safety Program

Interview the SFMTA MUNI representative in charge of the Contractors Safety Program and review SFMTA MUNI's internal safety audit requirements, audit reports and other records to determine if:

1. SFMTA MUNI has developed and implemented a control document clearly establishing its responsibilities and requirements for the contractor safety program including:
   a. Training and certification for contractors and their employees;
   b. The rules, regulations, and procedures applicable to contractors and their employees;
2. SFMTA MUNI's procedures and practices clearly identify, for the contractors and SFMTA MUNI managers, that SFMTA MUNI is in charge and that its contractors and their employees must comply with all established safety rules and procedures and;
3. SFMTA MUNI procedures require regular SFMTA MUNI audits and inspections of the construction sites to monitor compliance with its safety requirements;
4. SFMTA MUNI procedures establish the range of activities for its monitoring and enforcement of contractor's and contractor employee's compliance with the safety requirements by regular unscheduled and unannounced compliance checks as well as by scheduled periodic audits and inspections of the construction sites and;
5. SFMTA MUNI's monitoring and enforcement activities are properly recorded, distributed, and filed.

ACTIVITIES, FINDINGS, AND RECOMMENDATIONS

Activities and Findings:

Staff interviewed the SFMTA MUNI personnel in charge of the Contractor Safety Program and reviewed 1) the On Track & Trackside Safety Program Standard Operating Procedure (SOP) revision #2, 2) the recently revised Contractor Safety Program SOP, 3) selected audit reports done by the Health & Safety (H&S) division, and 4) recent contractor safety training records.

Staff found the following:

1. In the beginning of this review, SFMTA MUNI personnel gave CPUC staff a copy of the SFMTA MUNI's new version of Contractor Safety Program SOP that they recently developed, but have not adopted. This SOP updates the Contractor Safety Procedures SOP with an effective date of July 8, 2003, addresses recommendation #41 from the 2005 SFMTA MUNI Triennial Audit, and incorporates the provisions contained in recommendation #1 from the 2002 SFMTA MUNI Triennial Audit. It needs to get SFMTA MUNI's Rules & Procedures Committee (RPC) approval and executive signatures in order to be officially implemented.

2. The SFMTA MUNI's H&S personnel sent the revised Contractor Safety Program SOP to the RPC on 10/20/08 for review and approval. As of the date of this review, the SOP has not been approved by the RPC yet. As soon as the RPC approves the SOP, the SOP will be sent to the SFMTA MUNI's executives for signatures, and then, after they sign it, it will be officially implemented and recommendation #41 from the 2005 SFMTA MUNI Triennial Audit will be closed out.

3. The core of the contractor safety program is SFMTA MUNI's On Track Safety (OTS) Program, which consists of both an On Track & Trackside Safety Program SOP and training material that details SFMTA MUNI's safety rules and procedures for personnel working on or near the SFMTA MUNI's track system. SFMTA MUNI recently completed revision #2 of their On Track & Trackside Safety Program SOP. Revision #2 of this SOP was approved by the RPC on 10/6/08, but SFMTA MUNI has not implemented it yet because it has not been signed by SFMTA MUNI's executives. SFMTA MUNI plans to get it signed by the executives in a timely manner, and it will then be implemented.

4. SFMTA MUNI will provide the On Track & Trackside Safety or OTS training class to all SFMTA MUNI employees and contractors' employees who must perform work on or near SFMTA MUNI tracks.

5. If the contractor plans to work on or near SFMTA MUNI rail right of way, he/she must file for a permit and clearance with SFMTA MUNI OCC. The OCC Superintendent will then convey the approval or disapproval decision to the requester. The contractor will not allow employees who

did not receive SFMTA MUNI OTS training on the job site.

6. SFMTA MUNI will assign H&S personnel to oversee safety on the job site. When a project is subject to a Safety and Security Management Plan (SSMP), SFMTA MUNI will audit the work site and determine if the contractor is complying with the requirements of the SSMP. Also, SFMTA MUNI determines whether a contractor's employees need SFMTA MUNI's OTS training or not.

7. SFMTA MUNI will not allow its contractors' employees to work on or near SFMTA MUNI tracks unless they have successfully passed SFMTA MUNI's OTS training class, per SFMTA MUNI personnel at the review. Not all of SFMTA MUNI's contractors work on or near SFMTA MUNI tracks. If they don't work on or near SFMTA MUNI tracks, they are on their own to comply with their own safety program such as Cal OSHA regulations, and SFMTA MUNI conducts oversight of them.

8. SFMTA MUNI's contractor safety reviewer conducts monthly audits of the MME facility. He audits the MME contractor's and subcontractor's safety programs including auditing against OSHA regulations and for employee hazards. After he completes each audit, he drafts a report documenting the audit findings (e.g. problems found) and recommendations. For example, his audit report for February 2008 for the MME facility showed that the MME contractors complied with their own safety programs and that there was no CAP. He sends all these reports to the SFMTA MUNI's H&S Manager. Subsequently, the H&S Manager sends these reports to SFMTA MUNI's project manager.

9. The SFMTA MUNI's contractor safety reviewer conducts scheduled periodic audits of the MME facility once per month, which is a standard frequency, and he conducts these audits unannounced. He stated that the contractors of each SFMTA MUNI facility conduct their own scheduled inspections of their Injury and Illness Prevention Program (IIPP) weekly.

10. The SFMTA MUNI's Internal Safety Audit (ISA) report for its Contractor Safety Program was not available for review during the date of the audit when Staff requested it. The responsible SFMTA MUNI personnel stated that SFMTA MUNI did not conduct the Contractor Safety Program ISA as part of their 2006 – 2008 ISA program according to System Safety Program Plan (SSPP) section 4.12, and the ISA report on Contractor Safety Program was not done. Also, the schedule for Contractor Safety Program ISA is not listed on 2006 – 2008 ISA program schedule dated 10/16/08 provided by the department prior to the audit. The responsible SFMTA MUNI personnel stated that they will conduct the Contractor Safety Program ISA and write the ISA report in the near future.

11. The SFMTA MUNI's contractor safety auditor showed Staff all of his monthly audit reports of his audits of the MME facility for the period ranging from October 2007 to October 2008. His audit reports document SFMTA MUNI's Health and Safety oversight of the MME contractors according to the MME's SSMP, which was implemented in 2006. All of his reports are complete and in compliance with SFMTA MUNI's requirements.

12. The SFMTA MUNI's contractor safety auditor's findings from his audits mentioned above from October 2007 to October 2008 are all resolved except for the ones from his audit conducted on 10/20/08. His audit report for his 10/20/08 audit of the MME facility showed that he found some non-compliances in the facility and has recommendations for CAPs. The report will be sent to the SFMTA MUNI's project manager who will then send it to the MME's general contractor to correct the problems. Subsequently, the SFMTA MUNI auditor will conduct a follow-up audit of these problems in his next monthly audit of the MME facility to check whether these problems are corrected or not. He stated that, in general, these problems can be fixed in approximately one week because construction is dynamic and fast-paced.

13. SFMTA MUNI's OTS Program trainer keeps on file all the OTS training sign-in sheets and graded exams for all of the contractors' employees who took the OTS class. He also sends copies of these files to various SFMTA MUNI Project Managers and department representatives. Also, the SFMTA MUNI's Maintenance Training Unit maintains records of all SFMTA MUNI employees who completed OTS training.

14. Staff reviewed selected OTS training class records for various SFMTA MUNI employees and SFMTA MUNI's contractors for the classes that took place in February, March, April, June, July, August, and October of 2008, and all of these records are complete and are in compliance with SFMTA MUNI's requirements.

Recommendations:

1. SFMTA MUNI should finalize, adopt, and implement its Contractor Safety Program SOP (SSPP Sections 4.16.4 & 4.18.2). Subsequent to this audit, per the e-mail dated December 4, 2008, sent by SFMTA MUNI's Health & Safety Manager, the SFMTA MUNI's Rules & Procedures Committee (RPC) approved the revised Contractor Safety Program SOP on December 1, 2008 (SSPP Sections 4.16.4 & 4.18.2).
2. SFMTA MUNI should complete and submit its Contractor Safety Program ISA at a minimum of once every three years per GO 164-D and SFMTA MUNI SSPP Section 4.12.

2008 CPUC SYSTEM SAFETY AUDIT CHECKLIST FOR SAN FRANCISCO MUNICIPAL RAILWAY

Checklist	**45**	**Procurement Control**	
Date of Audit	**October 22, 2008**	Department	**Material Management Section**
Reviewers / Inspectors	**Anton Garabetian**	Persons Contacted	**Angela Carmen** **Napoleon Khalilnaji** **Luther Manning** **Bartholomew Murphy**

REFERENCE CRITERIA

1. SFMTA MUNI System Safety Program Plan Section 4.21
2. CPUC General Order 164 Series
3. Purchasing Materials & Supplies M.PR.001

ELEMENT, CHARACTERISTICS, AND METHOD OF VERIFICATION

Procurement Control

Interview the SFMTA MUNI representative responsible for procurement control and the Material Control Group as well as review SFMTA MUNI's procurement control program, policies and procedures, internal safety audit requirements for procurement control, internal safety audit reports and other records to determine if:

1. SFMTA MUNI has comprehensive, clearly defined, and current procedures in place for procurement control;
2. Procurement control is actively monitored and enforced by responsible SFMTA MUNI personal;
3. Procurement control is addressed in SFMTA MUNI's internal safety audit program;
4. Procurement control includes hazardous materials, maintenance and repair parts, and materials that could affect safety of the system, employees, passengers, the general public, equipment and the environment and;
5. Deviations from procurement control are brought to the attention of executive management.

ACTIVITIES, FINDINGS, AND RECOMMENDATIONS

Activities and Findings:

Staff interviewed the SFMTA MUNI Material Management Section representatives, responsible for procurement control, and reviewed SFMTA MUNI's procurement control program, policies and procedures and other records.

1. SFMTA MUNI has comprehensive, clearly defined, and current procedures in place for procurement control. SFMTA MUNI's SSPP does not refer to any of the procedures that SFMTA MUNI procurement department follows, such as Purchasing Materials & Supplies M.PR.001.
2. Procurement control is actively monitored and enforced by responsible SFMTA MUNI management. Staff reviewed a sample of SFMTA MUNI material procurement process.
3. Staff reviewed SFMTA MUNI's internal audit report. Procurement control was part of the August 2008 internal safety audit.
4. Procurement control includes hazardous materials, maintenance and repair parts, and materials that could affect safety of the system, employees, passengers, the general public, equipment and the environment. All newly purchased materials are approved by SFMTA MUNI's Health and Safety Department.
5. Material Management Section brings any deviation to the attention of executive management.

Recommendations:

None

2008 CPUC SYSTEM SAFETY AUDIT CHECKLIST FOR SAN FRANCISCO MUNICIPAL RAILWAY

Checklist	46	Chief Operating Officer's Safety Initiative	
Date of Audit	**October 23, 2008**	Department	**Service Delivery**
Reviewers / Inspectors	**Steve Espinal, Arun Mehta**	Persons Contacted	**Ken McDonald, John Byrd**

REFERENCE CRITERIA

1. SFMTA MUNI System Safety Program Plan Section 4.1.3

ELEMENT, CHARACTERISTICS, AND METHOD OF VERIFICATION

Chief Operating Officer's Safety Initiative

Interview the Chief Operating Officer and other appropriate SFMTA MUNI representatives and review appropriate documents to determine if the Chief Operating Officer's Safety Initiative has been implemented for the following items stated in SFMTA MUNI System Safety Program Plan Section 4.1.3:

1. Safety Awareness Campaign;
2. Redesign of the accident-evaluation criteria;
3. Operator Refresher Program;
4. Redesigned Employee Discipline;
5. Manager Ride-Check program; and
6. Biweekly Review of Safety Performance.

ACTIVITIES, FINDINGS, AND RECOMMENDATIONS

Activities and Findings:

Following are the findings.

1) SFMTA MUNI began a safety awareness campaign in March 2008. The safety awareness campaign consisted of focusing efforts in the following areas: (1) improving safety awareness at Fourth and King Streets interlocking and the prevention of future derailments; (2) implementation of the surreptitious ride check program, which involves a SFMTA MUNI inspector or a safety officer monitoring an operator either from a distance or while on board the LRV; (3) operator training -- providing a one day training class on signals and their

operation; (4) Chief Operating Officer Weekly Service Review Meeting every Friday to discuss operations and safety issues.

2) SFMTA MUNI has redesigned its accident-evaluation criteria investigation work sheet. The work sheet information is inputted into a database for trend development and analysis.
3) All operators are required to go through operator training and retraining per the SOP.
4) SFMTA MUNI conducts surreptitious ride checks quarterly.
5) SFMTA MUNI maintains a watch list of operators needing attention, based upon data provided by "Transit Safe". SFMTA MUNI provides these operators extra training, and they are subject to disciplinary action if found to be involved in further rule violations.

Recommendations:

None.

2008 CPUC SYSTEM SAFETY AUDIT CHECKLIST FOR SAN FRANCISCO MUNICIPAL RAILWAY

Checklist	47	SSPP Review and Modification	
Date of Audit	**October 23, 2008**	Department	**Health and Safety**
Reviewers / Inspectors	**Rupa Shitole**	Persons Contacted	**Michael Kirchanski**

REFERENCE CRITERIA

1. SFMTA MUNI System Safety Program Plan Section 4.2
2. General Order 164 Series
3. SFMTA MUNI System Safety Program Plan

ELEMENT, CHARACTERISTICS, AND METHOD OF VERIFICATION

SSPP Review and Modification

Interview the Health and Safety Manager and review appropriate documents to determine if the SSPP Review and Modification has been implemented for the following:

1. The Health and Safety Manager shall review the SSPP document annually to determine if revision is necessary due to:
    a) Operating environment changes, technological or equipment innovations/advancements and replacements, and/or opening of new lines and/or rail extensions.
    b) Any SFMTA MUNI organizational changes
    c) Any related, external legal changes and requirements.

2. The Health and Safety Manager will notify CPUC staff, in writing, by January 31 of each calendar year, when the annual review of the SSPP will be complete.

ACTIVITIES, FINDINGS, AND RECOMMENDATIONS

Activities and Findings:

Staff interviewed the Health and Safety Department Manager and found the following:

1. SFMTA MUNI submitted the first version of the SSPP to CPUC in May 2006; however, that version did not meet the requirements of the General Order 164-D. Working with CPUC

staff, SFMTA MUNI prepared an approved SSPP (version 3).

2. The Health and Safety Manager did review the SSPP document annually as required and sent a letter to CPUC staff regarding the annual review of the SSPP on January 15, 2008. CPUC sent an approval letter regarding the SSPP on March 7, 2008.
3. SSPP version 3 (effective date 2/28/2008) is the current document being referenced. SFMTA MUNI is undergoing some revisions of this version and plans to submit such notification to CPUC staff in January 2009.
4. Staff noted no other exceptions.

Recommendations:

None.

2008 CPUC SYSTEM SAFETY AUDIT CHECKLIST FOR SAN FRANCISCO MUNICIPAL RAILWAY

Checklist	48	Safety Certification - Central Subway Project	
Date of Audit	**October 21, 2008**	Department	**Transportation Planning and Development; Office of Health & Safety**
Reviewers / Inspectors	**Dain Pankratz**	Persons Contacted	**Roger Nguyen, Dan Rosen, Michael Kirchanski**

REFERENCE CRITERIA

1. SFMTA MUNI System Safety Program Plan Section 4.5
2. General Order 164 Series
3. Safety & Security Certification Plan - Central Subway Project

ELEMENT, CHARACTERISTICS, AND METHOD OF VERIFICATION

Safety Certification - Central Subway Project

Interview SFMTA MUNI department representatives and review Central Subway Project records to determine if:

1. A safety certification procedure or plan for the project has been established, implemented, and, if necessary, updated;
2. A safety certification committee with representatives from all affected SFMTA MUNI departments is actively and regularly involved in the safety certification process including reviewing and commenting on project safety critical decision-making activities;
3. The safety critical design elements are being tracked and verified with regular status reports being provided to the Safety Certification Committee (SCC);
4. Members of the safety certification committee or its designated representatives regularly attend committee meetings and participate in the oversight of the safety certification process;
5. Safety design criteria specified for the safety critical design elements have been verified to be implemented in the project design and are being verified to be implemented into construction;
6. Audits have been and would continue to be performed to determine the validity of the safety certification verification process;

7. Appropriate hazards analyses of design and construction modifications are being performed;
8. The safety certification process formally addresses all changes to safety critical elements of the project.
9. Safety certification is administered by the SFMTA MUNI Health and Safety Department or other safety professionals not subordinate to the project (Construction Division) management.
10. All safety certification activities are thoroughly documented throughout the life of the project to substantiate that safety elements, safety criteria, final design, construction, testing, operating and emergency procedures, and training aspects of the project would be implemented in the completed project.

ACTIVITIES, FINDINGS, AND RECOMMENDATIONS

Activities and Findings:

1. The Central Subway Project is in the Preliminary Engineering Phase. The Safety Certification Plan (SCP) is available in DRAFT form (dated 10/10/2008). The Central Subway SCP is not approved by SFMTA MUNI management or the CPUC as required by GO-164D. Per FTA Safety & Security Management Plan (SSMP) timeline, the SCP is not required to be formally approved until Preliminary Engineering is completed.

2. SFMTA MUNI has not yet established a Safety Certification Committee (SCC) for the Central Subway Project; however, it plans to do so by March, 2009. SFMTA MUNI has discussed this project during Fire Life Safety Committee (FLSC) and Technical Coordination Meetings. FLSC and Technical Committee members include personnel from various internal SFMTA MUNI departments as well as outside agencies such as San Francisco Fire Department (SFFD) and CPUC.

3. SFMTA MUNI will establish the Safety Design Criteria for the Central Subway Project during the SCC meetings.

4. SFMTA MUNI will establish the audits during the SCC meetings.

5. SFMTA MUNI has performed Preliminary Hazard Analysis (PHA) and Threat & Vulnerability Analysis (TVA). SFMTA MUNI plans to discuss these reports during the future SCC meetings.

6. SFMTA MUNI plans to address safety critical elements during the future SCC meetings.

7. SFMTA MUNI Health & Safety Manager administers the Safety Certification independent of the construction division.

8. SFMTA MUNI has not started the Safety Certification activities yet.

Recommendations:

None.

2008 CPUC SYSTEM SAFETY AUDIT CHECKLIST FOR SAN FRANCISCO MUNICIPAL RAILWAY

Checklist	**49**	**Bridges and Structures Inspections and Reports**	
Date of Audit	**October 29, 2008**	Department	**Transportation Planning and Development; Service Delivery, Infrastructure Maintenance, Caltrans Liaison**
Reviewers / Inspectors	**Raed Dwairi**	Persons Contacted	**Ted Aranas, Robb Bury**

REFERENCE CRITERIA

1. SFMTA MUNI System Safety Program Plan Section 4.14 Facility & Equipment Inspections

ELEMENT, CHARACTERISTICS, AND METHOD OF VERIFICATION

Bridges and Structures Inspections and Reports

1. Interview SFMTA MUNI representatives to determine if a procedure exists for bridge and structural inspections.
2. Review available records of bridge and other structural inspections at SFMTA MUNI to determine whether or not these were inspected and remedial actions taken in a timely manner. Record reviews should include, but not be limited to, the following locations:
   a) Highway 101 & Third Street, CPUC Crossing Number 125J-0.65-B.
   b) Interstate 280 & San Jose Avenue, CPUC Crossing Number 125M-15.47-B
   c) 4th Street Bridge
   d) Islais Creek Bridge

ACTIVITIES, FINDINGS, AND RECOMMENDATIONS

Activities and Findings:

Staff interviewed Mr. Aranas, Sr. Operations Manager of Infrastructure Maintenance, and determined the following:

1. No formal written procedure currently exists for bridge and other structural inspections.
2. Staff reviewed the following preventive maintenance reports which were conducted by the

Department of Public Works (DPA) or Caltrans:

- Highway 101 & 3rd Street inspection report dated 02/05/08, Bridge #34-0103.
- Highway 280 & San Jose Avenue (cross street with Vernon) inspection report dated 04/28/08, Bridge #34-0087.
- 4th Street Bridge (China Basin) inspection report dated 12/05/07, bridge #34C-0027.
- Islais Creek Bridge (3rd Street & Cargo Way) inspection report dated 12/19/07, bridge #34C-0024.

3. Staff reviewed draft biennial tunnel structural inspection report dated March 2006 which was prepared by Michael K. Tsang with Sandy Ng & Sanford Pong for the SFMTA MUNI Construction Division, Facilities Engineering Section. The body of this report specifies structural inspections of tunnels once every two years and comments that APTA recommends these inspections once every five years.

Recommendations:

1. Although main responsibility of structural integrity of the bridge may lie with another agency such as Caltrans, SFMTA MUNI should take the responsibility of the oversight of the PM program and relevant documentation. SFMTA MUNI should accordingly develop a new standard operating procedure (SOP) mentioning the responsibility of preventive maintenance (PM) lying with another agency and SFMTA MUNI's role as providing an oversight of the PM of the structures including bridges (PU Code 29047).

2008 CPUC SYSTEM SAFETY AUDIT CHECKLIST FOR SAN FRANCISCO MUNICIPAL RAILWAY

Checklist	**50**	**Training of Executives, Directors, Senior Managers, Superintendents, Supervisors, and Operators**	
Date of Audit	**October 28, 2008**	Department	**System Safety**
Reviewers / Inspectors	**Raed Dwairi**	Persons Contacted	**Michael Kirchanski**

REFERENCE CRITERIA

1. SFMTA MUNI System Safety Program Plan Section 8.0, Training of Executives, Directors, Senior Managers, Superintendents, Supervisors, and Operators

ELEMENT, CHARACTERISTICS, AND METHOD OF VERIFICATION

Training of Executives, Directors, Senior Managers, Superintendents, Supervisors, and Operators

Interview the training representatives and review the training program documents and records to determine if they specify:

1. Training requirements for the Executives, Directors, Senior Managers, Superintendents, Supervisors, and Operators, as described in Section 8.0 of the SFMTA MUNI System Safety Program Plan

Select a representative sample of individuals from each classification in Section 8.0 and determine if:

1. Each selected individual successfully completed the required training for their position, and
2. Training and certification records for each selected individual are complete and in compliance with SFMTA MUNI's requirements.

ACTIVITIES, FINDINGS, AND RECOMMENDATIONS

Activities and Findings:

Staff interviewed SFMTA MUNI's Health & Safety Manager, reviewed relevant training program documentation, and determined the following:

1. There exists an approved procedure entitled SSPP Training Program Plan with an effective

date of 05/01/08 which describes how the Health and Safety Department provides System Safety Program Plan (SSPP) training to executives, managers, and supervisors. This procedure specifies training requirements for the executive managers and applies to deputy directors of Service Delivery, maintenance & operations superintendents and assistant superintendents, train controllers, OCC Duty Managers, and transit supervisors. SSPP training requirements described in this procedure are consistent with those specified in Section 8.0 of SFMTA MUNI's SSPP effective 02/19/07.

2. SFMTA MUNI developed SSPP training materials on 04/10/08 and trained the executive team on 04/28/08. Staff reviewed the sign-up sheet which showed that all members of the executive team received one hour training in awareness pertaining to 49 CFR 659, GO 164-D, SFMTA MUNI System Safety Program Plan and Cal OSHA Injury Illness Prevention Program.
3. First-line supervisors received management/leadership enhancement training on 08/01/08 as the signup sheet indicates.
4. Transit supervisors, train controllers, electrical/electronic transit assistant supervisors were trained on 08/15/08, 09/12/08, and 09/26/08 as the sign up sheet indicates.
5. Training records are complete and comply with SFMTA MUNI's requirements.
6. Staff noted no exceptions.

Recommendations:

None.

2008 CPUC SYSTEM SAFETY AUDIT CHECKLIST FOR SAN FRANCISCO MUNICIPAL RAILWAY

Checklist	**51**	**Hazard Management**	
Date of Audit	**October 23, 2008**	Department	**System Safety**
Reviewers / Inspectors	**Noel Takahara**	Persons Contacted	**Antonio Parra, Michael Kirchanski**

REFERENCE CRITERIA

1. SFMTA MUNI System Safety Program Plan Section 4.4 – Hazard Management
2. CPUC General Order 164 Series
3. Hazard Analysis SY.PR.042
4. Corrective Action Plans SY.PR.033

ELEMENT, CHARACTERISTICS, AND METHOD OF VERIFICATION

Hazard Management

Interview the responsible SFMTA MUNI representatives and review the hazard management program records to determine if:

1. The Office of Health and Safety analyzes, categorizes, and resolves hazards using the approach of Military Standard 882D
2. Safety professionals from Health and Safety learn of hazards through Employee Safety Committees, complaints, regulatory citations, observations, accident reports, and other sources.
3. The Hazard Analysis Work Group uses the Military Standard 882D approach, categorizing hazards by criticality (I, II, III, and IV) and probability (A, B, C, D, and E).
4. SFMTA MUNI considers hazards classified 1A, 1B, 1C, 2A, 2B, and 3A as unacceptable and immediately mitigates those unacceptable hazards.
5. When unacceptable hazardous conditions are identified, the CPUC staff is immediately notified.

ACTIVITIES, FINDINGS, AND RECOMMENDATIONS

Activities and Findings:

For this checklist, the reviewer referred to SSPP revision number three (effective date 2/19/2007) that details that SFMTA MUNI will categorize and resolve hazards according to Military Standard 882D. SFMTA MUNI personnel informed the reviewer that the actual effective date of the SSPP was one year later in February 2008, which was when it was signed and approved by executive management.

SFMTA MUNI personnel showed the reviewer the step-by-step process of how the hazard identified at 19th and Holloway is being mitigated. Initially, the Hazard Analysis Work Group (HAWG) convened on 8/15/2008 to review and approve the Operational Hazards Analysis (OHA). The OHA is compiled by safety personnel and includes an assessed hazard rating or risk index based on the 882D standard. In this case SFMTA MUNI assigned this hazard with a risk index of 1B and reported as such to CPUC staff according to the SSPP and as mandated by Federal and State regulations. Finally, the staff reviewed the Corrective Action Report that detailed the work to be done and the estimated construction start and completion dates.

The reviewer found that since February 2008 SFMTA MUNI has dealt with hazards according to the SSPP in a clear and consistent manner in compliance to State and Federal regulations. However, in the interim period before February 2008, while the SSPP was undergoing final approval, the hazard management process was not clear and consistent. Staff found the following upon review of the hazard management process.
1. SFMTA MUNI did not always perform Operational Hazard Analysis (OHA) when a hazard was identified. This is an important step in the hazard management process since the risk index is documented in the OHA.
2. Staff found an inconsistency in documentation linking corrective action plans to identified hazards. Staff found an instance where a corrective action was made but could find no record of that hazard in the master index.

Notes Regarding the RTSS Procedures #10 and GO 164-D, Section 6 Rule: Program Management Standard State Safety and Security Oversight Clarification of RTSS-10 - Procedure for Hazard Management, Section 3.5, is provided for this recommendation. Each RTA shall describe the processes used to investigate, evaluate and analyze hazards in this section of the SSPP. The analysis component of this section shall detail the methodology used to categorize and prioritize identified hazards. In this section, RTA should define a primary quantitative/qualitative methodology for hazard analysis. Per GO 164-D, Section 6 – Requirements for Hazard Management Process, each RTA SSPP's discussion of the hazard management process shall include a process to identify and resolve hazards during operations, including any hazards resulting from system extensions and modifications, operational changes or other changes within the rail transit environment.

Recommendations:

1. SFMTA MUNI should conduct an Operational Hazard Analysis (OHA) whenever a hazard is first identified and assign a risk index to that hazard. If found necessary, SFMTA MUNI should develop a corrective action plan to mitigate identified hazards in accordance with the SSPP (SY.PR.033).