

Testimony of Richard W. Clark  
Before the  
United States House of Representatives  
Committee on Transportation and Infrastructure  
Subcommittee on Highways and Transit  
Public Transit Safety: Examining the Federal Role  
December 8, 2009

Chairman Oberstar and members of the Committee, my name is Richard W. Clark. I am the Director of the Consumer Protection and Safety Division of the California Public Utilities Commission. I am pleased to have the opportunity today to come before you and discuss rail transit safety and the proposed restructuring of the federal and state regulatory effort.

This testimony has been prepared by the Consumer Protection and Safety Division. The Division has the responsibility for the regulatory oversight of rail transit safety in California. This testimony will describe the Commission's program, comment on the proposed *Public Transportation Safety Program Act of 2009*, and discuss some examples of California's success in exercising its safety jurisdiction over rail transit and fixed guideway systems.

### **The California Rail Transit Safety Program**

The California Public Utilities Commission (CPUC) oversees the safety and security of all rail transit systems within California. There are twelve rail transit systems under the CPUC's jurisdiction, including light rail systems, heavy rail transit, funiculars, automatic people movers, and trolleys. Collectively these systems account for millions of passenger trips every year. The CPUC is responsible for investigating all reportable accidents, as well as conducting regular audits and inspections of rail transit systems. Additionally, at any given time, rail transit agencies have dozens of new projects, extensions, and retrofits in progress, all of which must pass the rigorous CPUC safety certification process before carrying passengers.

Through the California Public Utilities Code, California state law gives the CPUC jurisdiction over rail transit safety. For example, Public Utilities Code (PU Code) section 99152 states:

Any public transit guideway planned, acquired, or constructed, on or after January 1, 1979, is subject to regulations of the Public Utilities Commission relating to safety appliances and procedures. The commission shall inspect all work done on those guideways and may make further additions or changes necessary for the purpose of safety to employees and the general public. The commission shall develop an oversight program employing safety planning criteria, guidelines, safety standards, and safety procedures to be met by operators in the design, construction, and

operation of those guideways. Existing industry standards shall be used where applicable. The commission shall enforce the provisions of this section.

Other code sections provide this authority individually to rail transit agencies in operation before January 1, 1979. Additionally, PU Code Section 778 provides authority over rail transit highway-road crossings:

The commission shall adopt rules and regulations, which shall become effective on July 1, 1977, relating to safety appliances and procedures for rail transit services operated at grade and in vehicular traffic. The rules and regulations shall include, but not be limited to, provisions on grade crossing protection devices, headways, and maximum operating speeds with respect to the speed and volume of vehicular traffic within which the transit service is operated. The commission shall submit the proposed rules and regulations to the Legislature not later than April 1, 1977.

The Commission also has state level accident investigation responsibilities. Transit accidents directly or indirectly related to maintenance or operation activities resulting in:

- loss of life,
- or injury to person or property,
- and which requires, in the judgment of the Commission, an investigation,

may result in Commission order(s) or recommendation(s) it deems appropriate. Further, every transit agency shall prepare and submit an accident report to the Commission under rules prescribed by the Commission. Finally, no order or recommendation of the Commission, nor any accident report received by the Commission, shall be admitted as evidence in any action for damages based on or arising out of such loss of life, or injury to person or property. (See Cal. Pub. Util. Code § 315.)

The CPUC has quasi-legislative rulemaking authority, and uses it to develop General Orders. CPUC General Orders are an integral part of the CPUC oversight program, mandating minimum requirements, are specified in the following:

- General Order 143-B, Safety Rules and Regulations Governing Light Transit, original implementation date June 27, 1978.
- General Order 127, Rules for Maintenance and Operation of Automatic Train Control Systems—Rapid Transit Systems, original implementation date August 15, 1967.
- General Order 75-C, Rules for Grade Crossing Equipment, original implementation February 14, 1973.
- General Order 88-B, Rules for Altering Public Highway Rail Crossings, original implementation February 14, 1973.
- General Order 95, Regulations Governing the Rules for Overhead Electric Line Construction (e.g. Catenary System), original implementation July 1, 1942.
- General Order 26-D, Regulations Governing Clearance on Railroads and Street Railroads with Reference to Side and Overhead Structures, Parallel tracks,

Crossings, and Public Roads, Highways, and Streets, original implementation date February 1, 1948. This General Order applies to joint-usage or shared track railroads such as San Diego trolley, Inc. and other rail transit systems not specifically excluded from its requirements.

- General Order 164-D, Rules and Regulations Governing State Safety Oversight of Fixed Guideway Systems, original implementation September 27, 1996.

Subsequent to the adoption of Section 3029 of the Intermodal Surface Transportation efficiency Act (ISTEA) of 1991, which requires each state to develop and implement safety plans for all fixed guideway transit systems, Governor Pete Wilson designated the CPUC on October 13, 1992 as the agency responsible for ensuring California compliance with that Section.

On December 29, 1995, the Federal Transit Administration (FTA) issued 49 Code of Federal Regulations Part 659, Rail Fixed Guideway Systems: State Safety Oversight. The Rule required States to oversee the safety of rail fixed guideway systems through a designated oversight agency. The Governor's designation of the CPUC fulfilled this requirement. This rule was revised by the Federal Transit Administration, effective May 1, 2006.

The CPUC has both state and federal obligations, and the authority to enforce both state and federal law in the pursuit of rail transit safety.

## **Rail Transit Safety Section**

The CPUC currently has the following 20.5 person-year positions dedicated to the rail transit safety program:

- One half of a Program Manager's time.
- One Program and Project Supervisor.
- Two Senior Utilities Engineer Supervisors.
- One Senior Transportation Operators Supervisor.
- One Senior Utilities Engineer Specialist.
- One Regulatory Analyst.
- Three Railroad Inspectors
- Eleven Utilities Engineers

Rail Transit Safety staff performs the following functions:

- Conducts triennial safety and security reviews of the rail transit systems, performing four audits each year, which covers the 12 agencies in the three-year period.
- Approves rail transit System Safety Program Plans.
- Provides safety certification for new rail transit agency systems or new extensions on existing agency systems.

- Audits System Security Plans.
- Performs accident investigations.
- Writes and publishes accident investigation reports for the more severe accidents.
- Initiates and/or supports CPUC rule promulgation. The Commission currently is considering new regulations that the staff has drafted to ban personal electronic device use by safety-sensitive rail transit personnel. The Commission currently is also formally considering “roadway worker protection” rules for rail transit wayside employees.
- Initiates and/or supports formal Commission safety investigations. Past examples include:
  - Bay Area Rapid Transit (BART) Tunnel Fire – 1979
  - BART Derailment at A05 Interlocking – December 17, 1992, CPUC Case 9867
  - San Francisco Municipal Transportation Authority (MUNI) State Safety Oversight
  - San Francisco International Airport AirTrain Collision at Storage Yard – August 4, 2002
  - San Francisco International Airport AirTrain System Safety Program Plan and Regulatory Authority – Investigation 02-07-014
- Conducts routine inspections of track, equipment, and signal and train control systems.
- Conducts operations compliance observations.
- Participates in rail transit agency internal safety audits.
- Community outreach through staff participation in Operation Lifesaver, the national rail safety education organization.

### **Proposed *Public Transportation Safety Program Act of 2009***

The proposed *Public Transportation Safety Program Act of 2009* will change the federal-state relationship regarding rail transit safety oversight and regulation. From the material provided us for this hearing, we understand that the proposed new regulatory structure would:

- Eliminate the statutory prohibition against the imposition of safety standards that has been in law since 1965.
- Require the Secretary of Transportation to establish and enforce minimum federal safety standards through the Federal Transit Administration (FTA) for rail transit systems not already regulated by the Federal Railroad Administration. In so doing,

the Act also provides the Secretary the option to establish a safety program for public transportation bus systems.

- Give each state a choice of assuming federal enforcement authority or “opting out” with the FTA taking the enforcement role for states that “opt out.”
- Require states that choose to assume federal enforcement authority to demonstrate that they have an adequate number of fully-trained staff to enforce federal regulations, have been granted enforcement authority under state law, and have sufficient financial independence from any transit systems under their purview.
- Provide federal assistance to participating states to cover the salary and benefit costs, as well as the training, certification and travel costs of the state agency in overseeing and enforcing federal transit safety regulations.
- Authorize state agencies participating in federal enforcement to 1) conduct inspections, investigations, audits, examinations, and testing of a public transportation system’s equipment, facilities, rolling stock, operations, and persons engaged in the business of a public transportation system, 2) issue reports, subpoenas, and discovery requests, and 3) conduct research, development, testing and training.
- Create nationally uniform federal regulations, considering existing industry standards to the extent practicable.
- Allow states to establish more stringent safety standards than the federal standard.

The CPUC’s Consumer Protection and Safety Division supports the administration’s proposed regulatory initiative. We understand that the intent of the proposed Public Transportation Safety Program Act of 2009 (Act) is to preserve the well-functioning state rail transit safety programs’ ability to continue with full authority to raise the level of public rail transit safety while ensuring consistency in safety oversight quality in all states.

The current proposal to create national rail transit safety standards has many similarities to the federal initiative in the late 1960’s on the nation’s railroads. The Federal Railroad Safety Act of 1970 (FRSA) created national standards for freight and passenger railroads, and was passed under similar conditions on the railroad that we find described today in the rail transit safety proposal. The CPUC has 39 years of experience with regulating railroad safety in concert with the Federal Railroad Administration (FRA) under FRSA. Originally created in 1879 as the California Railroad Commission, in 1911 the Commission began regulating railroad safety. California experienced the FRA regulatory scheme introduced in 1970 as a clear benefit to safety, but has also experienced some serious pitfalls as well.

California’s greatest concern with railroad safety regulation under FRSA has been in the area of federal preemption. Fortunately, in contrast to FRSA, the proposed Act is being presented as not preempting state safety regulation above the minimum levels set by the Act. Whereas FRSA has thwarted attempts by the states to regulate safety areas on railroads, we understand that the Act as proposed will not preempt states from imposing their own regulations as long as they are at least as strict as the federal regulations.

Staff's view in general is that Federal-state relationship should be based on the relative strengths of the two levels of government.

- Federal government has the advantage of an economy of scale for such things as research, equipment testing, and promulgation of regulations that would be applicable across all properties such as accident reporting, equipment crashworthiness, inspector training, and system-safety program plans.
- State government has the advantage of being “on the ground,” more familiar with the systems and their different situations, environments, operating conditions – such as operating rules, equipment, track, geography, traffic interface, and local transportation infrastructure.
- State government has the advantage of establishing regulatory compliance relationships with local systems through inspections and compliance follow-up.
- Federal government has the advantage of being able to set a minimum floor of safety requirements that the less safe state systems must follow when the local government does not have the will, authority, or resources to institute sufficient safety requirements.
- State government has the advantage of being able to specify the level of safety that the affected population desires and funds above any minimum requirements.
- State government has the advantage of trying out new regulatory innovations on a test scale.

State governments should be able to set safety requirements that exceed any federal safety requirements, either in the level of specification of a certain type of regulation or the level of resultant safety through a different type of regulation, for example, a performance standard versus an explicit standard.

The FRA-state participation model has worked well in California for promoting freight and passenger railroad safety, and would be a good model for the FTA to adopt - if the lessons learned over the years since the Federal Railroad Safety Act of 1970 were acknowledged and adopted:

- A national minimum floor of regulations has been beneficial.
- The prohibition against state regulatory promulgation has been detrimental. States were expressly preempted from promulgating regulations more strict than the minimum federal regulations where the subject matter was covered, and court precedents have severely restricted the interpretation of “covered subject matter.” For example, the 5<sup>th</sup> Circuit Court of Appeals decision on a Texas Railroad Commission walkway regulation ruled that a walkway surface adjacent to the track was preempted because the subject matter was covered by the federal regulations regarding track

structures.<sup>1</sup> This ruling did not recognize that providing a safe walkway surface for brakemen and switchmen served a different safety purpose than did the federal purpose of creating a roadbed to support trains. In contrast, the 9<sup>th</sup> Circuit Court of Appeals recognized that similar California walkway surface standards were not only important for employee safety separate from train support, but that the employee walkways and track structure support were different subject matters that had coexisted independently for over 20 years.<sup>2</sup>

- Federal regulations were often set at a “lowest common denominator” level of safety, bringing up the safety level for lagging states and systems and dropping the safety level for achieving states and systems.
- The prohibition against state regulatory promulgation has been detrimental even where the original intent was to allow uniquely strict state regulation where local conditions created a particular safety hazard. However, court precedent since FRSA was enacted has eviscerated the original intent of the Act to allow the states to adapt regulations to local conditions. For example, after a severe derailment and toxic spill that poisoned the Sacramento River for 40 miles, the CPUC adopted a track standards regulation at the Cantara Loop in Northern California. The new state standards exceeded the federal track standards to provide greater track strength and derailment resistance at this uniquely dangerous steep curved part of the mountain grade on a bridge over the river. The railroad even stated in formal testimony that the increased strengthening was needed to prevent derailments at that site. Even so, the 9<sup>th</sup> Circuit Court ruled that California could not adopt such a stricter regulation,<sup>3</sup> and to-date, the FRA has not done so.
- The 50-percent federal funding for state participation inspectors, since discontinued, was essential in getting state inspection programs started.
- States can often adopt NTSB safety recommendations immediately, whereas a nationwide regulatory proceeding could delay safety improvements.
- Federal economy-of-scale resources have been beneficial. For example, inspector and investigator training and the subsequent certification by the FRA have greatly benefited the California railroad safety program.

## Key Elements for Regulatory Reform

CPUC staff believes that the following elements should be considered in the new federal-state safety regulatory structure.

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<sup>1</sup> *Missouri Pacific Railroad Co. v. Railroad Commission of Texas*, 948 F.2d 179 (5th Cir. 1991), cert. denied 507 U.S. 1050, 123 L. Ed. 2d 649, 113 S. Ct. 1943 (1993).

<sup>2</sup> *Southern Pac. Transportation Co. v. Public Utility Comm. of State of Cal.*, 647 F. Supp. 1220 (N.D. Cal. 1986), *aff'd per curiam* 820 F.2d 1111 (9th Cir. 1987).

<sup>3</sup> *Union Pac. R.R. v. Cal. Pub. Util. Comm'n*, 346 F.3d 851 (9<sup>th</sup> Cir. 2003).

1. Expand FTA jurisdiction to include authority to develop and impose minimum safety standards
2. Maintain state authority to impose greater rules/regulations; do not preempt state authority but allow for more stringent rules/regulations than federal minimum standards.
3. Funding for state programs. Funding should be allocated for the cost of operating the state program, including salary and benefits of state staffing and actual expenses in executing rules/regulations.
4. State oversight program needs. Number of staff positions should be equitably established using metrics such as route miles and number of rail transit agencies regulated. Consideration should be given to specific needs of states with interstate systems. Staffing levels should include sufficient staff positions to also oversee rail transit agencies that do not participate in FTA funding programs. Safety oversight should not be linked to funding as criteria for that oversight. The following positions should be funded:
  - a. Program Manager
  - b. Engineering staff (licensed professional engineers with discipline specific training: mechanical, electrical, traffic, civil)
  - c. Discipline specific inspection staff (operating practices, track, signal and train control, motive power and equipment, hazard management)
  - d. Analytical staff
  - e. Administrative staff
5. FTA should establish criterion for state safety and security oversight programs. Criterion should dictate that designated state safety and security oversight agency be separate from agencies that promote rail transit use, and administer grants and funding for regulated rail transit agencies. Safety programs housed within state departments of transportation may not receive support needed for the program as those agencies predominately focus on highways and funding programs. Therefore, we recommend that the SSO program be housed in an agency whose mission is dedicated to safety and segregated from promotion of rail transit usage and funding and/or administration of funds.
6. Compensation levels for state staff should be competitive with private industry in order to recruit and retain expert staff.
7. Discourage the use of contractors for safety and security reviews and other state responsibilities. Support development of staff stability and institutional expertise to efficiently and comprehensively execute oversight responsibilities, minimizing the

need for consultant/contractors and the resultant loss of expertise and function when contracts expire.

8. Training for state managers and staff. Robust training and certification program fully funded by FTA is essential to the success of the program. Course curriculum should include all aspects of rail transit industry technology as well as regulatory procedures and jurisdiction. Discipline specific training and certification for inspectors is necessary to provide the skills set necessary to conduct efficient oversight. Training should include, but not be limited to:
  - a. Industry specific technical training
  - b. Investigative techniques
  - c. Report writing, digital photo documentation
  - d. Performance measurements
  - e. Threat and vulnerability analysis tools
  - f. Security sensitive information training
  - g. Auditing techniques
  - h. Drug and Alcohol program
  - i. Fitness for duty
  - j. Evaluation of the structure and effectiveness of system safety program plans
  - k. Safety culture
9. Credentialing and background checks for state employees. Safety and security oversight is closely linked with the essential characteristics of the systems that will fall within this regulation. Safety certification and day-to-day oversight activities may expose rail transit agencies to vulnerability if those effecting the federal and state rules and regulations are not properly vetted and trained in security matters. The Department of Homeland Security (DHS) is equipped to continue its role in the prevention of terrorism and that this element should continue to reside within that segment of the federal government. However, safety is closely linked to security in many elements. Therefore, it is essential that state employees are fully vetted and cognizant of security elements associated with intentional harm to public transportation systems.
10. States should have authority to mark documents as security sensitive information to ensure that security sensitive information is protected from public disclosure. The current regulations in Title 49 Code of Federal Regulations Part 659 extend that authority only to the rail transit agencies and not the state safety oversight agencies. The rule mandates that the states oversee the agency(s) security program plans and conduct triennial reviews of those programs but has no provision to protect these documents from being released in the public domain.

11. Investigative authority for states. As illustrated by the recent banning of state safety oversight staff from the Washington Metropolitan Transportation Authority (WMATA) from trackside inspections it is imperative that states are vested with full investigative authority. The authority relegated to NTSB inspectors might serve as a model for this authority.
12. For states without relevant subpoena authority, establish authority in federal regulation for use in accident investigation and other records and data needs. For those states with such authority, allow enforcement under both sources of authority.
13. Civil penalties and individual agency fines for willful violations of safety-critical rules/regulations should be included in new regulations. Enforcement tools are vital to a successful program. These penalties should include compliance with federal and state regulations as well as rules and procedures established by individual rail transit agencies. Current regulations allows for FTA to withhold 5% of formula funds from a state that is not in compliance. Those states with multiple rail transit agencies are reluctant to report infractions as the monies are withheld from the state and not the egregious agency only. States need a robust citation/violation program that can easily be executed.
14. The regulation should include a licensing/certification program for safety-critical rail transit employees such as train operators, control operators, and roadway workers. The FTA should maintain a database to maintain status of employees and issue the license/certification. This program would provide an essential enforcement tool if tied to specific safety critical regulation/rule infraction that may result in employee forfeiting license/certification with a progressive time and training element.
15. States managers should be at the table for all research and development projects, including the development of industry standards with the American Public Transportation Association (APTA), Volpe National Transportation Systems Center, Transportation Research Board, and other academic research entities. Completed products should be readily available to states.
16. Regulatory reform should not depend on APTA standards. Consideration must be given to the conflict-of-interest of APTA. This organization serves as the lobbying organization for the industry. While APTA deserves much credit for creating consensus-based standards and guideline development, safety-focused independence is lacking. States are generally not members of APTA and have limited input into product development. FTA should develop its state safety and security oversight program independent from APTA. APTA standards and guideline development processes are often cumbersome to complete, often taking several years to reach consensus before being published. APTA should be commended for its accomplishments, but existing standards and guidelines should be adopted outright. These standards should be used as reference materials in developing federal minimum standards, and should be fully vetted with state oversight managers. The

current partnership between the FTA and APTA should be expanded to include all states oversight agencies to capitalize on the benefits of this organization.

17. An organization that includes FTA, state, industry and labor organization representatives should be developed to offer a platform for idea and information sharing. Such an organization could collectively develop standards, guidelines, and best practices for the industry. State participation in this organization should be funded by the FTA.
18. Information sharing is essential to a successful program. States should be included in communications from FTA to stakeholders, both from the FTA headquarters and the FTA regional offices. States should be included in both safety and security communications. Too often FTA efforts are focused on funding alone—safety and security should be elevated to a higher priority level.
19. FTA should establish fitness-for-duty standards for rail transit employees who perform safety critical duties, including wellness programs, annual physical examination requirements, and fatigue management.
20. The FTA should establish and fund project management oversight contractors (PMOC) for state use in safety certification projects—throughout conceptual stages and the life of the project. These resources should be separate from the FTA region contractor list to avoid conflict of interest.
21. Standardize reporting thresholds and guidelines between 49 CFR Part 659, National Transportation Database (NTD) and the Research and Innovation Technology Administration (RITA). Establish web-based reporting forms for both states and rail transit agencies to minimize workload. Include employee accident data in the reporting thresholds.
22. FTA should establish an interactive database or expand the NTD to assist states and rail transit agencies in their accident trend analyses, accident prediction modeling, and hazard management. Applications should include web-based accident/incident/hazard notification, tracking matrices for corrective actions, and document storage (e.g., audits, reviews). The database should accommodate queries for proactive trend analysis and incorporate GIS technology. States should have access to all data.
23. Reorganize FTA staff. Safety functions should report to directly to the Administrator consistent with the FTA recommendation that transit agency safety staff report to the chief executive office of those agencies. Add resources to federal safety staff and utilize FTA regional offices for safety oversight and resources.
24. Link FTA grant funding to safety requirements. Establish a program where safety critical infractions of an agency will result in penalties.

25. Develop a grant program for safety-critical findings of states. Provide funding for safety-critical corrective action plans prompted in audits, accident investigations, random and focused inspections, and NTSB recommendations.
26. Improve communication and coordination between regional offices and states.
27. Establish audit standards where region, state, TSA/DHS, and contractor audits are linked or related. Multiple audit schedules are often repetitive and cumbersome. DHS/TSA and FTA Regions should coordinate audits with state managers. A coordinated effort between all agencies would be more effective and reduce audit fatigue. Audit findings should be shared between all federal and state agencies with safety and security oversight responsibilities of rail transit.
28. Quarterly meetings between FTA and state managers. An annual meeting is not sufficient to maintain consistency and optimize progress.
29. Succession planning for state oversight agency personnel, particularly for the smaller state agencies. Retirements and career moves can cause program disruption in terms of lost institutional knowledge, expertise, and professional networks.
30. The security element descriptions and specifications in Title 49 CFR Part 659 should be enhanced. The link between safety and security should be emphasized. Coordination between DHS/TSA and state oversight agencies should be emphasized to better utilize the skill sets of both agencies. Communications and coordination descriptions should be enhanced. DHS/TSA should focus on terrorism. States should focus on other security issues. DHS/TSA and states should share information and findings. States programs and personnel must be vetted and credentialed. States should be required to maintain Transportation Worker Identification Credentials (TWIC). Emergency response and recovery plans development and implementation should include all stakeholders, including state managers.

## **Successes of Rail Transit Safety Oversight Jurisdiction**

Safety oversight is often reactive. Public attention is aroused too often only after catastrophic events and media attention. Good governance demands a proactive approach where there are clear standards and practices to identify and mitigate hazards before they become tragic events. Proactive safety oversight built upon a systems safety approach and hazard management is necessary to the advance of public transportation. The CPUC's mission in rail transit safety is to proactively ensure the safe design, construction, and operations of rail transit. The following sections describe some of the benefits of the CPUC's exercise of safety jurisdiction over rail transit agencies in California.

### **BART Automatic Train Control**

An example of the CPUC's safety experience is illustrated by its General Order 127, *Rules for Maintenance and Operation of Automatic Train Control Systems – Rapid Transit Systems*, which was adopted on August 15, 1967, before rapid transit construction was

expanded in California. The concept for the Bay Area Rapid Transit (BART) was first envisioned in 1946, with engineering studies and design work beginning in 1963 and with construction beginning in 1964. Promulgated by the CPUC under the authority granted by PU Code Section 29047,<sup>4</sup> General Order 127 ensured that safety was addressed early on in the project.

Revenue service on BART commenced in 1972. Prior to the commencement of revenue service various tests of BART's automatic train control systems were conducted. Through these tests, the Commission staff learned that the automatic train control system could not always detect the presence of a single dead or un-powered car. Also, in the opinion of the staff, the testing of the train braking, propulsion, protection, and interlocking systems was insufficient. The staff recommended to the Commission that it not authorize full automatic train operations, but that the use of the established and proven manual block override method of operation for train separation protection and provide a two-station separation mode between trains.

The Commission ordered that the, "train control system be supplemented by manual override consisting of a trained operator at the controls of each train with a back-up of supervisory personnel at key stations to provide positive train control in accordance with rules to be agreed upon and filed with the Commission"<sup>5</sup>. The CPUC further mandated that the train control system be supplemented by manual override remain in effect until further order of the Commission.<sup>6</sup>

Subsequently, Lawrence Berkeley Laboratory, as consultant to the California Senate Public Utilities and Corporations Committee, conducted failure-mode analyses as part of an independent evaluation of the technical merits of the BART Computer Aided Block system. The objective was to reduce the two-station separation mode to a one-station separation mode as proposed for the transbay operation and that the "worst case" failure should be an "uncovered failure-mode," that is, the collision protection should revert to that provided by the basic automatic train control system in the event of a one-station separation failure.

Lawrence Berkeley Laboratory (LBL) recommended several modifications and additions to the train control system. Recommendations included the establishment of zero speed gates to automatically stop a train in the case of a station run-through; a revision of computer algorithm to require positive detection of a released train in the block past a station platform before the release of a following train; the revision of the existing hardware for the transbay tube train-detection; integrity tests to ensure that the computer hardware and software actually perform their intended functions; abnormal operations performance tests; and a full-scale (36-train) dynamic performance test.

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<sup>4</sup> California Public Utilities Code, Division 10, Transit Districts, Part 2, San Francisco Bay Area Rapid Transit District, Chapter 6, Powers and Functions of District, Article 5, Rapid Transit Facilities and Service, § 29047 Safety appliances and procedures

<sup>5</sup> CPUC Resolution S-1358, August 31, 1972,

<sup>6</sup> CPUC Decision No. 81248

It wasn't until August 27, 1974, after staff reviewed and confirmed BART's installation and testing of the Sequential Occupancy Release (SOR) train control system<sup>7</sup> and implementation of all other LBL recommendations, that the Commission allowed automatic train control in place of manual override.<sup>8</sup>

Subsequent to the tragic Washington Metropolitan Area Transportation Authority (WMATA) collision on June 8, 2009, the NTSB made urgent recommendations to the FTA as follows.

- Advise all rail transit operators that have train control systems capable of monitoring train movements to determine whether their systems have adequate safety redundancy if losses in train detection occur. If a system is susceptible to single point failures, urge and verify that corrective action is taken to add redundancy by evaluating track occupancy data on a real-time basis to automatically generate alerts and speed restrictions to prevent train collisions. (R-09-007) (Urgent)
- Advise all rail transit operators that use audio frequency track circuits in their train control systems that post-accident testing following the June 22, 2009, collision between two rail transit trains near the Fort Totten station in Washington, D.C., identified that a spurious signal generated in a track circuit module transmitter by parasitic oscillation propagated from the transmitter through a metal rack to an adjacent track circuit module receiver, and through a shared power source, thus establishing an unintended signal path. The spurious signal mimicked a valid track circuit signal, bypassed the rails, and was sensed by the module receiver so that the ability of the track circuit to detect the train was lost. (R-09-17) (Urgent)
- Advise all rail transit operators that use audio frequency track circuits in their train control systems to examine track circuits that may be susceptible to parasitic oscillation and spurious signals capable of exploiting unintended signal paths and eliminate those adverse conditions that could affect the safe performance of their train control systems. This work should be conducted in coordination with their signal and train control equipment manufacturers. (R-09-18) (Urgent)
- Advise all rail transit operators that use audio frequency track circuits in their train control systems to develop a program to periodically determine that electronic components in their train control systems are performing within design tolerances. (R-09-19)

It is possible the state oversight similar to that which required the redundant train control measures in California, may have prevented the WMATA accident.

### **Cell phone use ban**

We contend that State Safety Oversight must be empowered with tools to take immediate action as necessary to ensure safety following accidents and/or the identification of

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<sup>7</sup> LBL-developed redundant software for train detection and train separation as recommended by the failure-mode analyses.

<sup>8</sup> CPUC Decision No. 83339

hazardous conditions. California has empowered the CPUC with these tools as illustrated in the CPUC emergency Resolution SX-88 which prohibits the use of personal electronic devices by train operators. The CPUC adopted this order within six days of a commuter rail catastrophic accident where use of personal electronic devices is believed to be one of the most probable causes. At this time, the CPUC is in the process of rulemaking to determine if the ban should be made permanent and if so, the content and structure of the resultant rule.

### **BART fire in the transbay tube**

Two days after a fire in the BART transbay tube on January 17, 1979, the CPUC ordered that the transbay tube be closed until further order.<sup>9</sup> The CPUC ordered that six conditions be met before resumption of revenue service in the transbay tube. Conditions included the development of a detailed evacuation plan, improvement of communications, provisions of an extensive public information program on evacuation procedures, modifications of exit doors within the tube to allow rapid egress, employee emergency drills, testing of emergency procedures, and physical modifications to hatch covers and gallery structures to reduce fire risk and improve ventilation capability. Following hearings, the CPUC allowed resumption of service in the transbay tube on April 4, 1979, with a stringent set of requirements that included:

- The complete elimination of polyurethane materials from the seat assemblies in cars within 270 days.
- A plan of action with a timetable to reduce fire risks associated with fiberglass reinforced plastic materials used in the floors, ceiling, and sidewall linings of cars, to reduce fire hazard.
- Requirement for BART Board of Directors to develop a detailed plan to oversee public safety in its operations with a subsequent annual report to the CPUC. The plan included the organization form and levels and types of manpower devoted to safety.
- A detailed plan for training, practice, and repeat training of train operators and safety personnel in appropriate safety and emergency procedures.
- Improved communications capability for emergency situations and for instruction of passengers in emergency procedures.
- Ongoing passenger safety educational programs, including provisions for non-English speaking and handicapped persons.
- Directional signs within the transbay tube indicating the nearest gallery door and the distance to the near alternative door in the opposite direction.
- Provision of back-up emergency personnel at BART Central.
- Provision for walk-through track inspections in the event of unexplained in-service train stoppages.

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<sup>9</sup> CPUC Decision No. 89902

- Provisions for airpacks, megaphones, portable radios, and other such devices for attendants on transbay tube trains to facilitate the ability of train attendants to function safely and efficiently outside the train in emergency conditions.
- Further studies of safety issues not fully explored, including the option of a second BART employee in addition to the train operator on all trains through the Berkeley tunnel.
- The submission of a proposal within 30 days of the order to study the toxic effects of car combustion and the impact on evacuation procedures.<sup>10</sup>

It is notable that following the investigation of the Chicago Transit Authority (CTA) derailment and passenger evacuation in a tunnel environment in 2007, the NTSB made the following recommendations.

Recommendations to the FTA:

- Modify your program to ensure that State safety oversight agencies take action to prompt rail transit agencies to correct all safety deficiencies that are identified as a result of oversight inspections and safety reviews, regardless of whether those deficiencies are labeled as findings, observations, or some other term. (R-07-009)
- Inform all rail transit agencies about the circumstances of the July 11, 2006, Chicago Transit Authority subway accident and urge them to examine and improve, as necessary, their ability to communicate with passengers and perform emergency evacuations from their tunnel systems, including the ability to (1) identify the exact location of a train, (2) locate a specific call box, and (3) remove smoke from their tunnel systems. (R-07-012)

Recommendations to the State of Illinois

- Evaluate the Regional Transportation Authority's (state safety oversight agency) effectiveness, procedures, and authority, and take action to ensure that all safety deficiencies identified during rail transit safety inspections and reviews of the Chicago Transit Authority are corrected, regardless of whether those deficiencies are labeled as findings, observations, or some other term. (R-07-013)

**Angel's Flight Railway Company**

Another example of the necessity for strong safety oversight authority is illustrated in the CPUC actions following a severe accident that occurred on February 1, 2001, on the Angels Flight Railway Company. The CPUC ordered closure of the Angels Flight funicular after a mechanical failure caused a collision between the two vehicles resulting in one fatality and seven injuries.

The Angels Flight Railway Company is a privately owned funicular system that was originally built in 1901 and operated until 1969 when it was dismantled. Beginning in 1993 the Angels Flight funicular was reconstructed approximately ½ blocks from its original location. Operation resumed in 1996 using the original two cars. The system operates at a 33

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<sup>10</sup> CPUC Decision 90144, April 4, 1979

percent grade and moves people approximately 298 feet from the bottom of Bunker Hill up to a commercial area.

Restoration efforts are in progress under the close scrutiny of CPUC staff; however revenue service will not be authorized by the CPUC until all outstanding recommendations made in the CPUC accident investigation and those from the NTSB have been closed acceptable. It has become clear to the staff that two outstanding NTSB recommendations requiring end gates on the vehicles and an emergency ingress and egress walkway would not have been implemented were it not for the CPUC's safety certification role.

### **San Francisco Municipal Transportation Agency**

The San Francisco Municipal Transportation Agency (SFMTA), commonly referred to as MUNI, was brought under the umbrella of the CPUC's State Safety Oversight in 1997. During the time between 1997 and 2005, MUNI reported an 87 percent drop in rail transit collisions. Generic statewide statistics of rail transit accidents during the time period between 1997 and 2005 indicate an overall reduction in crossing collisions of 76 percent<sup>11</sup>, reduction in derailments of 84 percent, and a reduction in serious injuries of 75 percent. However, fatalities during this same time period increased by 12.5 percent. The SFMTA system is the oldest transit system in the state and, consequently, has many age-related problems which the Commission continues to identify and works to correct.

A more recent example of proactive state safety oversight and hazard management practices is illustrated in the SFMTA track rehabilitation in its subway. CPUC inspectors identified egregious track conditions and mandated that SFMTA take immediate steps to return its tracks to a state of good repair. CPUC mandated that SFMTA not only correct deficiencies noted by its inspectors, but that SFMTA conduct ultrasonic testing and inspection of the entire rail transit system with a geometry car, and repair all discovered defects.

### **Grove Farmers Market Trolley**

The benefits of a separate proactive safety oversight program such as California's is important and is illustrated by an incident that occurred in August 2009 on a small trolley operation at the Grove Farmers Market in Los Angeles. CPUC staff following an on-site inspection made recommendation to the trolley that a park bench located over the tracks at the end of the line in front of the wheel stops be removed. The staff concern was that in the event a mechanical malfunction caused a brake failure, the trolley could collide with the bench and injure members of the public sitting on the bench. Just two weeks after the removal of the bench pursuant to staff's request, a brake failure occurred and the trolley slammed into the concrete planters that had replaced the bench. Severe injuries and possibly fatalities had been prevented by California's safety oversight where no federal safety oversight existed under current law.

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<sup>11</sup> Following the enactment of the Federal Transit Administration final rule, Title 49, Code of Federal Regulations, Part 659, effective May 5, 2006, reportable crossing collisions have increased due to the change in the reporting criteria that mandates all accidents at highway-rail crossing be reported.