ANNUAL RAILROAD SAFETY ACTIVITY REPORT TO THE CALIFORNIA STATE LEGISLATURE

Pursuant to Public Utilities Code Sections 309.7 and 765.6

November 30, 2013
for
Fiscal Year 2012-13

CALIFORNIA PUBLIC UTILITIES COMMISSION
OFFICE OF RAIL SAFETY
SAFETY AND ENFORCEMENT DIVISION
RAILROAD OPERATIONS AND SAFETY BRANCH

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Annual Railroad Safety Activity Report
Fiscal Year 2012-2013

Pursuant to California Public Utilities Code Sections 309.7 and 765.6

Executive Summary

This report complies with the California Public Utilities (PU) Code Sections 309.7 and 765.6. Section 309.7 requires the California Public Utilities Commission (CPUC) to report on activities of the safety division and document expenditures of the funds derived by fees paid by the railroad corporations and the State Highway Account. Section 765.6 requires the CPUC to report on the necessary actions the CPUC has taken to ensure the safe operations of railroads in this state. In addition, Section 765.6 requires the CPUC to report annually on the impact on competition, if any, of the regulatory fees assessed railroad corporations for the support of the CPUC's activities.

The CPUC ensures the safety of freight and commuter railroads, and highway-railroad crossings in California. CPUC performs these railroad safety responsibilities through its Safety and Enforcement Division, Office of Rail Safety, Railroad Operations and Safety Branch (ROSB). The ROSB's mission is to ensure that California communities and railroad employees are protected from unsafe practices on freight and passenger railroads by promoting and enforcing rail safety rules, regulations and inspection efforts.

Safety culture and risk management are paramount to the CPUC culture and mission. As a result of the San Bruno natural gas explosion on September 9, 2010, an Independent Review Panel recommended that the CPUC move to performance-based regulatory oversight over the public utilities it regulates. In addition, it directed the CPUC to be "equally, if not more vigilant," concerning the regulated entities' actions that affect the health and safety of the public to ensure the public utilities' actions and programs are in line with those of a prudent operator.

In response to the Independent Review Panel's report, all CPUC divisions are engaged in proactive risk management practices. Risk management practices encompass firm regulatory oversight by looking beyond the regulations toward more comprehensive overall safety oversight. The ROSB has devised a new risk management reporting structure to allow its inspectors to capture all possible risks, in addition to regulatory enforcement required by the Federal Railroad Administration (FRA), California laws, and CPUC General Orders (GOs).

The ROSB Risk Assessment Section was created to proactively detect and mitigate risks that may have the greatest public safety consequences. The Risk Assessment Section has identified significant risks associated with rail industry. In order to approach risks in a scientific and empirical manner, the Office of Rail Safety launched a database system to enable the risk assessment team to identify the areas with the greatest vulnerability. In addition, it has identified significant safety risks associated with rail and public safety, including the dearth of information on the structural integrity of California's railroad bridges, the proliferation of transporting hazardous materials through high-population areas, derailments associated with track-train dynamics,[1] and the need for a hazardous materials reporting threshold for transit districts.[2]

[1] Track-train dynamics refers to the placement of loaded and empty cars in strategic points in the string of rail cars

The ROSB looks beyond the regulations to add an additional layer of proactive safety oversight, such as with positive train control (PTC) implementation and high-speed rail planning and implementation. Two rail safety inspectors specialize in the application and operation of PTC, an intricate national web of technologies integrated to prevent collisions as well as some derailments. California's high-speed rail is in its early planning stages and proposes the use of new technologies that are unique to high-speed rail and to the California rail safety program.

CPUC rail safety inspectors and support staff volunteer for Operation Lifesaver, a federally funded activity that presents to schools, community organizations, driver's education classes, bus driving workshops, trucking organizations, and the general public at civic events with the goal of ending collisions and the resulting fatalities and injuries at highway-rail grade crossings and on-railroad rights of way.

ROSB employs 48 rail safety employees. Thirty six employees are inspectors with expertise in hazardous materials, motive power and equipment, operations, signal and train control, and track, and are supported by analysts and administrative staff. The inspectors also perform overarching risk assessment and risk management to identify and address additional public safety risks.

During 2012-13, ROSB rail safety inspectors have:

- Performed 3,510 inspections and follow-up inspections to monitor the railroads' compliance and remedial actions;
- Identified 10,843 federal defects;
- Completed 2,984 CPUC General Order (GO) reports that identified 1,074 GO defects;
- Cited 170 defect violations of Federal Railroad Administration (FRA) regulations;
- Cited 1 violation of a state law;
- Responded to and resolved 26 informal complaints; and,
- Performed 131 Operation Lifesaver presentations that reached approximately 8,960 people.

The Office of Rail Safety foresees challenges ahead. One of the most significant challenges to identifying risks and ensuring public safety is that railroads are reluctant to report accidents, collisions, and near-miss incidents. In addition, the CPUC is challenged to recruit and retain experts in all disciplines. In particular, signal and train control inspectors are especially difficult to attract into a career with CPUC. The optimal operation of signal equipment is critical to mitigating collisions between trains and vehicles, with vehicles incurring the most fatalities and damages. The dominant reason for the inability for the CPUC to successfully recruit railroad experts is the disparity between the state and federal government compensation for all inspector

("consist") to ensure no excessive forces that could derail a train are generated by the locomotives' pulling or braking power.

[2] The Office of Rail Safety, Rail Transit and Crossings Safety Branch is primarily responsible for the safety of rail transit systems.

disciplines.

The Office of Rail Safety inspectors can assess penalties for failing to remedy a public safety situation. For violations of federal railroad safety regulations, CPUC rail safety inspectors make recommendations to the FRA for the assessment of civil penalties. For violations of State laws and GOs, CPUC Resolution ROSB-002 provides the Director or Deputy Director of the Safety and Enforcement Division the authority to issue civil penalties to railroad carriers for violation of certain specific PU Codes and GOs.

Last year, the state Legislature appropriated $6.16 million for the operations of ROSB from a dedicated account within the CPUC Public Transportation Reimbursement Account (often referred to as the *User Fee*). PU Code Section 309.7 requires the activities of the CPUC that relate to safe operation of common carriers by railroad, other than those relating to grade crossing protection, to be supported by the fees paid by railroad corporations. The fees paid by the railroad corporations are deposited into a separate subaccount within the CPUC Public Transportation Reimbursement Account and are the sole funding source for the ROSB railroad safety program. The fees do not fund any other CPUC programs. The railroad user fees assessed in 2012-13 on Union Pacific Railroad and BNSF Railway represented just over one-fifth of one percent of revenues (0.0022), and was unlikely to have had any effect on competition.

Introduction

The CPUC railroad safety program is one of the most comprehensive railroad safety assurance programs in the nation. The Constitution of California declares that the PU Code is the highest law in the state, that the Legislature has unlimited authority to regulate public utilities under the PU Code, and that the Constitution's provisions override any conflicting provision of state law which addresses the regulation of public utilities.

In 1970, the Federal Railroad Safety Act promulgated the Code of Federal Regulations Title 49 (49 CFR), Part 212, which establishes the State Safety Participation Program with the FRA. The purpose of the state-federal partnership is to provide an enhanced investigative and surveillance capability by having the state agencies assume responsibility for compliance investigations and other surveillance activities as a federal partner.

The ROSB federally-certified inspectors protect California communities and railroad employees from unsafe practices on freight and passenger railroads. The federally-certified inspectors promote and enforce rail safety rules and regulations by performing inspections and accident investigations. The CPUC's rail safety responsibilities include:

- Inspecting railroads for compliance with state and federal railroad safety laws;
- Investigating railroad accidents and safety-related complaints;
- Recommending railroad safety improvements to the CPUC and federal government; and,
- Ensuring efficient enforcement of railroad safety requirements.

ROSB inspectors during field audit.

Safety Culture and Risk Management

ROSB works to continuously enhance the safety culture of the railroad industry as well as its own safety culture. ROSB inspectors identify, mitigate, and eliminate hazards that reach beyond the basic regulations.

CPUC Safety Culture

As a result of the San Bruno natural gas explosion on September 9, 2010, an Independent Review Panel recommended that the CPUC adopt the commitment to move to performance-based regulatory oversight over the public utilities it regulates. In addition, it directed the CPUC to be "equally, if not more vigilant," concerning the regulated entities' actions that affect the health and safety of the public to ensure the public utilities' actions and programs are in line with those of a prudent operator.

In response to the Independent Review Panel's report, all CPUC divisions are engaged in proactive risk management practices. Risk management practices encompass firm regulatory oversight by looking beyond the regulations toward more comprehensive overall safety oversight. The ROSB has devised a new risk management reporting structure to allow its inspectors to capture all possible risks, in addition to regulatory enforcement required by the FRA, California laws, and CPUC GOs.

In the late 2012-13 fiscal year, the ROSB staff has started using data from a recently launched database to detect and analyze accident trends and inspection data. This database has provided tools for a new innovative approach to proactive risk management and instilling a safety culture within ROSB. In addition to basic quantitative analytical tools, analytical staff uses GIS mapping software to plot incidents, which enable them to detect unusual clusters of accident data, such as derailments, trespasser fatalities, and crossing-related train-vehicle collisions.

Risk Management Status Reporting

In 2012-13, ROSB instituted a Risk Management Status Reporting (RMSR) structure to allow its inspectors to proactively capture all identified risks. The objective of the RMSR protocol is to document and mitigate safety concerns identified in the field which fall outside of existing communication and documentation protocols. This project aims to achieve two objectives: (1) to provide CPUC rail safety inspectors with a mechanism that allows them to document field activities for which they currently have no consistent means to record; and, (2) to provide a consistent protocol for recording, addressing, and analyzing field findings that are not part of ROSB's established processes.

The new program is intended as a means to span disciplinary expertise so that any ROSB investigator has the ability, and the responsibility, to call-out railroad related safety risks regardless of their nature. ROSB management developed the program in response to an identified need to document and remedy risks for which there was no clear protocol for redress. During the course of any type of inspection or investigation, an inspector may notice an item of concern that is either: (1) out of his/her area of expertise; (2) outside of the formal/official reporting and action protocol; or, (3) an item, or related item, which despite prior formal or informal regulatory action, has gone unresolved or has recurred. Upon detection, the inspector completes an RMSR form.

Once an initial report is submitted to management, the assigned investigator works with her/his senior investigator or supervisor to mitigate the identified risk factor. This process may take place through meetings with the subject industry or railroad, correspondence with those entities, follow-up inspections or investigations, or by alternate means of redress. If the railroad is indifferent to the noted unsafe issue, or fails to take action or develop an action plan, the RMSR is moved up to the Program Manager, Deputy Director and/or Director for more effective handling. Whatever the response is by railroad managers, the response is recorded on the RMSR and the railroad is then informed that an internal document with their response, whether positive or negative, has been recorded. Regardless of the process for redress, this documented action thus becomes a tangible part of our safety oversight.

During 2012-13, the risk factors that have been addressed through the RMSR protocol include the following:

- False "clear" signal in an area of PTC installation;
- Poor design of track layout resulting in lack of compliance with CPUC GOs pertaining to clearance requirements;
- Inadequate roadway worker protection at job site;
- Poor sight distance for signal resulting from relocation of signal during railroad construction project;
- Inconsistent communication to train crews regarding speed restrictions;
- Inadequate protection for the public against train movements on industrial track;
- Unsafe working conditions for railroad crews;
- Flagging problems on track with slow/stop orders;
- Rusty rail at several crossings that require a stop notice and flag notice for train crews that need to stop for an excessive time period;
- Stop orders and flag orders out of regulatory compliance;
- Failure to use a train air-brake system, and failure to set handbrakes;
- Tripping hazards from yard switches;
- Improper positioning of a derail, such that it would not function effectively; and,
- Equipment and vehicles obstructing tracks, with no lock-out system to prevent entrance by train crews.

Over the past fiscal year, 18 RMSRs have been put forward by CPUC rail safety inspectors. Of those, eight have been fully resolved. The others are either still the subject of continued efforts or are of such a nature that continual monitoring is warranted.

Risk Assessment

The Office of Rail Safety, Risk Assessment Section was created to proactively detect and mitigate risks that may render the greatest public safety consequences. In order to approach risks in a scientific and empirical manner, the Office of Rail Safety is conducting an internal workshop to review the science behind risk assessment and identify the optimal approach toward detecting the highest risks for rail safety.

1. Rail Safety & Security Information Management System—2013 Release

The Safety and Enforcement Division rail employees manage large inventories of rail inspection, accident, infrastructure, complaint, formal proceeding, and historical data. Managing rail-related risks requires access to this information in order to identify, analyze, and assess safety risks associated with rail hazards and incidents (i.e. accidents, injuries, fatalities, and near misses). In April 2013, the Risk Assessment Section along with other Safety and Enforcement Division rail units continued activities in the development, training, and implementation of the Rail Safety & Security Information Management System (RSSIMS) — a database software tool.

The purpose of the RSSIMS software tool is to provide an informational database and facilitate the tasks of storing, updating, analyzing, and communicating a significant amount of rail-related data among all Safety and Enforcement Division rail employees. RSSIMS provides a centralized database repository and a user friendly software interface to enable all rail safety staff to easily generate needed information. The RSSIMS software tool enhances the rail safety program and Risk Assessment Section risk assessment efforts by incorporating and centralizing rail related information for the three Office of Rail Safety focuses: ROSB, Rail Transit Safety Section (RTSS), and Rail Crossings Engineering Section. RSSIMS development, implementation, and communication efforts were carried out to ensure that information intensive rail-related data could be successfully managed and communicated among inspectors, engineers, analysts, managers, and supporting staff. Efforts included planning and training activities with key stakeholders to ensure project objectives, requirements, and expectations were met.

The RSSIMS informational database and method of use will be further developed and explored for additional opportunities to improve rail safety. The Risk Assessment Section is actively planning for and carrying out efforts to enhance rail safety assessment through risk-based statistical analysis and trending.

One example of the Risk Assessment Section risk-based statistical analysis planning activities involves using RSSIMS to identify incidents that occur at or near identified local safety hazard sites. PU Code Section 7711 requires annual reporting for sites on railroad lines in the state that CPUC finds to be hazardous. The Risk Assessment Section is currently evaluating the RSSIMS information and data on rail-related incidents occurring at established local safety hazard sites and other rail sites with observed increases in rail incidents. For instance, the occurrences of rail incidents at California's major three ports, the Port of Long Beach, the Port of Los Angeles, and the Port of Oakland are being assessed for any increase in derailments and hazardous materials releases. As increased demand for crude oil, gas, and other hazardous materials result in more rail shipments of these materials through California's ports, this analysis and monitoring is imperative to ensure public safety.

The Risk Assessment Section is using the RSSIMS to identify areas of risk concern through

year-over-year trending assessment of the Railroad Infrastructure Protection Program compliance. PU Code Section 7665.4 requires every rail operator to protect rail infrastructure in the state from acts of sabotage, terrorism, or other crimes.

The April 2013 release of RSSIMS marks a significant milestone and sets the necessary basic data management foundation for the Risk Assessment Section as well as ROSB analytical staff to identify, analyze, and proactively assess rail-related public safety risks.

2. Railroad Bridges

The CPUC Risk Assessment Section has identified California's railroad bridges as a potential significant rail safety risk. Most of California's railroad bridges are old steel and timber structures, some over a hundred years old.

Union Pacific Railroad was the first railroad to link the mid-west with California in 1869. Between 1870 through 1900, track construction started accelerating; from less than 50,000 miles of track to 200,000 miles at the turn of the century. At the height of construction, between 1916 through 1920, railroad track miles increased to just over 250,000 miles of track across the US. The amount of new railroad track added to the system started decreasing as government financing of road building accelerated and trucks began competing with railroads. By 1975, the nation's rail mileage showed that 21 percent was being operated in bankruptcy.

Due to the frenetic building of railroads during the late 19th and early 20th centuries, actual railroad bridge plans or records are either absent or unreliable. Often, these bridges now reside on properties owned by smaller short line railroads that may not be willing or able to acquire the amount of capital needed to repair or replace degrading bridges. Similar to the natural gas infrastructure, it is unclear if the railroads are able to adequately identify, with a high degree of certainty, the year, model, construction materials, and maximum weight the bridge can carry, as well as maintenance programs and practices. Also, like most transportation infrastructure, the more the bridge is used with greater frequency and with heavier loads, the more the bridge integrity is potentially compromised. There are many unknown questions regarding bridge integrity that need to be answered to ensure the public safety.

Railroad bridges are not inspected by any entity in the California state government, even though they carry thousands of rail cars containing hazardous materials and thousands of passengers daily. By comparison, the California Department of Transportation (Caltrans) ensures the structural integrity and safety of highway bridges in California, employing 120 inspectors and 80 subspecialty personnel for inspecting highway bridges, along with 3 Federal Highway Authority inspectors.

While the federal government, by way of the FRA, has new and broadly based bridge regulations under Title 49 CFR Part 237,[3] they employ only five bridge specialists for the entire United States and perform bridge "observations" for approximately 80,000 bridges in the nation. The federal government relies on the railroads to inspect their bridges and prepare Bridge Management Programs that are to be made available to FRA, but only when requested by FRA.

[3] 49 CFR Part 237 requires track owners to adopt a Bridge Management Program to provide assurance of railroad bridge safety.

One federal inspector is currently assigned to cover California, along with 10 other states in the West, and cannot possibly provide adequate oversight for the approximate 5,000-7,000 bridges in California.[4] One federal inspector may actually perform observations on approximately 225 - 250 bridges annually, but that is merely 1.5 percent of railroad bridges nationwide.

The CPUC Risk Assessment Section is assessing risks of railroad bridges by developing evaluations, concerns, and assumptions regarding the integrity, load capacity, maintenance and inspection practices on all bridges, taking into consideration the ages of bridges. To determine the accuracy of the risk criteria, ROSB will need actual experienced railroad bridge inspectors to determine whether the categories of bridges identified as high risk, truly are at risk. After the bridges are ranked, the inspectors will identify deficiencies in the bridges, make recommendations to the railroads to either repair or replace bridges located in the most vulnerable high-consequence areas. Criteria that may affect a ranking of the risk of a bridge includes whether the bridge exists in high-population areas and/or over major waterways, and the frequency that the bridges support trains that that transport passengers, volatile hazardous materials and petroleum products.

CPUC Senior Utility Engineer David Leggett during the first ROSB timber bridge evaluation.

ROSB has been provided an overview of the methodology Union Pacific Railroad uses to identify the bridges that are most economically valuable and those that are most at-risk. Although Union Pacific Railroad's plan may appear reasonable, we are unable to scientifically validate their methodology. In addition, ROSB is unsure of whether other track owners, such as short line operations, have a schedule of bridge maintenance or replacement in place.

Unlike the relatively complete inventory documented for highway bridges, there is no comprehensive list of railroad bridges in California. The railroads do not currently submit

[4] There is no comprehensive inventory of California railroad bridges. The Association of American Railroads states that, in 2011, California railroads operated over 5,327 miles of freight track and about 1,000 miles of non-freight track for a total of 6,327 miles of track. FRA estimates that railroad bridges occur about every 1.25 miles of track, which results in approximately 5,062 railroad bridges in California.

inventory lists of railroad bridges to the CPUC, and not all railroads have submitted their Bridge Management Programs, which should include an inventory of bridges, to the FRA. The railroads only will submit the plan when FRA requests it.

The Risk Assessment Section is in discussions with the Caltrans, the departments of transportation of other states, and railroad industry experts to design a CPUC bridge inspection program to identify the California railroad bridges that pose the greatest public safety risk. ROSB has designed a bridge evaluation form and is in the experimental stage of performing bridge inspections.

Risk Assessment Section and ROSB personnel on a Union Pacific Railroad bridge in Sacramento, California during a bridge inspection.

3. Track-Train Dynamics and Train Securement

The Risk Assessment Section is currently assessing the existing California rail system and rail operation practices for the purposes of identifying and scrutinizing risks involving derailments. This assessment is associated with the dynamics of trains in motion, known as track-train dynamics (TTD), the interactive physical forces a train experiences as it moves along the path of its track structure. Railroad operators must place loaded and empty cars at strategic locations in the string of rail cars ("consist") to ensure no excessive forces that could derail a train are generated by the locomotives' pulling or braking power.

For example, in uphill movements, if empty cars are placed on the head-end of a heavy train with too much power, these lightweight cars could be pulled sideways through the inside of a curve, called "*stringlining*", such as occurred in the infamous Cantara Loop incident of July 14, 1991. In downhill movements the weight of the train pushing against a braking locomotive could cause such lightweight cars to derail to the outside of the curve, called "*jackknifing*".

For the purposes of determining whether or not appropriate train consist and track structure requirements are being adhered to, the Risk Assessment Section is exploring two recent TTD-caused derailments: one in Dunsmuir and another in Tehachapi. By gathering and analyzing TTD-related information, new risk-mitigation measures may be discovered that can improve safety and reduce the number of train derailments.

The securement of stationary trains is another issue being considered by the Risk Assessment Section. One example of failure to secure a train is the July 2013 runaway and derailment of a parked but inadequately secured train in Canada. The unattended train and the accompanying crude oil shipment rolled away at very high speed toward the town of Lac-Mégantic, Quebec, Canada, where it derailed, exploded in fire, and resulted in approximately 47 deaths. The Risk Assessment Section uses such worldwide rail incidents in order to gauge the adequacy and effectiveness of California's rail safety program and identify any previously unknown risks in California's rail system. For example, the catastrophe in Canada also highlights concerns over recent increased crude oil rail traffic through California's, refineries, coast, and mountains. These shipments occur over some of California's steepest rail grades – making train securement a timely issue.

Operating procedures and regulations for both TTD and train securement are being evaluated to determine if current standards are sufficient to ensure safety on California rail lines. These examinations include consideration of stationary and dynamic braking, structural integrity of cars, train consist, track incline, track curvature, and speed limits.

Aerial photo of the crude oil train derailment aftermath, July, 2013 in Lac-Mégantic, Canada.

4. Earthquake Early Warning for Railroads

Seismic hazards may pose a major safety concern in California for buildings, highways, roadways, bridges, dams, and other structures, including California's railroad system infrastructure. Railroad tracks and bridges cross active faults in the state, and the potential for earthquake-induced damage to the railroad system infrastructure and other rail facilities is high, with consequent risks to public safety and the environment.

During 2012-13, the Risk Assessment Section initiated an assessment of the railroads' preparedness for earthquake detection and response. Staff will evaluate the adequacy of these programs, including comparing them to other available systems and existing best practices. For example, CalTrans has a seismic system in place for the highways. It includes the detection, notification, calculation, and determination of earthquake-induced damage in the event of various levels of earthquake magnitudes and different locations of occurrences throughout the

state. In the event of significant seismic activity, the system readily notifies appropriate personnel and agencies, identifies and calculates estimates of the potential resulting negative effects or damage to different types of known structures in the vicinity of the earthquake, and allows for timely responses and safety measures to be taken.

After assessing the possible benefits and costs associated with earth quake early-warning detection systems, the Risk Assessment Section will evaluate the alternatives as well as funding mechanisms to determine the optimal method for California's railroads.

5. Near-Miss Reporting and Analysis

Situations in which trains narrowly miss colliding with pedestrians, other trains, vehicles, and various obstructions are termed "close calls" or "near misses." PU Code Section 7711.1 requires the CPUC to collect and analyze near-miss data. Collecting and analyzing near-miss information can reduce risk when conditions, trends, or patterns are discovered that expose underlying causes of unsafe conditions. Accidents may be preceded by one or more near misses. For example, the failure of a train to stop at a red signal, even in the absence of an accident, can be a warning that corrective action needs to be taken before a collision actually occurs.

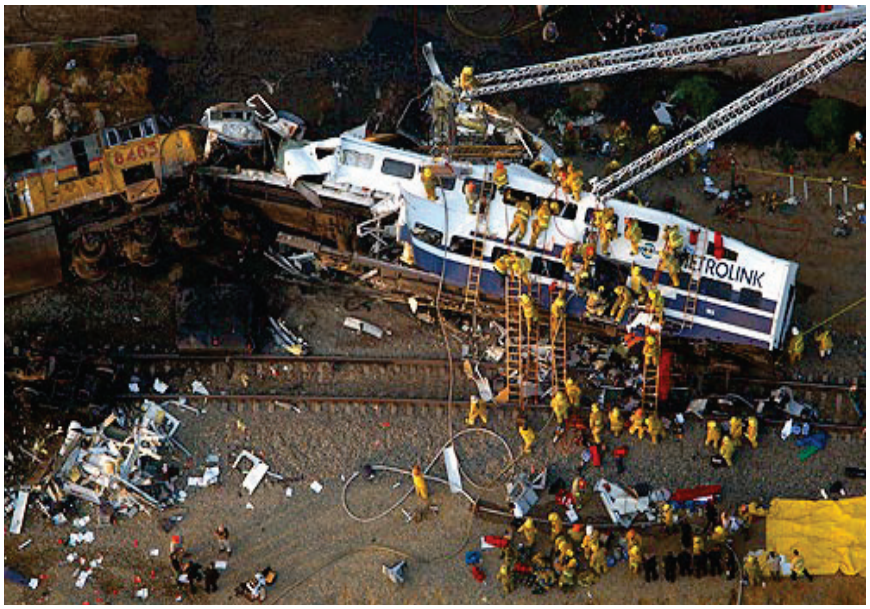
Instead of waiting for an accident to occur, near-miss events can provide valuable information on which railroads and agencies can act to reduce risk. This approach drives ROSB's Risk Management Status Report process, which provides inspectors with a tool and protocol to look beyond the established regulations to increase public safety.

Other Proactive Safety Issues

Positive Train Control

In the wake of one of the most tragic rail accidents in U.S. history, Congress mandated installation of PTC in the Rail Safety Improvement Act of 2008 (P.L. 110-432). The Rail Safety Improvement Act of 2008 requires PTC implementation nationally by December 31, 2015.[5]

On September 12, 2008, a freight train and commuter train engaged in a head-on collision in Chatsworth, California. Twenty-five people died and 130 were seriously injured. Both the National Transportation Safety Board (NTSB) and the CPUC determined that PTC would have prevented the accident and both agencies strongly urged Congress to pass a railroad safety act.



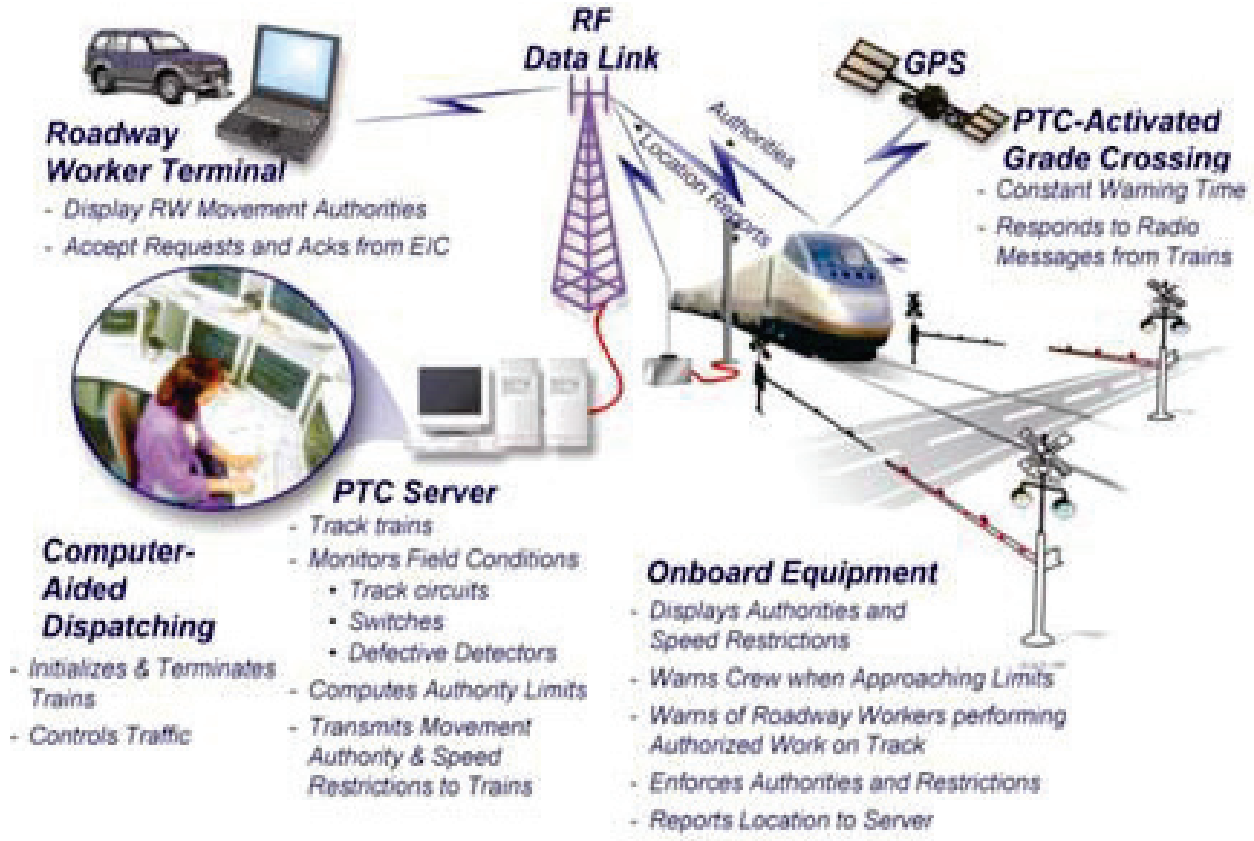
September 12, 2008, Chatsworth, California - Metrolink Passenger and Union Pacific Freight Head-on train collision - 25 fatalities, over 130 injuries.

PTC systems are integrated command, control, communications, and information systems for controlling train movements. PTC systems are comprised of digital data link communications networks, continuous and accurate positioning systems, on-board computers with digitized maps on locomotives and maintenance-of-way equipment, in-cab displays, throttle-brake interfaces on locomotives, wayside interface units at switches and wayside detectors, and control center computers and displays. PTC systems issue movement authorities to train and maintenance-of-way crews, track the location of the trains and maintenance-of-way vehicles, have the ability to automatically enforce movement authorities, and continually update operating data systems with information on the location of trains, locomotives, cars, and crews. The remote intervention capability of PTC will permit the control center to stop a train should the locomotive crew be incapacitated.

[5] A federal bill was recently introduced (SB 1462) to extend the federally mandated PTC deadline five years to 2020.

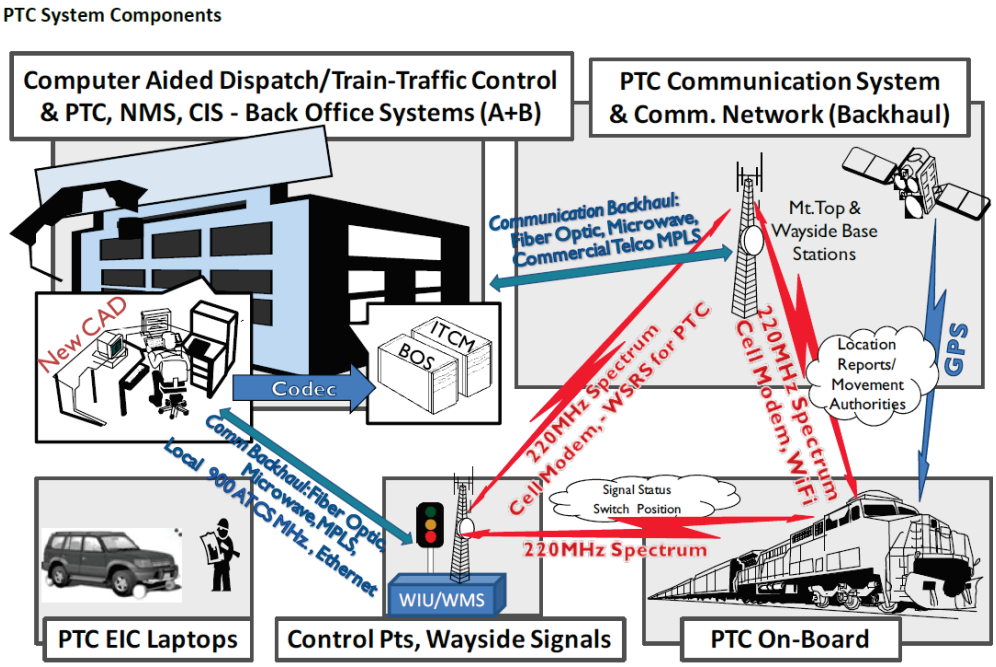
PTC is an intricate national web of technologies integrated to work between railroad entities. Although the specific PTC systems used by each railroad may differ, they must be interoperable with each other in order to function properly and to prevent accidents. This coordination is achieved through the railroads' Interoperable Train Control Committee.

The following diagram shows key PTC components, and the complexity of PTC system communications.



[Radio Frequency (**RF**), Right of Way (**RW**), Acknowledgement (**ACKS**), Global Positioning System (**GPS**), Employee in Charge (**EIC**),]

The following diagram shows Metrolink's new PTC system including the new ARINC dispatching system:



[Computer Aided Dispatch (**CAD**), Network Management System (**NMS**), Computer Information System (**CIS**), Back Office Server (**BOS**), Interoperable Train Control Messaging (**ITCM**), Wayside Relay Status Service (**WSRS**), Global Positioning System (**GPS**), Multiprotocol Label Switching (**MPLS**), Employee in Charge (**EIC**), Advanced Train Control System (**ATCS**), Wayside Interface Unit (**WIU**), Wayside Management Servers (**WMS**)]

The two largest railroads operating in California, BNSF Railway and Union Pacific Railroad, have a combined total of approximately 5,300 miles of track in the state. California short-line railroads have approximately 1,700 additional miles of track. Most of this track will require PTC installation.

49 CFR Part 236.18 defines a Software Management Control Plan for processor-based signal and train control systems. A Software Management Control Plan is a plan designed to ensure that the intended version of the software for each specific site and location on the railroad is documented and maintained throughout the life-cycle of the system. The plan must also describe how the proper software configuration is to be identified and confirmed in the event of replacement, modification, or disarrangement of any part of the system. CPUC rail safety inspectors review the railroads' plan to ensure PTC will still work if modified.

CPUC rail safety inspectors that specialize in Signal & Train Control (S&TC) are the primary staff involved in PTC regulation, due to the traditional role that S&TC has in regulating wayside signaling systems. The role that the S&TC discipline has with PTC has expanded with the addition of hardware and software components to facilitate and integrate PTC into existing systems. This creates a gap in regulatory authority for inspections between the traditional S&TC systems and the newer system components.

CPUC rail safety inspectors have identified risks associated with PTC. On October, 24, 2012, on the BNSF at Kern Junction (where the BNSF Railway and UP Railroad's San Joaquin Valley lines merge) in Bakersfield, a BNSF construction group had previously upgraded the signals and

switches during PTC installation. Due to improper wiring of the signals, a BNSF train received an erroneous signal to proceed, which could have resulted in a head-on collision with another train. Fortunately, the locomotive engineer realized there was a signal indication error, safely stopped his train and immediately contacted the train dispatcher.

Another risk associated with PTC is revealed by examining the different requirements for PTC between the largest freight railroads and short-lines. All short-line locomotives which can access California PTC track are not required to have PTC-interoperable locomotives. Remote-control stopping would not be available on the non-PTC locomotive, severely compromising the PTC system in California. There are over 22,000 locomotives capable of entering California operating in the U.S. which would benefit by increased inspections to ensure PTC interoperability.

CPUC rail safety inspectors identified an additional problem with PTC installation. Dispatchers at Metrolink and Caltrain are experiencing problems with incorrect signal indications and intermittent train positioning and directional issues on their dispatching displays. At the present time, CPUC inspectors are monitoring operations at the Metrolink Operations Center on a weekly basis.

Although PTC installation is a federal law, the FRA has not been able to witness a large portion of PTC testing and validation procedures, and instead relies on self-reporting by rail operators such as Metrolink. The CPUC does not have enough inspectors at the present time to effectively and proactively monitor PTC implementation to ensure that safety regulations and protocols are formulated and enforced.

Metrolink, BNSF and Union Pacific are focusing their efforts on shared trackage within Metrolink's operating area in order for Metrolink to meet the PTC mandate of 2015. PTC construction activities are occurring elsewhere within California on BNSF and Union Pacific. Caltrain, North County Transit District, and Altamont Commuter Express are still in the start-up phases. More specifically, the following railroads have progressed as follows:

- Metrolink has completed Critical Feature Testing on all subdivisions except the River Subdivision. The San Gabriel subdivision Wayside Interface Unit verification and validation testing was witnessed by the FRA. Computer Aided Dispatch and Back Office Server are still under development and issues still need to be worked out before switching to the new ARINC system from the existing dispatch system called Digicon. The PTC radio network is still being installed and tested. Metrolink is testing interoperability with BNSF Electronic Train Management System Version 7 along BNSF's San Bernardino subdivision. Metrolink is the furthest along with PTC implementation among California's railroads, and continues to proceed with plans for PTC completion well in advance of the 2015 deadline, regardless if an extension beyond 2015 is granted by Congress. Both Union Pacific Railroad and BNSF (Shared track with Metrolink) previously had pledged to complete Los Angeles Basin PTC implementation by the end of 2012. That deadline has past and Metrolink is targeting completion, certification, and functional for revenue service by mid-2014.

- BNSF has finished PTC testing on the San Bernardino, Bakersfield, Mojave, and Stockton Subdivisions. Revenue Service Demonstration started on March 26, 2013 in the

San Bernardino subdivision, April, 15, 2013 in the Bakersfield subdivision, April 25, 2013 in the Mojave subdivision, and July 15, 2013 in the Stockton subdivision.

- Union Pacific Railroad has submitted field testing requests as required by Subpart I, Section 236.1035 of the CFR for the Santa Barbara subdivision between Ventura and Las Posas, and for the Los Angeles subdivision between East Redondo and West Riverside. FRA conditional approval was granted on September 19, 2012 for that field testing request.

- North County Transit District has not submitted a field test request as required by Subpart I, Section 236.1035 of the CFR to the FRA as of July 31, 2013.

- Caltrain is working with the FRA on their Request for Amendments document, revised PTC implementation plan, and PTC development plan document. Caltrain has not submitted a field test request as required by Subpart I, Section 236.1035 of the CFR.

High-Speed Rail—Safety is a Priority

The Rail Safety Branch has an integral role ensuring public safety in the deployment and operations of high-speed rail. PU Code Section 309.7 requires the CPUC rail safety inspectors to be responsible for inspection, surveillance, and investigation of the rights of way, facilities, equipment, and operations of railroads and public mass transit guideways. PU Code Section 768 provides the CPUC the responsibility to safeguard public health and safety by specifying the manner in which railroads construct, maintain, and operate their systems, equipment, apparatus, tracks, and premises.

California's high-speed rail proposal uses new technologies that are unique to high-speed rail and to the California rail safety program. To ensure public health and safety, the Office of Rail Safety has been formulating a safety oversight approach that ensures public safety is included in the planning, construction, and ongoing operations of California's high-speed rail.

During planning, federal and state oversight agencies are conducting rulemakings to develop new regulations for many areas where no standards currently exist. The FRA created a Rail Safety Advisory Committee that will hold proceedings to create new high-speed rail safety regulations. The CPUC Deputy Director of the Safety and Enforcement Division has been requested to participate as a member of the Rail Safety Advisory Committee due to the CPUC's leadership on rail safety.

The new FRA regulations will include standards for track for speeds up to 220 mph, collision-avoidance systems, vehicle crashworthiness, passenger platforms, barriers and intrusion detection systems, system safety program plans, operations, and human factors such as engineer certifications and fatigue issues. The CPUC will also open formal proceedings to adopt waivers to current GOs where they are not applicable or relevant, and to adopt new GOs specific to high-speed rail design, operations, and maintenance.

The rail safety inspectors will monitor high-speed rail work as the track is constructed and before operations begin to ensure that the system meets the new and unique safety and technical standards. In addition, the inspectors will monitor and verify the safety of the high-speed rail operations and maintenance through regular audits of the High-speed Rail System Safety Program Plan, semi-annual inspections of the track, audits of operations, and other safety oversight functions similar to the current rail safety program.

Each derailment, hazardous materials spill, or crossing accident diminishes confidence in the state's ability to protect the public and the environment, and regulate the rail industry. If state rail safety inspectors can effectively mitigate rail accidents and instill a strong safety culture for existing rail carriers, the ability to transition this safety culture to high-speed rail increases exponentially.

Operation Lifesaver

In America, about every three hours a person or vehicle is struck by a train. Operation Lifesaver, a volunteer organization founded in 1972, believes that the majority of these incidents are preventable. Through the "Three 'E's" of Operation Lifesaver—education, enforcement and engineering—volunteers aim to end collisions and the resulting fatalities and injuries at highway-rail grade crossings and on railroad rights of way.

CPUC rail safety inspectors and support staff volunteer throughout the state, providing presentations to schools, community organizations, driver's education classes, bus driving workshops and trucking organizations, as well as educating the public at weekend events such as festivals and safety fairs. CPUC employees take part in Officer on the Train and other enforcement events with local law enforcement to promote compliance with state motor vehicle laws and penal codes on railroad at-grade crossings and rights of way.

During 2012-13, CPUC staff made 131 Operation Lifesaver presentations and participated in 13 special events, including educational booths, enforcement activities and safety fairs, reaching a total of 8,960 people. Presentations have been targeted toward areas where new train traffic will be introduced in the near future to raise awareness that tracks that were unused for years will become active with train traffic again.

Figure 1: Locations of Operation Lifesaver Presentations near Railroad Tracks.

The Foundation of the Rail Safety Program

Over the past year, CPUC rail safety inspectors have engaged in both proactive safety efforts and retroactive accident investigations to mitigate public safety risks. CPUC rail safety inspectors perform regular inspections, focused inspections, accident investigations, security inspections and complaint investigations. Some sample inspections and investigations, as well as a comprehensive list of rail safety inspections and investigations are available in the Appendix of this report.

CPUC rail safety inspectors must participate in a thorough training process to become federally-certified in one of five rail-related disciplines:

1. Hazardous Materials
2. Motive Power and Equipment
3. Operating Practices
4. Signal and Train Control
5. Track

The Memorandum of Understanding with the FRA requires ROSB rail safety inspectors to make civil penalty recommendations to the FRA when the CPUC rail safety inspectors discover non-compliant conditions with federal railroad safety regulations. CPUC Rail safety inspectors also evaluate whether the inspected properties comply with California laws and CPUC GOs.

Total inspection data for each discipline for 2012-13 include:

1) CPUC Hazardous Materials inspectors:

- Submitted 624 inspection reports for 19,775 units;
- Identified 834 defects; and,
- Cited 29 defect violations.

Hazardous Materials units can include each tank car, each record to ensure accurate representation of substance, each evaluation of a release plan, each inspection of the shipper's paperwork, and other similar items.

2) CPUC Motive Power and Equipment inspectors:

- Submitted 1,083 inspection reports for 88, 974 units;
- Identified 3,578 defects; and,
- Cited 95 defect violations.

Motive power and equipment units can include each locomotive, each rail car, inspection records or specific components thereof.

PU Code 765.5(d) requires the CPUC to establish, by regulation, a minimum inspection standard to ensure that at the time of inspection, that railroad locomotives, equipment, and facilities located in the class I railroad yards will be inspected not less frequently than every 120 days, and inspection of all branch and main line track not less frequently than every 12 months.

3) CPUC Operating Practices inspectors:

- Submitted 707 inspection reports for 4,867 units;
- Identified 407 defects; and,
- Cited 42 defect violations.

Operating Practices units can include ensuring the accuracy of train consist records, observing crews performing switching operations, reviewing the accuracy and completeness of accident records, ensuring compliance with certifications and licenses, and other similar items.

4) CPUC Signal and Train Control inspectors:

- Submitted 208 inspection reports for 1,344 units;
- Identified 535 defects; and,
- Cited 1 defect violation.

Signal and train control units can include each signal system appurtenance, maintenance and testing records, warning devices at crossings, and other electronic or mechanical signaling systems.

5) CPUC Track inspectors:

- Submitted 876 inspection reports for 20,835 units;
- Identified 5,448 defects; and,
- Cited 3 defect violations.

Track units are equal to each mile of track, each switch inspected, Roadway and Maintenance Machine inspections, records and other similar items involving the tracks.

One way track inspectors fulfill this statutory requirement is by physically walking the track. Walking the track provides a comprehensive visual inspection. Most main line track is traversed by a hi-rail vehicle (motor vehicle outfitted with rail wheels). On most main line track, railroads

use a specialized track geometry car to identify safety risks associated with track geometric deficiencies and other potential accident-causing conditions. The track geometry cars collect and disseminate track information which is made available to the FRA, the CPUC rail safety inspectors. FRA also has geometry cars that operate throughout the US. Using this information, the CPUC rail safety inspectors verify the defective conditions identified by the track geometry car and ensure that the railroad has applied remedial action for the safe passage of trains.

The track geometry cars detect non-compliant conditions such as wide gage, narrow gage, profile, alignment, warp, and cross level defects as well as conditions becoming close to non-compliant. This information allows the CPUC to be more proactive in verifying and auditing the railroads' track maintenance plans to correct these locations before the condition becomes a defective condition. When a defective condition is identified by the geometry car, railroads are typically allowed 30 days before a state rail safety inspector will perform a follow-up inspection. During this time, the railroads perform corrective actions by repairing the track, restricting the track (speed reductions) or removing the track from service. State and federal inspectors are equipped with digital track note books featuring GPS technology which allows them to pinpoint defects to within 3 feet. If the follow-up inspection identifies conditions that have worsened or were not properly repaired, a recommendation for civil penalties for non-compliance with the track safety standards is made.

In 2012-13, CPUC rail safety inspectors and FRA track inspectors surveyed 4,865 miles of track in California aboard the track geometry vehicles. The track geometry vehicles identified 499 defective conditions. Staff inspectors conducted follow-up inspections to monitor the railroads' compliance and verify that the defects had been corrected.

Regular Inspections

PU Code Sections 309.7 and 765.5(d) require the CPUC to employ a sufficient number of federally-certified inspectors to ensure that railroad locomotives and equipment and facilities located in Class I railroad yards in California are inspected not less frequently than once every 120 days, and that all main and branch line tracks are inspected not less frequently than once every 12 months. Inspectors also conduct unannounced inspections at the facilities of shippers, consignees, freight forwarders, intermodal transportation companies, and railroads.

CPUC rail safety inspectors achieved 100 percent of the mandate that all locomotive and equipment repair facilities be inspected every 120 days. The track-inspection mandate has not been achieved since 2005-06, which was the last year that ROSB had fully staffed certified track inspectors. In 2012-13, ROSB only fulfilled 72 percent of the statutory track-inspection mandate, due to track position vacancies.

The following lists the number of inspections and the results of the inspections per each statutory mandate:

Mandated Motive Power and Equipment Regular Inspections

- Conducted 383 inspections for 915 locomotives and 13,485 rail cars;
- Identified 236 locomotive defects and 1,386 rail car defects;
- Cited 2 locomotive violations and 34 rail car violations

Mandated Track Regular Inspections

- Conducted 240 inspections over 5,289 track miles;
- Identified 878 defects; and,
- Cited 7 defect violations

Focused Inspections

Under PU Code Section 765.5(e), CPUC rail safety inspectors conducted focused inspections of railroad yards and track; operating practices; signal and train control; hazardous materials and railroad equipment. Typically, focused inspections are joint efforts between the FRA and ROSB, though ROSB can choose to, and often does, perform focused inspections on its own. Focused inspections involve inspectors from a variety of disciplines or multiple inspectors from a single discipline, working together at a specific location or rail facility.

The focused inspection program targets railroad issues that pose the greatest safety risk, based on inspection data, accident history, and rail traffic density. Focused inspections allow CPUC rail safety inspectors to evaluate all aspects of a railroad or facility's operational and maintenance practices and procedures. They also allow for close evaluation of railroad management and labor abilities, comprehension, and integrity.

If corrective actions are recommended by ROSB, a follow-up inspection is performed to determine progress by the railroad entity in carrying out the recommended actions.

ROSB rail safety inspectors performed 26 focused inspections. Of that amount, 8 were in the track discipline, 5 were hazardous materials inspections, 7 were for operating practices, 3 for motive power and equipment, 2 for signal and train control, and 1 Operation Lifesaver which focused on trespassing on railroad property.

Hazardous Materials Inspections

CPUC rail safety inspectors conduct a variety of activities, including the investigation of accidents involving the actual or threatened release of hazardous materials as reported by the California Emergency Management Agency's (CEMA) 24-hour Warning Center. Inspectors also conduct unannounced inspections at the facilities of shippers, consignees, freight forwarders, intermodal transportation companies, and railroads.

CPUC rail safety inspectors also inspect facilities to ensure compliance with GO 161—Rules and Regulations Governing the Transportation of Hazardous Materials by Rail. GO 161 has requirements for reporting the release or threatened release of hazardous materials where there is a reasonable belief that the release poses a significant present or potential harm to persons, property, or the environment.

According to the California Energy Commission, more than 200,000 barrels of crude per month were imported into California this summer, a fourfold increase from early 2012. Hauling crude into California involves traversing some of the most challenging mountain passes in the nation. A runaway train, although rare, could render significant consequences. In 2003, a 31-car train rolled downhill for about 30 miles and crashed into the City of Commerce with a load of lumber that damaged property and injured a dozen people. It if had been highly volatile Bakken crude, which can burn like gasoline, the damage would have assuredly been far greater.

Accident Investigations

CPUC rail safety inspectors investigate accidents including derailments; collisions between trains and other trains, motor vehicles, bicyclists, pedestrians, and obstructions; and hazardous materials releases from trains, pursuant to PU Code Section 315. CPUC rail safety inspectors evaluate each accident when reported to CPUC (usually, by CEMA) and determines the appropriate investigative response based on accident severity criteria, including:

- Impact to the public (evacuations, injuries, fatalities);
- Injuries or fatalities to railroad employees or passengers;
- Environmental impact;
- Impact on commercial transportation (highway closures, commuter interruptions); and,
- Violations of state or federal railroad safety regulations or operating rules.

In 2012-13, there were 512 reported rail incidents and while ROSB review all reported incidents, 117 required investigation.

Security Inspections

PU Code Sections 7665-7667 (The Local Community Rail Security Act of 2006) require all rail operators to provide risk assessments to the CPUC, the Director of Homeland Security, and the CEMA that describe the following:

- Location and function of each rail facility;
- Types of cargo stored at or typically moved through the facility;
- Hazardous cargo stored at or moved through the facility;
- Frequency of hazardous movements or storage;
- A description of sabotage/terrorism countermeasures;
- Employee training programs;
- Emergency response procedures; and,
- Emergency response communication protocols.

The Local Community Rail Security Act also requires railroads to develop and implement infrastructure protection programs. The railroads update the infrastructure protection programs annually and the CPUC rail safety inspectors review the plans and the updates.

To ensure compliance with the Local Community Rail Security Act, the CPUC performs annual security reviews on all railroads operating within the state.

In 2012-13 ROSB rail safety inspectors conducted 33 reviews of railroads' infrastructure protection programs. Of that amount, 3 railroads were found to be out of compliance with multiple issues: the Altamont Commuter Express, Santa Cruz & Monterey Bay Railway and Mare Island Railroad.

CPUC rail safety inspectors are working with the 3 out-of-compliance railroads to bring them into compliance. The ROSB rail safety inspectors performed security inspections on the following railroads and determined whether they were in compliance:

Rail Road	Date	Compliant Y/N
Trona	02/25/13	Y
Fillmore Western	02/26/13	Y
LAJ	03/11/13	Y
West Isle line	03/25/13	Y

Nation Switching Service	04/17/13	Y
SJVR	04/23/2013	Y
SDIV	04/24/13	Y
Ventura County RR	4/24/13	Y
North County Transit	04/25/13	Y
Pacific Sun RR	4/25/13	Y
Baja California RR	4/26/13	Y
Pacific Harbor Lines	3/26/13	Y
Altamont CE	5/2/13	N
Stockton Terminal	5/2/13	Y
Central Traction	5/2/13	Y
Modesto & Empire	5/2/13	Y
Santa Maria Valley RR	5/9/13	Y
Sacramento Valley RR	5/29/13	Y
California Northern RR	5/29/13	Y
Richmond Pacific RR	5/29/13	Y
Sierra Northern RR	5/29/13	Y
San Francisco Bay RR	5/30/13	Y
Mare Island RR	5/30/13	N
Cal-Train	5/30/13	Y
Santa Cruz Big Trees	5/30/13	Y
Napa Valley RC	6/3/13	Y
Niles Canyon RWY	6/3/13	Y

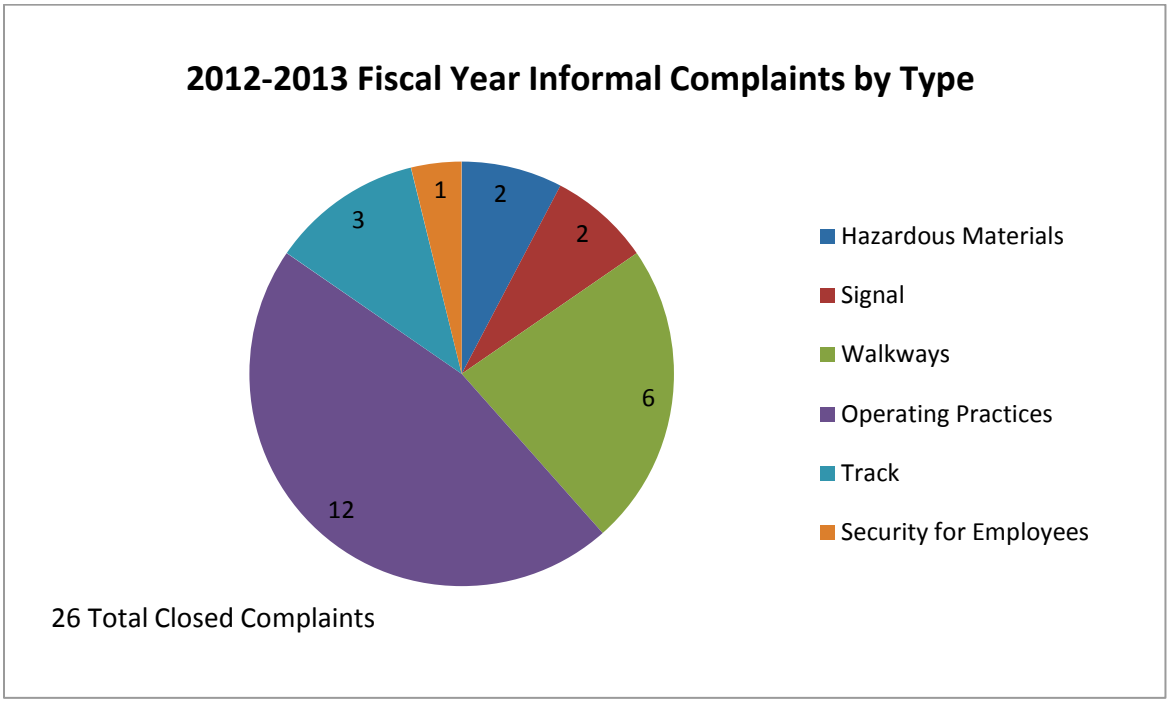
Metrolink	6/5/13	Y
UPRR	6/5/13	Y
BNSF	5/28/13	Y
Amtrak	6/20/13	Y
Santa Cruz & Monterey Bay Railway	4/25/13	N
Quincy	6/20/13	Y

Complaint Investigations

ROSB receives complaints from such sources as railroad employees, railroad unions (United Transportation Union and the Brotherhood of Locomotive Engineers), the general public, and government personnel. ROSB initially contacts the FRA to determine whether the complainant notified both agencies. The CPUC and FRA determine which agency will perform the investigation to eliminate duplication.

For complaints investigated by ROSB, an inspector discusses the issue with the complainant or a contact person. The inspector investigates the issue and relevant location and gathers data, including photographs and other pertinent information. The inspector will discuss the issue with railroad managers in an effort to gain general compliance by pointing out unsafe condition, practice or risk pertinent to the complaint. A formal or informal action plan is discussed with railroad management, including a timeframe for remediation. The inspector then prepares a written response, with proposals for resolving the complaint, for review by his or her supervisor. A response letter is prepared by one of the branch supervisors and mailed to the complaining party or his/her representative. A follow-up inspection is performed to ensure compliance and/or remedial action.

In 2012-13, ROSB investigated and resolved 26 complaint investigations.



Challenges for Rail Safety

Reporting of Accidents and Incidents

One of the primary concerns of the CPUC is that many railroads lack consistency to comply with federal law, California law, and CPUC GOs with regard to reporting accident / incidents and hazardous materials releases to the CPUC. The railroads often fail to "immediately" report accidents / incidents to the CPUC, and make associated document retrieval difficult that could aid the CPUC rail safety inspectors with completing a thorough investigation. It is presumed the actions could adversely affect an accurate investigative conclusion.

The CPUC uses the results of investigation to make recommendations for rule changes or new regulations that would increase safety and mitigate similar accidents in the future. In addition, if the investigation reveals that the railroad failed to adhere to federal or state laws or regulations, it could administer fines or penalties.

The following provide authority for CPUC rail safety investigators to be notified immediately of an accident that occurs on rail property, and requires the railroads to cooperate with CPUC investigators:

- The California Constitution, Article XII, prescribes the authority for the CPUC to establish rules for the transportation of passengers and property by transportation companies.

- PU Code Section 309.7 states that the Safety and Enforcement Division is responsible for inspection, surveillance, and investigation of the facilities and operations of railroads, and for enforcing state and federal laws, regulations, orders, and directives relating to transportation of persons or commodities, or both, of any nature or description by rail.

- PU Code Section 309.7 also requires the Safety and Enforcement Division to "exercise all powers of investigation granted to the commission, including rights to enter upon land or facilities, inspect books and records, and compel testimony."

- CPUC GO 22-B requires the superintendent of the relevant railroad division to provide the CPUC with immediate notice of the following:

    a) All collisions of locomotives, cars and trains resulting in loss of life or serious injury to persons;

    b) All derailments or other accidents to locomotives, cars and trains, resulting in loss of life or serious injury to persons;

    c) All bridge failures; and,

    d) All highway crossing accidents resulting in loss of life or serious injury to persons.[6]

[6] GO 22-B reporting requirements may be satisfied when railroads send notifications to CEMA, and CEMA then

- PU Code Section 315 requires the CPUC to investigate the cause of all accidents that have occurred on the property of any public utility resulting in loss of life or injury to person or property and permits the CPUC to make an order or recommendation.

- PU Code Section 7661 requires the Safety and Enforcement Division to investigate any incident that results in a notification, and report its findings concerning the cause or causes to the commission.

- PU Code Section 7662 requires railroads to provide immediate notification to CEMA of accidents and incidents;[7]

- PU Code Section 7672.5 requires railroads to immediately report incidents resulting in a release or threatened release of a hazardous material to relevant agencies, including CEMA.[8]

- GO 161 requires railroads to immediately notify the appropriate emergency-response agency in the event of a hazardous materials incident.

The following GOs govern reporting requirements of other public utilities under the CPUC's jurisdiction. These GOs could be used as a basis for identifying reasonable reporting requirements for the railroads:

- GO 95, which provides requirements for overhead electric and communication line design, construction, and maintenance, requires each public utility to provide "immediate access" to any factual or physical evidence related to the incident.

- GO 112, which provides minimum requirements for the design, construction, and maintenance of gas facilities, references subparts of 49 CFR Part 191.[9] GO 112 specifically adopts parts of 49 CFR Part 191 which requires an operator to:

    - Submit a Safety-Related Condition Report within 5 working days after the discovery of the condition, and not later than 10 working days; and,

    - Submit the Safety-Related Condition Report concurrently to the applicable State agency when the State agency *acts as an agent of the Secretary* with respect to interstate transmission facilities.

The CPUC rail safety inspectors act as an agent of the Secretary with respect to railroad safety. 49 CFR Part 212 establishes the State Safety Participation Program. The stated purpose of the

notifies the CPUC. GO 22-B also requires the railroads to report monthly to the CPUC not later than 30 days from the end of the month in which the accident occurred. 49 CFR 225.11 also requires railroads to report monthly accident information to the FRA.

[7] CEMA immediately notifies the CPUC.

[8] CEMA immediately notifies the CPUC.

[9] 49 CFR Part 191.5 requires notification of an incident, "at the earliest practicable moment following discovery;" however, GO 112 does not specifically adopt Part 191.5.

State Safety Participation Program is to authorize the states to work in partnership with the FRA to enforce federal railroad safety regulations. The CPUC has an agreement with the FRA under which the CPUC rail safety personnel inspect railroad cars and facilities for compliance with FRA regulations contained in federal statute. Under this agreement, the FRA officially certifies CPUC rail safety inspectors in specific disciplines to become "agents" on behalf of the FRA. The CPUC rail safety inspectors enforce both state and federal laws, as well as CPUC GOs. The CPUC rail safety inspectors make civil penalty recommendations to the FRA when the CPUC rail safety inspectors discover non-compliant conditions with federal regulations.

Immediate reporting can increase safety. GO 22-B is the most specific and identifies the type of information required in the immediate notice, such as date, time, place, kind of accident, and other information. This information in necessary for the CPUC to deploy inspectors to determine whether the railroad violated state laws, federal laws, or CPUC GOs. When time passes, evidence can be altered or removed, which can result in an inaccurate or incomplete investigation.

An example of an incident that highlights the reporting problem occurred on June 2, 2013. A BNSF freight train derailed in the small town of Denair, CA, right by the Amtrak platform where just 10 minutes earlier passengers had been waiting. The passengers would have sustained significant injuries and possibly fatalities had the Amtrak train been delayed.

BNSF failed on two accounts to comply with California law and CPUC GOs.

- Failed to timely report an accident, "immediate reporting" took 7 hours; and,
- Failed to produce incident-related documents for over 10 days, which should have been immediately provided to CPUC investigators.

CPUC GO 22-B requires "immediate reporting" of an accident by railroads when the CPUC needs to launch its investigation required by California law. "Immediate" in most cases could mean 20 minutes or soon after notifying first-responders. In this case, BNSF did not report this until 12:31 a.m., 7 hours after an amateur video revealed it on the Internet.

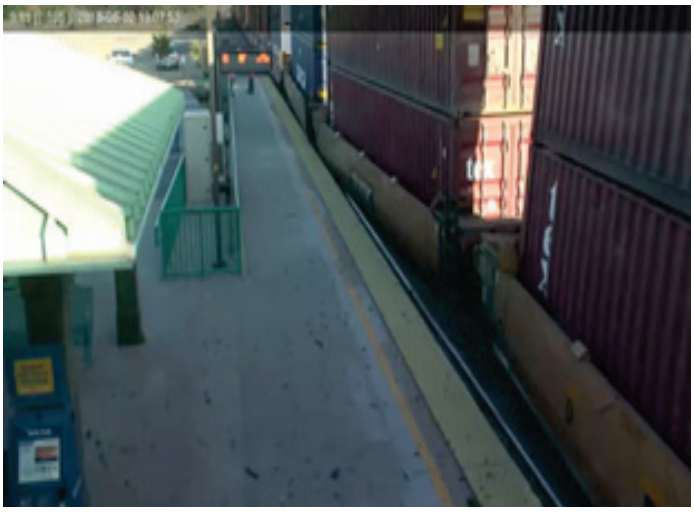
Derailed cars crashed into a nearby storage facility at Denair, California. Modesto Bee photo

PU Code Section 309.7 requires the Safety and Enforcement Division to exercise all powers of investigation granted to the commission, including rights to enter upon land or facilities, inspect books and records, and compel testimony. BNSF held up some portions of ROSB inspection

efforts for several days before releasing records to ROSB investigators.

Due to random luck and the incident happening on a Sunday, no person was in the path of the derailing equipment in the storage facility, the rail crossing, or nearby streets and fields, including a field where a wheel/axle set apparently landed at about 100 yards from the tracks. Amtrak and BNSF train traffic were severely disrupted for the following day.

Had BNSF reported the derailment soon after first-responders were notified, a CPUC rail safety inspector could have investigated the accident while the evidence was still fresh. The BNSF did not report the incident for over 7 hours, nor immediately release records to CPUC rail safety investigators. This issue was immediately discussed with BNSF upper management by CPUC. BNSF expressed their regret of what they termed a communication error by local management staff. An assurance by the BNSF General Manager was given to CPUC that local BNSF managers were given new, clear instructions as to the requirements of reporting accidents and incidents and subsequent production of documents to CPUC staff, once requested.



Amtrak platform at Denair, California, at the moment of derailment.

Recruiting and Retaining Signal and Train Control Inspectors

The CPUC has experienced difficulty recruiting qualified applicants for a Signal and Train Control (S&TC) inspector position. This may be the result of the significant pay disparity between the CPUC rail safety inspectors and their FRA counterparts. Of the 5.0 authorized STC inspector positions, last year, 2.0 of the positions were advertised and could not be filled. Over the past fiscal year, the CPUC received 10 applications for the examination. Only two were qualified and are on an active list. One did not accept an interview when he was informed of the pay, and the other was interviewed and offered a job. The interviewee had 15 years of experience in S&TC; however, he was also offered a job by the Union Pacific Railroad as a trainer in Omaha, which paid significantly higher than the state. He declined the CPUC's offer and is now working for the Union Pacific Railroad.

Another possible reason for the difficulty recruiting qualified S&TC inspectors is the FRA requirement for the railroads to install PTC systems. PTC systems are integrated command,

control, communications, and information systems for controlling train movements. They allow for remote-controlled train and signal operations. The Rail Safety Improvement Act of 2008 requires the country's largest rail carriers to install PTC by December 31, 2015, which may be why S&TC specialists are the primary staff involved in PTC installation.

Without qualified S&TC inspectors, the CPUC is challenged to effectively and frequently monitor railroad signal system installations, maintenance, and follow-up inspections. Retaining well-trained and experienced signal inspectors increases public safety because a signal defect could lead to certain collision. In 1988 in Pico Rivera, a freight train collided at 46 miles per hour with a stopped train because of erroneous wiring in the signal system. The accident resulted in one fatality, two injuries, and $2 million in damages.

Recruitment and Retention

PU Code Section 309.7 requires the CPUC to employ sufficient federally certified inspectors to inspect and investigate the rights-of-way, facilities, equipment, and operations of railroads and public mass transit guideways, and enforcing state and federal laws.

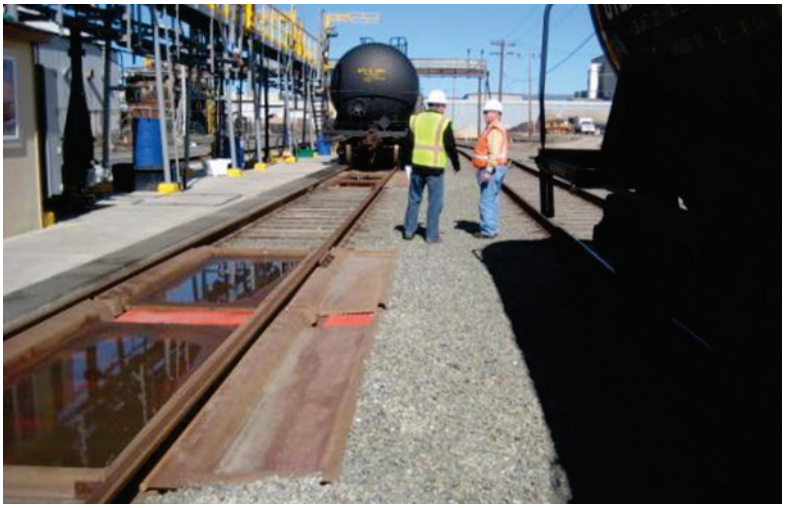
The CPUC is challenged to recruit and retain experienced all disciplines of rail safety inspectors. One significant cause of this problem is the compensation disparity between state inspector salaries and the higher federal and industry wages for similar job requirements. After the CPUC hires, trains and certifies the inspectors, they often leave to work for the FRA. The FRA pays about $20,000 to $35,000, or about 35 percent more per year for enforcing only federal regulations, whereas the CPUC inspectors must enforce both state and federal rail safety regulations.

The inspectors are required to identify and require repairs that prevent derailments, collisions, hazardous materials spills and explosions, and employee casualties. Experienced rail safety inspectors keep Californians safe. Newly trained novices miss critical defects and unsafe conditions, leaving California vulnerable to passenger-train derailments, hazardous materials spills and explosions, and auto-train collisions at crossings. Due to the size and weight of the rail equipment, when accidents occur, they are almost always tragic.

All railroad carriers need to operate safely and responsibly; however, their responsibility is to their clients who hire them to transport goods and materials expeditiously and inexpensively. Absent well-trained and seasoned rail safety inspectors, the railroad carrier industry may compromise safety in order to ensure timely service. Only experienced railroad inspectors can identify and make recommendations to railroad carriers to ensure California does not compromise public safety in order to save minor short-run costs.

The average tenure for State inspectors has been 2.7 years, and diminishes with increased attrition. When retirements and deaths are added to resignations, the attrition in the railroad inspector classes is 93 percent since 2000.

Constant training for new inspectors is expensive for the CPUC. Two inspectors (one mentor, one new-hire) cover only half of the territory of two independent and experienced inspectors, due to the time it takes to explain and train a new-hire. For example, on February 21, 2013, a mentor with a new CPUC railroad safety inspector conducted a follow-up inspection of walkway conditions for State GO compliance at rail shipper Cargill Industries, located in Newark. Cargill had previously been put on notice for various defects associated with walkways and impaired side clearance of a private grade crossing. The mentor noted that the items identified in the follow-up inspection were fixed, making for a safer environment for railroad and industry employees working in the area. The point being that, 2 inspectors could be independently working at different locations and covering twice the area as a team.



CPUC Rail Safety Inspector and trainee at Cargill Industries

As much as a year of field training is needed before an inspector is ready to be certified as an inspector. Each new inspector needs to go through FRA certification by an FRA Specialist for that discipline to be able to enforce federal laws and regulations. Each certification training session costs the state about $15,000.

The pay disparity between the state and federal inspectors decreases the ability for rail safety inspectors to detect unsafe conditions; follow up with the railroads to monitor remedial actions, and assess a penalty should the railroad neglect to remedy the issue. Experienced and well-trained rail safety inspectors possess the knowledge to identify code violations, monitor appropriate remedial actions, and follow through to ensure the remedy is implemented. If the railroad carriers fail to remedy the egregious condition, the experienced inspector will recommend a civil penalty violation and demand an action plan. All penalty payments for code violations are deposited into the General Fund.

Experienced inspectors identify and remedy unsafe conditions. On April 4, 2013 in Bloomington, CA during a routine inspection, an experienced CPUC Rail Safety Inspector spotted from a distance what appeared to be holes, essentially tripping hazards, inside the walkway adjacent to the track. The ROSB inspector decided to make a closer inspection confirming his observations.

The inspector noticed plastic covers placed over and protecting an underground cavity that housed an assortment of cables. Many covers had either caved-in at various locations along the walkway or had shifted in the ballast. Both conditions created a serious trip-and-fall hazard. Furthermore, railroad employees regularly walk up and down this track to conduct inspections of departing trains. Thus, the likelihood of injury was great.

Broken plastic covers intended to protect workers from tripping and falling into an underground cavity that houses an assortment of cables

Upon discussion with the railroad, the CPUC Rail Safety Inspector learned that different departments had been talking about the fix but had not progressed. Meanwhile, the railroad workers were at risk. Each day the plastic cover became weaker and less reliable.

The ROSB inspector prepared an Inspection Report documenting non-compliance with CPUC GO 118-A and presented the report to the local Track Maintenance Manager requesting that the inspector be informed of progress. The railroad responded by deciding that the whole installation including plastic covers was unreliable, high-maintenance, and unsafe. They immediately dismantled the covering, filled in the cavity, and leveled the ground next to the track.

Last year, ROSB worked with the California Department of Human Resources, the Department of Finance, and the Governor's staff to identify a course of action to eliminate the compensation disparity. All agreed that the Rail Safety Program would be more effective if the remuneration were equitable between state rail safety inspectors and their federal counterparts. There was no opposition. Nevertheless, final resolution is still pending.

Penalties and Citations

The Office of Rail Safety inspectors can assess penalties for failing to remedy a public safety situation. For violations of federal railroad safety regulations, CPUC rail safety inspectors make recommendations to the FRA for the assessment of penalties. For violations of State laws and GOs, CPUC Resolution ROSB-002 provides the Director or Deputy Director of the Safety and Enforcement Division the authority to issue citations to railroad carriers for violation of state laws and GOs. The GOs contain requirements for walkways, clearances, and certain railroad operating rules.[10] A railroad issued such a citation may accept the fine imposed or contest it through a process of appeal.

During 2012-13, CPUC rail safety inspectors noted 170 federal law violations which carry a fine of about $1,000 - $5,000 each, per day.

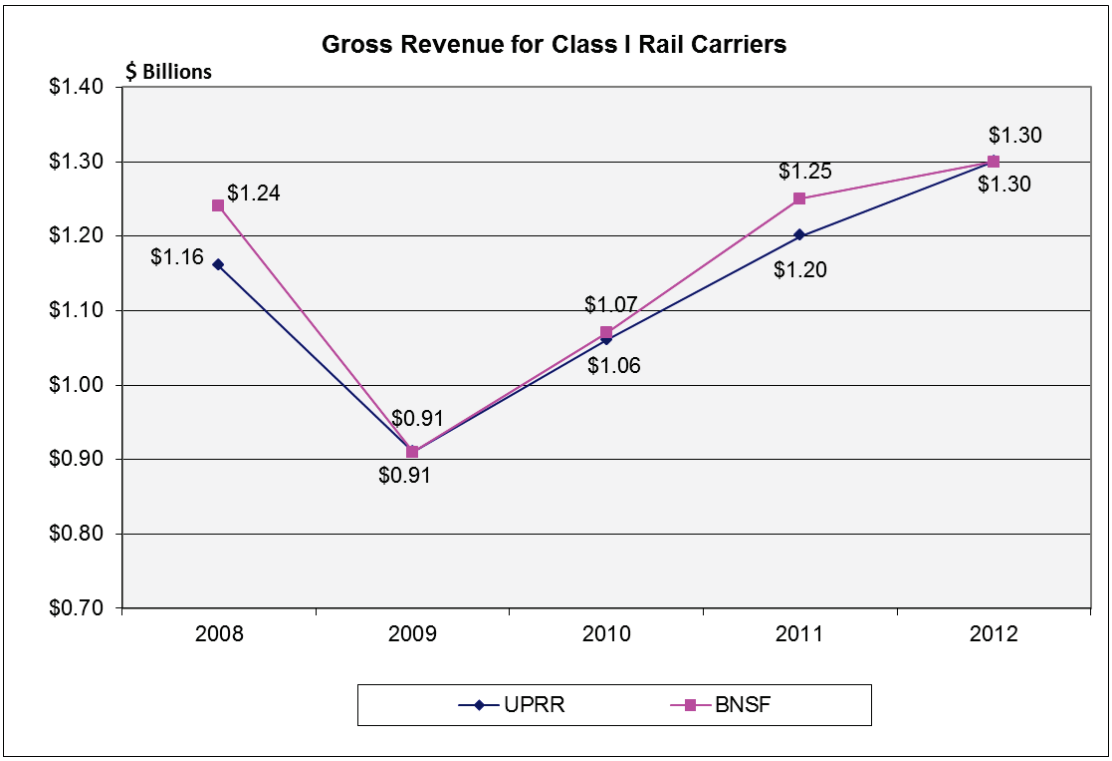
CPUC rail safety inspectors noted one violation to state laws and GOs. On April 22 and April 26, 2013, a rail safety inspector identified that Union Pacific Railroad had not displayed appropriate warning flags on the approach to a restricted area in order to ensure that trains are prepared to stop at the proper location. At the time of writing of this report (November 2013), a citation under ROSB-002 for these violations is under internal Safety and Enforcement Division review.

Regulatory Fee Impact on Competition

The activities of ROSB are supported primarily through fees collected from California railroads based on a percentage assessed against annual gross revenues, pursuant to PU Code Sections 421 and 422. Monies collected are used to fund the labor and expenses of staff involved exclusively in railroad safety activities as described in the PU Codes, including Sections 309.7, 315, 765.5, 765.6, 1202.7, and 7665-7667. Specifically, PU Code Section 309.7 requires the activities of the CPUC that relate to safe operation of common carriers by rail, other than those relating to grade crossing protection, to be supported by the fees paid by railroad corporations.

Last year, the state Legislature appropriated $6.16 million from the CPUC Transportation Reimbursement Account. The fees paid by the railroad corporations are deposited into a dedicated subaccount within the CPUC Transportation Reimbursement Account and are the sole funding source for the ROSB Rail Safety Program. The fees do not fund any other CPUC programs.

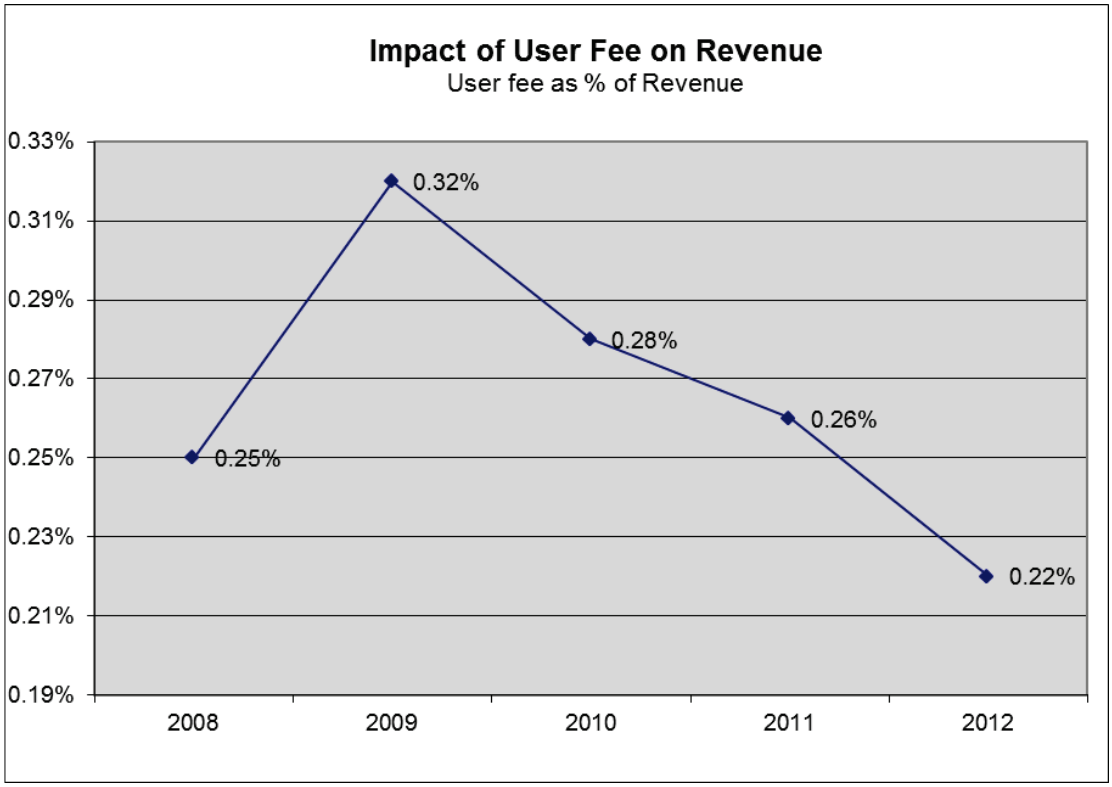
[10] GO 26-D, GO 118-A.



From 2011 to 2012, Union Pacific Railroad and BNSF combined gross revenues increased by 6 percent and 5 percent, respectively. Union Pacific Railroad set the best ever quarterly record in the second quarter of 2013: $5.5 billion in operating revenue, up 4 percent year over year; $1.9 billion in operating income, up 6 percent; $2.37 per share in diluted earnings, up 8 percent and a 65.7 operating ratio, down 1 percent.

Union Pacific Railroad was able to register the banner results despite a 1-percent drop in volume to 2.24 million units as chemical and automotive business gains (10 percent and 4 percent, respectively) couldn't offset agricultural product and intermodal traffic declines (10 percent and 3 percent, respectively), as well as flat coal shipments. Excluding agricultural products volume, traffic rose by 1 percent.

The significant increases in chemical shipments make retaining all inspectors critical to ensuring safe rail transportation and generating confidence in rail safety in California.



The railroad user fees assessed in 2012 on Union Pacific Railroad and BNSF represented just over one fifth of one percent of revenues (0.0022), and were unlikely to have had any effect on competition.

Appendix A

Examples of Regular Inspections

Below are examples of regular inspections carried out during 2012-13:

July 15: An CPUC Rail Safety Inspector conducted a crossing inspection on the Union Pacific Railroad at Olive Street in Tipton on the Fresno Subdivision. While performing an operational and visual inspection the inspector noticed the locking device was broken on the junction box cover. This circumstance would allow for unauthorized entry into the wiring of the flashing light warning appliances. Regulations require that all highway-rail grade crossing warning system apparatus be kept locked, sealed, or secured against unauthorized entry. An activation failure and/or train collision with a vehicle causing death or severe injury could occur at a road crossing as a result of tampering by an unauthorized vandal. Such tampering with electrical cables could make the warning devices inoperable. The Inspector documented this defect and communicated the problem to the railroad whose staff made immediate repairs.

Padlock in Locked Position

August 19: A CPUC Rail Safety Inspector noticed that a broken rail had not been repaired within the required time frame in a heavily populated area in the City of Fresno. The defect was discovered by a UPRR railroad employee on August 9, 2012. Per regulations, the defect should have been repaired within four days of discovery, by August 14. In addition, trains should have been restricted to 30 m.p.h. until the rail was repaired.

This line is used by UPRR to transport various types of hazardous materials. Broken and service-failed rails are a major contributor to track caused derailments which can compromise

public and employee safety, especially when carrying hazardous or combustible materials.

The CPUC Rail Safety Inspector recommended a violation to the FRA and UPRR repaired the track.

December 15: As part of a regular inspection, a CPUC Rail Safety Inspector observed Caltrain's passenger train Emergency Response Drill in Redwood City between San Francisco and San Jose. The drill was planned to comply with a regulation which requires passenger railroads such as Caltrain to carry out training simulations to help local responders and railroad personnel better deal with such an event if it occurs. Some of the agencies participating or observing included the following: Caltrain, Samtrans management, both bus and train personnel, Caltrain's contract operator Transit America Services (TASI) , San Mateo Transit Police, Redwood City and San Carlos Fire and EMT personnel, and CPUC and FRA inspectors.

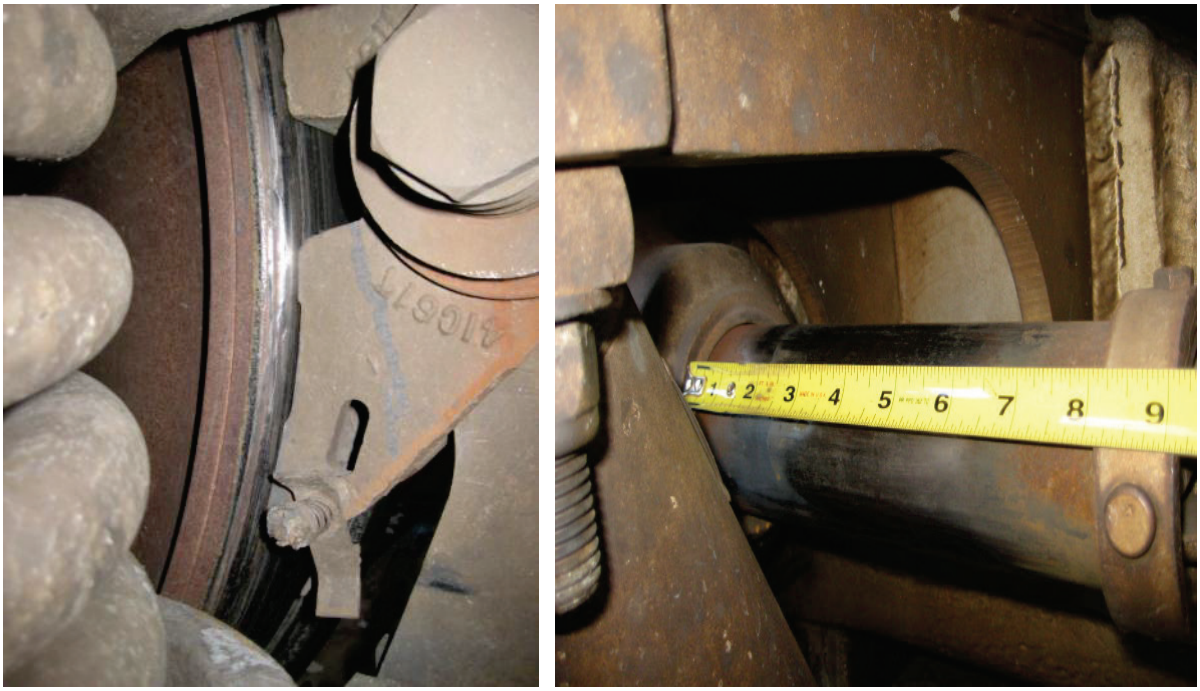
The drill was conducted safely and efficiently with no issue or incident. Such a drill is valuable for the way it connects diverse stakeholders who may respond to the same emergency, and helps them work together productively. The drill is also useful in familiarizing local fire and law enforcement personnel with train equipment and operations to ensure safe practices are followed when on railroad property. Seeing that these passenger trains operate through densely populated areas, it is critical that area responders and railroads are prepared to handle possible emergencies.

Briefing for Attendees in Front of Simulated Collision between a Caltrain Cab Car and Samtrans Bus

Redwood City Fire Department Responds to the Simulated Collision

A CPUC Rail Safety Inspector learns about the CPUC's role in observing emergency drills, one of a wide variety of training exercises for learning the role of an CPUC Rail Safety Inspector in promoting safety on both passenger & freight railroads

January 2: An CPUC Rail Safety Inspector performed a routine inspection of a BNSF Railway train in the town of Empire near Modesto. The train was made up of 5 locomotives and 51 cars. Before the inspection began the Inspector noted that the locomotives had already received the required daily inspection for that day. The inspection revealed a locomotive with a brake cylinder that had a problem with the brake rigging. This defect rendered the brakes on this locomotive ineffective and not in a safe and suitable condition for service. Two other locomotives were also discovered in non-compliance with either State or Federal regulations: one for a missing First Aid Kit (State GO 126) and the other for not having sufficient clearance. The CPUC Rail Safety Inspector notified BNSF Railway of the identified defects and the railroad corrected the problem.



Defective Locomotive Brakes Missing Brake Shoes on BNSF Train in Empire

February 21: Two CPUC Rail safety inspectors conducted a follow-up inspection of walkway conditions for State GO compliance at rail shipper Cargill Industries, located in Newark. Cargill had previously been put on notice for defects in violation of state regulations pertaining to clearances and walkways. The industry manager was present for the follow-up inspection and assured CPUC staff that the corrections would be addressed and remedied promptly. The local UPRR manager was also updated with the results of the re-inspection. CPUC Rail safety inspectors confirmed that items identified in this follow-up inspection were fixed, making for a safer environment for railroad and industry employees working in the area.

June 11: During a routine inspection at the Hanjin terminal at the Port of Long Beach, a CPUC Rail Safety Inspector noticed an excessive amount of miscellaneous equipment and vegetation between the track and a perimeter fence. Railroad employees and inspectors use these walkways throughout the day and evenings when

Excessive vegetation at the Hanjin Terminal at the Port of Long Beach

inspecting cars and performing routine repairs on brakes and couplings. Debris in the clearance area could cause railroad employees to slip, trip, or fall, especially in the evenings when visibility is low. Vegetation can also be a hazard to employees who are working around moving

equipment. Tripping on vegetation while switching in a live rail yard can have serious consequences if the person were to fall beneath a train.

CPUC GO 118 identifies specific defects that the CPUC inspectors must cite to ensure a safe work environment for railroad employees. Defects include debris of various types in the walkway and vegetation that impairs side or overhead clearance.

Tripping hazard, especially at night. Uneven communications box

The CPUC Rail Safety Inspector cited the railroad for an uneven communications box, excess vegetation, and random items strewn along the track, including blue flags, red flags, end-of-train devices, jumper cables, steel rebar, and other miscellaneous debris. Upon a follow-up investigation, the walkway had been cleared to enable unencumbered passage.

Appendix B

Examples of Focused Inspections

Below are examples of ROSB focused inspections as well as joint ROSB-FRA focused inspections during 2012-13.

September 10 – 14: FRA and CPUC Rail safety inspectors conducted a focused Inspection of the BNSF Railway's Northern California Division. The intent of the inspection was to assure compliance with FRA track standards, and to evaluate the BNSF Track Inspectors. In addition, a major focus of this inspection was to evaluate the BNSF's compliance with workplace safety, including Roadway Worker Protection (RWP), and Roadway Maintenance Machines (RMM) procedures. Track caused derailment data has shown a continued reduction over the past several years.

The inspection showed that the railroad was in compliance with track standards and RWP and RWW procedures and that improvements were noted during this focused inspection over last year. The Goal of the inspection was to help improve the BNSF track inspection practices and to help in the process of promoting a total safety culture.

September 13: An CPUC Rail Safety Inspector continued a series of observations and inspections of Union Pacific Railroad's (UPRR) Roseville Service Unit's newer operating officers as part of a focused inspection that includes review of records as well as field testing sessions of train crews. The objective of this work is to determine the officers' competence and compliance when administering the railroad's FRA-approved operational testing program. UPRR's system wide program is referred to as the Field Training Exercise (FTX) Program. The photos below depict a set of observations made by the Inspector while two UPRR officers set up and conducted a "stop test" on west bound Amtrak train #5 which operates over UPRR's main track through the Sierras east of Roseville.

The CPUC Inspector observed two new replacement Managers of Operating Practices (MOPs) working in this mountain district area as they performed their duties. MOPs are the UPRR managers who oversee the work of the locomotive engineers operating the trains. In performing a proper test, the managers communicate first with the train dispatcher as s/he controls and authorizes on-track movements. They then establish "occupancy indications" of the main track by "shunting" the track and verifying that the signal indication is working. Once a train is stopped, the managers board the train and expect to receive a safety briefing by the crew. The managers conduct their own inspections of the train and engine employees for rules compliance. After the testing is complete, the MOP's discuss their findings with the crew. The general objectives of the railroad are to reduce accidents, injuries and incidents by performing these FTX tests routinely at all hours of the day and night. Stop tests are particularly relevant for stressing the importance of focusing on signal indications and can help reduce the number of collisions on the railroad. CPUC Rail safety inspectors' role during these field tests is to ensure that the railroad managers adhere to their railroad's testing plans and objectives.

A comprehensive understanding of the effectiveness of the testing program can be had by reviewing testing records of the railroad managers, accident and injury records, reviewing

findings from independent CPUC inspections, and making observations of testing sessions. With several steep grades in California, it is important to know that train crews are paying attention to the signals and terrain and prepared to stop when signal indication requires them to do so. During this testing session, crews were in compliance with railroad rules and the railroad managers tested according to their plan.

A UPRR Manager of Operating Practices (MOP) places shunts and validates the signal aspect for an FTX test in order to stop west bound Amtrak train #5 at MP 157.5 as part of a structured FTX stop test.

A red flag is placed about 1.2 mile downhill from a red signal at MP 157.5 on Roseville Subdivision. The flag is placed below the red signal stop so that the testing officers can observe and test for a train operating at restricted speed.

The Amtrak train stopped short of the red flag in compliance with restricted speed and UPRR's structured test. The UPRR Managers and CPUC Inspector subsequently boarded the train and debriefed the train crew.

March 3: As part of a 2013 Track Safety Assessment, FRA & CPUC Rail safety inspectors performed a focused inspection at the Union Pacific Railroad's (UPRR) Fresno Yard. The goal of this inspection was to evaluate compliance with track safety standards and continue reducing track-caused derailments. 45 defective tie conditions were identified along with 41 miscellaneous defects in UPRR's Fresno Yard during the assessment. Defective ties were difficult to identify in many instances due to debris and vegetation covering the ties. Vegetation can also be a hazard to employees who are working around moving equipment. Tripping on vegetation while switching in a live rail yard can have serious consequences if the person were to fall beneath a train.

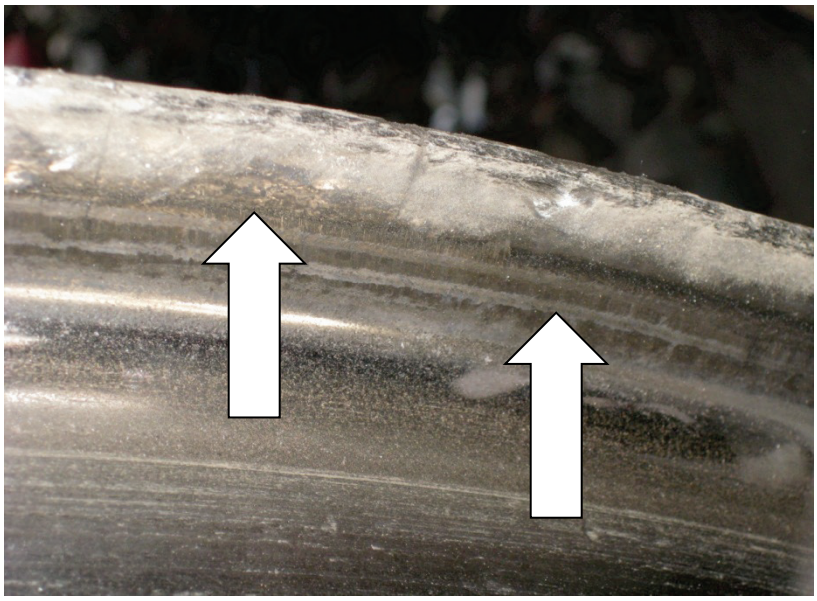
Other non-complying conditions identified during this inspection were improper welding and switch defects. Defects in switches can lead to derailments if not promptly repaired. FRA & CPUC participants in this focused inspection provided their findings to UPRR management for remedial action. UPRR management brought in a tie gang to do the needed repairs. Many ties were replaced and the yard cleaned up to eliminate tripping hazards and allow inspectors to more readily identify defective conditions. More thorough inspections by UPRR track inspectors are expected to better identify conditions that do not meet track safety standards during regular inspections. UPRR has scheduled more extensive rehabilitation for Fresno Yard in 2014.

Metal Strap is an Ineffective Fix for Defect of Excessive Vertical Lateral Movement of Switch point

Sloppy Welding of Rail End Mismatch

April 8 & 9: A focused inspection was conducted by the CPUC Rail Safety Inspector at the BNSF yard in Commerce, CA. The purpose of the inspection was to observe the railroad perform their routine inspection and testing procedures as required by Federal Regulations, State G.O's, and company rules. During the inspection approximately 245 freight cars and five locomotives were inspected. Minor defects were taken with 1 exception found. As a result of the inspection two violations were issued for failure to perform an air brake test as required and for freight cars found not properly secured.

At the conclusion of the inspection defects were discussed with the local management for correction. A follow up inspection determined that the defects has been corrected



April 17: An CPUC Rail Safety Inspector participated in a Multi-Agency Strike Force Operation (MASFO) at the Port of Oakland. At this location, both the BNSF Railway and Union Pacific Railroad (UPRR) have intermodal facilities to serve the port. The primary objective of the MASFO inspection was to ensure compliance with federal, state and local regulations pertaining to the safe shipment of Hazardous Materials. The MASFO was comprised of teams located throughout the port. The inter-agency teams were able to thoroughly inspect freight containers, bulk liquid tanks, tractor trailers, trucks and truck drivers before shipments left the port. Agencies participating in this operation along with the CPUC were the Federal Railroad Administration, US Coast Guard, Customs and Border Protection, Federal Motor Carriers Safety Administration, Pipeline and Hazardous Materials Safety Administration, California Highway Patrol, the City of Livermore Police and the City of Oakland Police.

A Union Pacific Railroad police officer also helped out during the inspection of the UPRR rail yard. The ROSB Investigator was teamed up with two FRA Hazmat Inspectors, two Pipeline and Hazardous Materials Safety Inspectors, and three US Coast Guard inspectors for the focused inspection. This team focused their inspection efforts on both the Union Pacific Railroad and the BNSF Railroad's Intermodal facilities, located within the Port of Oakland. During the inspection, the team documented five defects for improper placarding and two defects for blocking and bracing which the railroads arranged to have repaired before the containers were placed on a train. By identifying these non-complying conditions before the containers are placed in rail service and before trailers are traveling the highways carrying hazardous materials, the risk of accidental release is reduced.

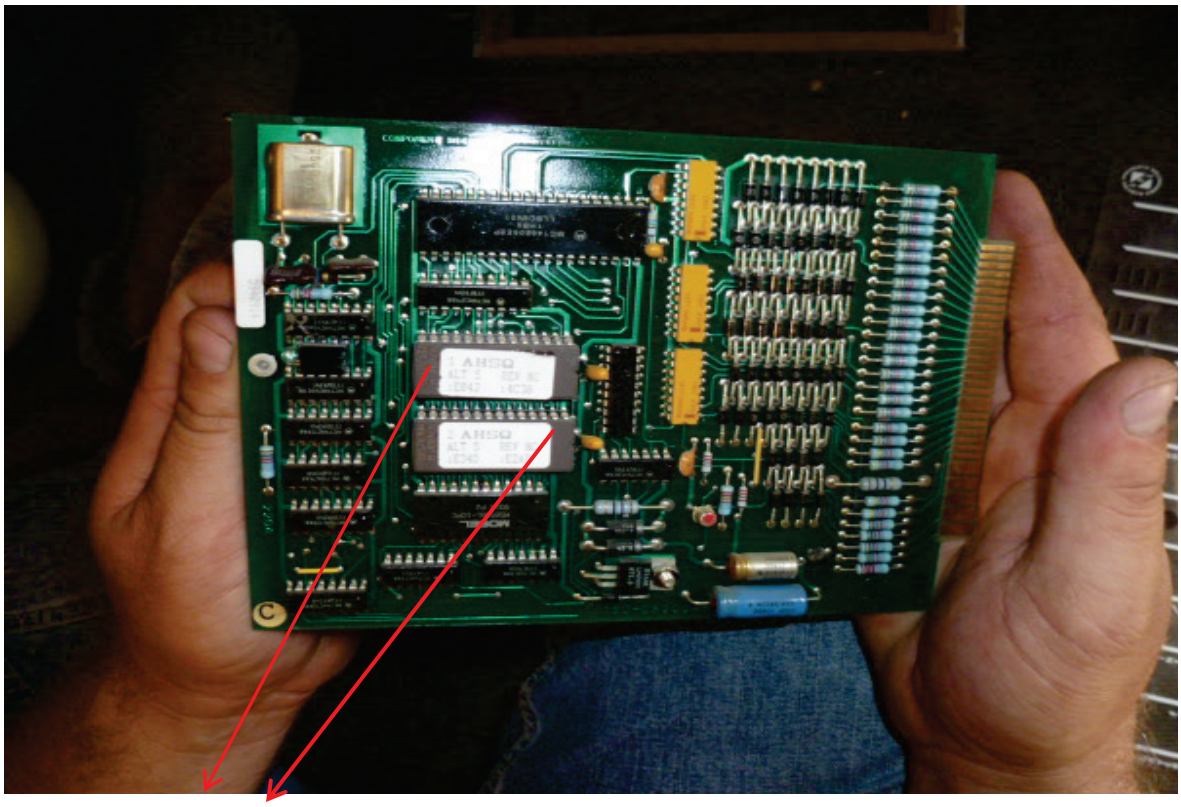
Inspection of a Load of Sodium Nitrate

Inspection of an Intermodal Portable Tank Loaded with a Hazardous Material Being Shipped from China to the East Bay area

June11-13: CPUC Rail safety inspectors conducted a focused inspection of Union Pacific's (UPRR) Software Management Control Plan (SMCP) per Title 49 CFR 236.18 the Federal Railroad Regulations (FRA).

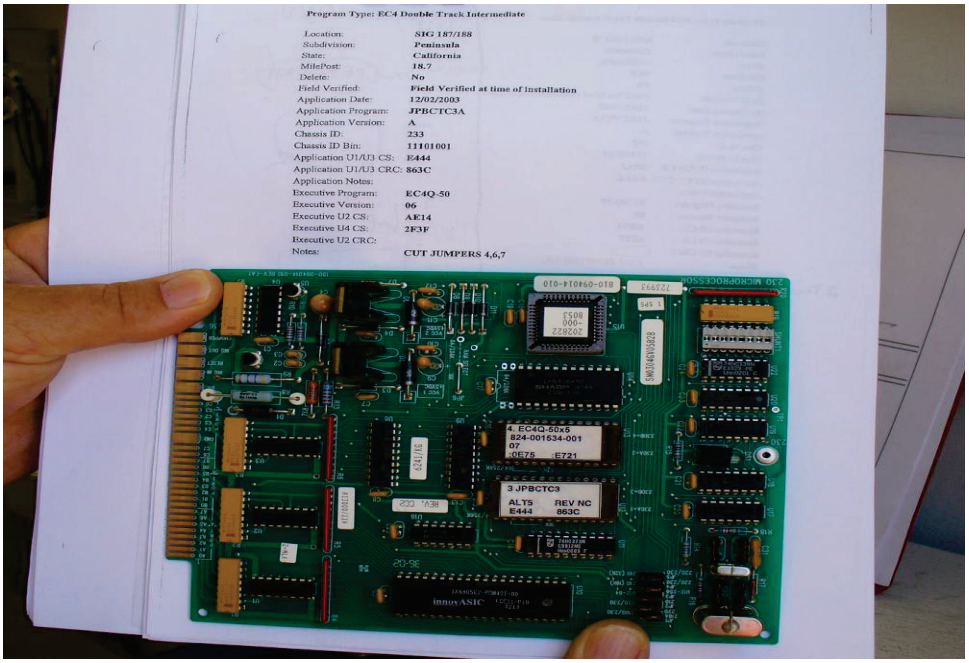
SMCP's are designed to ensure that the intended version of software for each specific site and location on the railroad is documented and maintained throughout the life-cycle of the system. The plan must also describe how the proper software configuration is to be identified and confirmed in the event of replacement, modification, or disarrangement of any part of the system.

Devices like the ones shown below are programed with the logic that controls the signal system. This ensures that switches are in the correct position and signals display the correct aspect. Putting in a device with the wrong software can cause signal failures which can lead to serious accidents.



THERE ARE 2 DEVICES ON EACH OF THE 2 PROCESSOR MODULES REQUIRING VERIFICATION.

UPRR's SMCP requires that proper documentation be kept in every signal case that has processor based equipment in them. The information on the sheet must match the equipment at that location.



Using the provided documentation at the location you can ensure that the Device has the proper software updates and revision level for the location that you are inspecting.

43 devices were inspected during the inspection and only three defects were found. Two of the defects were a result of upgrades being made and not properly documented and one was due to the incorrect information on the device. The defects were corrected.

Appendix C

Investigation Summaries

Below are summaries of ROSB incident investigations for the 2012-13.

April 13: At approximately 8:58pm (PDT), northbound Amtrak train operating on the Union Pacific Railroad's (UPRR) Niles Subdivision derailed at Niles Junction in Fremont, Alameda County. The engineer sustained a minor head injury during the derailment. No injuries to passengers were reported. The event recorder was downloaded at the scene with no exceptions taken to train handling. The train consisted of two locomotives plus 11 cars and at the time of the incident was carrying 144 passengers. As a result of the derailment, the track was out of service until the following morning. Track damages were estimated at approximately $30,000.

A CPUC Rail Safety Inspector and the UPRR Manager of Track Maintenance inspected the site of the derailment. Track geometry measurements were taken at several stations throughout the 10 degree curve and at the point of derailment. No conditions were found that would be considered a defect under existing safety regulations for track geometry.

Insulated joint plug weld near point of derailment

Locomotive 205 lead right hand wheel groove mark

CPUC staff concluded that there is no single cause behind this incident, but a combination of factors, both mechanical and track-related that led to the derailment. Since the incident, UPRR remedied the track caused condition and has also installed a new rail lubricator at the south end of the curve. Amtrak replaced the wheel set on Amtrak locomotive to remediate the mechanical conditions that may have contributed to the incident.

May 5: At approximately 9:13 a.m. a BNSF train derailed one car on the mainline track in the upright position in Caliente, Kern County. There were no reported deaths or injuries and no release of hazardous materials. A CPUC Rail Safety Inspector determined that lack of lubrication was the probable cause of this incident and relayed that determination to the railroad who stated that they would address the problem as part of their repairs to the track in response to this incident.

June 6: At approximately 04:57 p.m., a BNSF Railway train operating on the Stockton subdivision derailed 37 railcars with no hazardous materials released in the city of Denair in Stanislaus County. The derailment occurred on the main track near the Denair Amtrak passenger station, in an area surrounded by industrial complexes and a highly populated residential area. This incident did not result in any injuries or fatalities to any railroad employees or the public. The Stanislaus County Sheriff's Department and local Fire Departments responded to the scene of the incident.

Double stack intermodal cars loaded with containers are being rerailed after the derailment

Train was approaching on the main track to the right. The left track is the siding track

CPUC Rail safety inspectors arrived on scene and conducted an inspection of the track structure at the point of derailment. Also a follow-up investigation was conducted of the BNSF's inspection processes and qualifications of BNSF inspectors. BNSF management attributed the cause of the derailment to a thermal misalignment on the main track. Since thermal misalignments, often referred to as a track buckle, occur during times of extreme heat, CPUC Rail safety inspectors questioned BNSF management regarding their instructions for conducting track inspections during times of extreme heat. This discussion was followed by an audit by CPUC Rail safety inspectors of track inspection records to ensure compliance with the BNSF's own inspection plan which should prevent this kind of incident from happening in the future.

Appendix D

Examples of Operation Lifesaver Presentations

July 31: An CPUC Rail Safety Inspector attended a safety intervention event held near BNSF Railway tracks in Fresno. The event aimed to make contact with elementary and middle school students who walk (illegally) on or near the tracks. Amtrak and BNSF trains pass through this part of Fresno and due to a Quiet Zone are not required to sound the locomotive horn for the grade crossings in the area, though they do sound a warning when they notice trespassers. A total of 27 children were observed on the railroad right of way. 12 of those were contacted and 15 left when they saw the police officers. Students were counseled about the dangers of being near the tracks and officers reinforced the fact that they were not allowed by law to be there. The event was attended by police officers from BNSF, Amtrak and Fresno County. Also in attendance were managers and employees from BNSF Railroad and Amtrak, the State Director from Operation Lifesaver, union representatives for locomotive engineers and conductors and members of the local media. Two television stations broadcast stories about this event, including an interview with the Operation Lifesaver director in an effort to educate the public about safety near railroad tracks.

Railroad and local police officers converged in Fresno to help educate children about how trespassing on railroad right of way is both illegal and dangerous

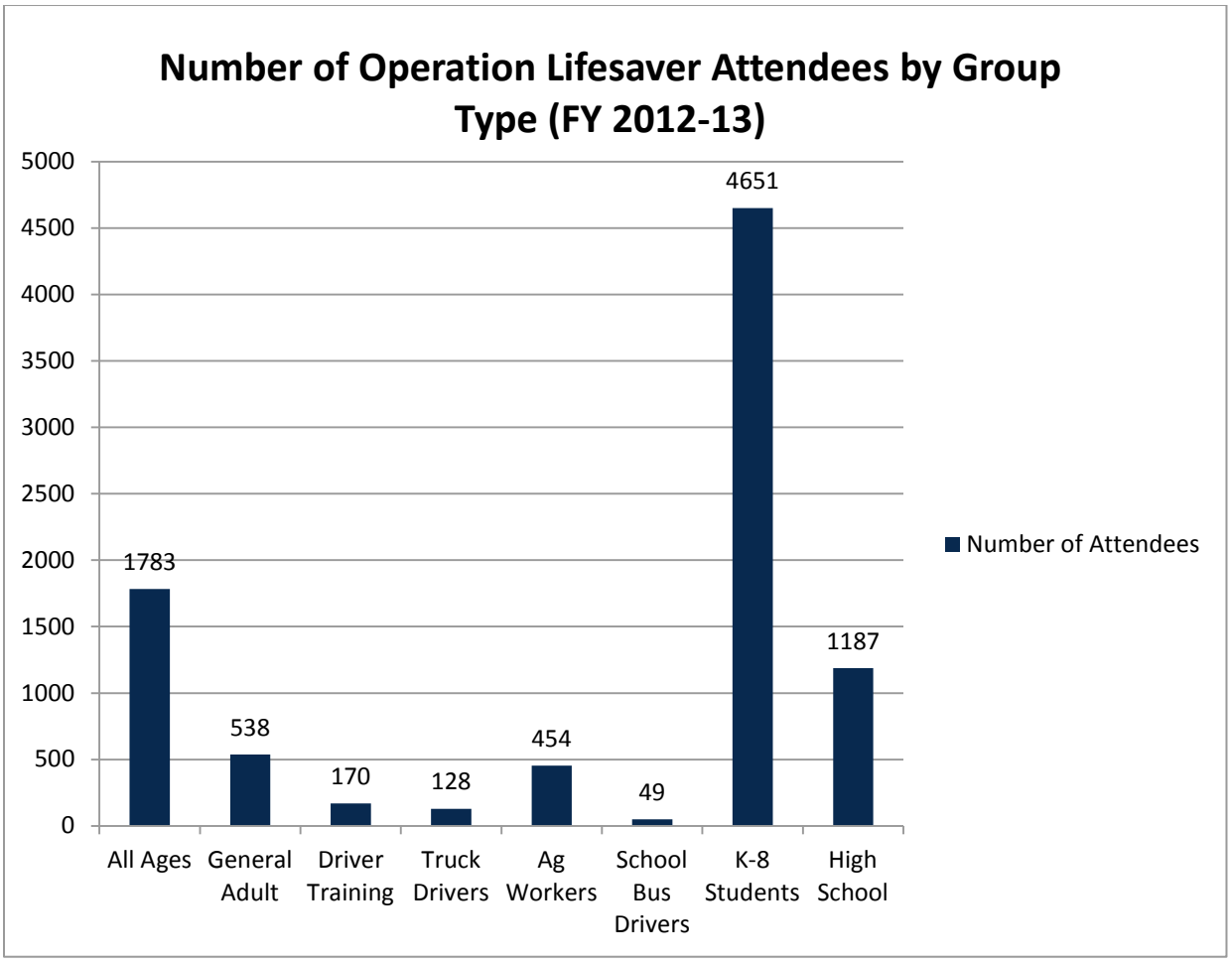
September 26: While inspecting departing trains in the south east California border town of El Centro, a CPUC Rail Safety Inspector witnessed school age children trespassing across railroad tracks and on the right of way. Some were accompanied by adults. A teenage couple was seen walking between parked freight cars as they looked for an opportunity to walk over or under a freight car to get across. The Inspector caught up to them and escorted them from the rail yard and out of harm's way. They were apologetic and appeared unaware of the danger to which they were exposing themselves, suggesting that they had done this before. After contacting the Principal of the local school, the Inspector was invited to give an Operation Lifesaver presentation to the student body at a later date. The Inspector gave the presentation to 70 students at a time, reaching a total of 398 students during one school day. During the

presentations, the Inspector provided the students with the knowledge they needed to make safe choices and not take risks around railroad tracks and equipment.

CPUC Rail Safety Inspector Gives OL Presentation at El Centro School

Month of March: CPUC Operation Lifesaver (OL) certified presenters addressed Spanish speaking employees of several produce farms in the Salinas Valley. Presentations were conducted in both a class room setting and in the fields. These activities were part of an effort to help educate farm employees of the dangers surrounding grade crossings and tracks. The Union Pacific Railroad runs adjacent to most of these farms. The UPRR Coast line includes numerous grade crossings that are used on a daily basis by the farm employees. Their work often requires them to be in close proximity to the tracks with large agricultural equipment. The presentation material also addressed normal daily driving. The attendees were encouraged to spread the OL message to their co-workers, friends and family. Presentations for farm workers were also made later in the year.

Salinas Valley farm workers receive OL training in classroom and in the field.



Map of Operation Lifesaver Presentations in Relation to Major Railroads (2012-13)

*Note: multiple presentations in one location may appear as one marker on map

Laws that Govern the Rail Safety Program

State Constitution, Article XII, Sec. 4	The commission may fix rates and establish rules for the transportation of passengers and property by transportation companies ….
PU Code Sec. 309.7 (a)	(a) The division of the commission responsible for consumer protection and safety shall be responsible for inspection, surveillance, and investigation of the rights-of-way, facilities, equipment, and operations of railroads and public mass transit guideways, and for enforcing state and federal laws, regulations, orders, and directives relating to transportation of persons or commodities, or both, of any nature or description by rail. The Safety and Enforcement Division shall advise the commission on all matters relating to rail safety, and shall propose to the commission rules, regulations, orders, and other measures necessary to reduce the dangers caused by unsafe conditions on the railroads of the state.
PU Code Sec. 309.7 (b)	(b) In performing its duties, the Safety and Enforcement Division shall exercise all powers of investigation granted to the commission, including rights to enter upon land or facilities, inspect books and records, and compel testimony. The commission shall employ sufficient federally certified inspectors to ensure at the time of inspection that railroad locomotives and equipment and facilities located in class I railroad yards in California are inspected not less frequently than every 180 days, and all main and branch line tracks are inspected not less frequently than every 12 months.
PU Code Sec. 309.7 (c)	(c) The general counsel shall assign to the Safety and Enforcement Division the personnel and attorneys necessary …to enforce safety laws, rules, regulations, and orders, and to collect fines and penalties resulting from the violation of any safety rule or regulation.
PU Code Sec. 309.7 (d)	(d) The activities of the Safety and Enforcement Division that relate to safe operation of common carriers by rail, other than those relating to grade crossing protection, shall also be supported by the fees paid by railroad corporations.
PU Code Sec. 315	315. The commission shall investigate the cause of all accidents occurring within this State upon the property of any public utility or directly or indirectly arising from or connected with its maintenance or operation, resulting in loss of life or injury to person or property and requiring, in the judgment of the commission, investigation by it, and may make such order or recommendation with respect thereto as in its judgment seems just and reasonable.
PU Code Sec. 765.5	(a) The purpose of this section is to provide that the commission takes all appropriate action necessary to ensure the safe operation of railroads in this state. (b) The commission shall dedicate sufficient resources necessary to adequately carry out the State Participation Program for the regulation of rail transportation of hazardous materials as authorized by the Hazardous Material Transportation Uniform Safety Act of 1990 (P.L. 101-615). (c) On or before July 1, 1992, the commission shall hire a minimum of six additional rail inspectors who are or shall become federally certified, consisting of three additional motive power and equipment inspectors, two signal inspectors, and one operating practices inspector, for the purpose of enforcing compliance by railroads operating in this state with state and federal safety regulations. (d) On or before July 1, 1992, the commission shall establish, by regulation, a minimum inspection standard to ensure, at the time of inspection, that railroad locomotives, equipment, and facilities located in class I railroad yards in California will be inspected not less frequently than every 120 days, and inspection of all branch and main line track not less frequently than every 12 months. (e) Commencing July 1, 2008, in addition to the minimum inspections undertaken pursuant to subdivision (d), the commission shall conduct focused

	inspections of railroad yards and track, either in coordination with the Federal Railroad Administration, or as the commission determines to be necessary. The focused inspection program shall target railroad yards and track that pose the greatest safety risk, based on inspection data, accident history, and rail traffic density.
PU Code Sec. 768	768. The commission may, after a hearing, require every public utility to construct, maintain, and operate its line, plant, system, equipment, apparatus, tracks, and premises in a manner so as to promote and safeguard the health and safety of its employees, passengers, customers, and the public. The commission may prescribe, among other things, the installation, use, maintenance, and operation of appropriate safety or other devices or appliances, including interlocking and other protective devices at grade crossings or junctions and block or other systems of signaling. The commission may establish uniform or other standards of construction and equipment, and require the performance of any other act which the health or safety of its employees, passengers, customers, or the public may demand.
PU Code Sec. 7661	The Safety and Enforcement Division shall investigate any incident that results in a notification…and shall report its findings concerning the cause or causes to the commission.
PU Code Sec. 7662	Requires a railroad to place appropriate signage to notify an engineer of an approaching grade crossing and establishes standards for the posting of signage and flags, milepost markers, and permanent speed signs.
PU Code Sec. 7665.2	By July 1, 2007, requires every operator of rail facilities to provide a risk assessment to the commission and the agency for each rail facility in the state that is under its ownership, operation, or control, and prescribes the elements of the risk assessment.
PU Code Sec 7665.4	(f) Requires the rail operators to develop an infrastructure protection program, and requires the CPUC to review the infrastructure protection program submitted by a rail operator. Permits the CPUC to conduct inspections to facilitate the review, and permits the CPUC to order a rail operator to improve, modify, or change its program to comply with the requirements of this article. (g) Permits the CPUC to fine a rail operator for failure to comply with the requirements of this section or an order of the commission pursuant to this section.
PU Code Sec. 7667	
General Order 22-B	Requires accident investigations on all incidents occurring on railroad property.
General Order 26-D	Establishes minimum clearances between railroad tracks, parallel tracks, side clearances, overhead clearances, freight car clearances, and clearances for obstructions, motor vehicles, and warning devices to prevent injuries and fatalities to rail employees by providing a minimum standards for overhead and side clearance on the railroad tracks. (Pursuant to PUC Sec. 768.)
General Order 72-B	Formulates uniform standards for grade crossing construction to increase public safety. (Pursuant to PUC Sec. 768.)
General Order 75-D	Establishes uniform standards for warning devices for at-grade crossings to reduce hazards associated with persons traversing at-grade crossings. (Pursuant to PUC Sec. 768.)
General Order 118-A	Provides standards for the construction, reconstruction, and maintenance of walkways adjacent to railroad tracks to provide a safe area for train crews to work. (Pursuant to PUC Sec. 768.)
General Order 126	Establishes requirements for the contents of First-Aid kits provided by common carrier railroads. (Pursuant to PUC Sec. 768.)
General Order 161	Establishes safety standards for the rail transportation of hazardous materials. (Pursuant to PUC Sec. 768.)
General Order 135	Establishes regulations governing the occupancy of public grade crossings by railroads. (Pursuant to PUC Sec. 768.)

GLOSSARY

ATIP	Automated Train Inspection Program
BNSF	BNSF Railway
CALTRANS	California Department of Transportation
CEMA	California Emergency Management Agency
CFNR	California Northern Railroad
CFR	Code of Federal Regulations
CPUC	California Public Utilities Commission
FRA	Federal Railroad Administration
GO	General Order
HSR	High Speed Rail
Metrolink	Southern California Regional Rail Authority
MP&E	Motive Power & Equipment
NCTD	North County Transit District
NTSB	National Transportation Safety Board
OL	Operation Lifesaver
PTC	Positive Train Control
RCES	Rail Crossing Engineering Section
RMSR	Risk Management Status Report
ROSB	Railroad Operations and Safety Branch
RSAC	Rail Safety Advisory Committee
RSSIMS	Rail Safety & Security Information Management System
RTSS	Rail Transit Safety Section
RWP	Roadway Worker Protection
SED	Safety and Enforcement Division
SSPP	System Safety Program Plan
STC	Signal and Trail Control
TTP	Track Train Dynamics
UPRR	Union Pacific Railroad