



Accident Investigation Final Report

San Francisco Bay Area Rapid Transit District
Train Collision with Two Roadway Workers

Between Walnut Creek and Pleasant Hill Stations

Walnut Creek, California

October 19, 2013

RAIL TRANSIT SAFETY SECTION
SAFETY AND ENFORCEMENT DIVISION
CALIFORNIA PUBLIC UTILITIES COMMISSION

RTSB Transit Incident: INCT 2013100015
Date Issued: March 11, 2016

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United States of America
Code of Federal Regulations
Title 49. Transportation
Part 659. Rail Fixed Guideway Systems; State Safety Oversight

659.35. Investigations.

(a) The oversight agency must investigate, or cause to be investigated, at a minimum, any incident involving a rail transit vehicle or taking place on rail transit-controlled property meeting the notification thresholds identified in [49 CFR] §659.33(a).

(b) The oversight agency must use its own investigations procedures or those that have been formally adopted from the rail transit agency and that have been submitted to FTA.

(c) In the event the oversight agency authorizes the rail transit agency to conduct investigations on its behalf, it must do so formally and require the rail transit agency to use investigation procedures that have been formally approved by the oversight agency.

(d) Each investigation must be documented in a final report that includes a description of investigation activities, identified causal and contributing factors, and a corrective action plan.

(e) A final investigation report must be formally adopted by the oversight agency for each accident investigation.

(1) If the oversight agency has conducted the investigation, it must formally transmit its final investigation report to the rail transit agency.

(2) If the oversight agency has authorized an entity other than itself (including the rail transit agency) to conduct the accident investigation on its behalf, the oversight agency must review and formally adopt the final investigation report.

(3) If the oversight agency does not concur with the findings of the rail transit agency investigation report, it must either:

(i) Conduct its own investigation according to paragraphs (b), (d), and (e)(1) of this section; or

(ii) Formally transmit its dissent to the findings of the accident investigation, report its dissent to the rail transit agency, and negotiate with the rail transit agency, and negotiate with the rail transit agency until a resolution on the findings is reached.

(f) The oversight agency shall have the authority to require periodic status reports that document investigation activities and findings in a time frame determined by the oversight agency.

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State of California
Public Utilities Code
Part 1. Public Utilities Act

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 judgment seems just and reasonable. Neither the order or recommendation of the commission nor any accident report filed with the commission shall be admitted as evidence in any action for damages based on or arising out of such loss of life, or injury to person or property. Every public utility shall file with the commission, under such rules as the commission prescribes, a report of each accident so occurring of such kinds or classes as the commission from time to time designates.

State of California
Public Utilities Code
Part 5. General Provisions
Division 10. Transit Districts

29047. The district shall be subject to regulations of the Public Utilities Commission relating to safety appliances and procedures, and the commission shall inspect all work done pursuant to this part and may make such further additions or changes necessary for the purpose of safety to employees and the general public.

The commission shall enforce the provisions of this section.

The district shall reimburse the commission for any cost incurred by the commission in regulating pursuant to this section when such regulating is performed (a) by persons not on the staff of the commission or (b) by the staff of the commission but not funded by a Budget Act appropriation. The reimbursement shall be in the amount as agreed upon by the district and the commission and approved by the Director of Finance. If the district and the commission are unable to agree as to the amount of the cost, the Director of Finance shall determine the amount.

CALIFORNIA PUBLIC UTILITIES COMMISSION
505 Van Ness Avenue
San Francisco, CA 94102-3298

TABLE OF CONTENTS

TABLE OF CONTENTS	IV
TABLE OF FIGURES	VI
TABLE OF TABLES.....	VI
ACRONYMS AND ABBREVIATIONS	VII
1 EXECUTIVE SUMMARY.....	1
2 PRE-ACCIDENT SUMMARY	2
2.1 Environmental Conditions	2
2.2 Pre-Accident Facts	2
2.2.1 Labor Strike	2
2.2.2 Track Maintenance	3
2.2.3 Train Maintenance	3
2.2.4 Train Configuration and Operations	3
2.2.5 Personnel Onboard Train #963	3
2.2.6 Train Control	4
2.2.7 Roadway Workers	4
2.2.8 Simple Approval	5
2.2.9 Wayside Worker Announcements	6
2.3 Accident Narrative	6
3 EMERGENCY RESPONSE	9
4 INVESTIGATION ACTIVITIES	10
4.1 Mechanical Inspections	10
4.2 Track Inspections	11
4.3 Data Logs	12
4.4 In-Cab Video Review	13
4.5 Accident Reenactment	15
5 ANALYSIS	16
5.1 Maintenance Crew	16
5.2 Operations Control Center	17
5.3 Train Crew	17
5.4 In-Cab Incident Video	18
6 CONCLUSIONS	19
6.1 Most Probable Cause	19
<i>Primary Cause</i>	19
<i>Contributory Causes</i>	20
6.2 Recommendations	20
APPENDIX I – BART STRIKE OPERATIONS PROPOSAL	21
OCC Managers	21
Revenue Train Operators	21

Circulation Train Operators	22
Yard Tower Controllers	22
APPENDIX II – BART CAR MAINTENANCE RECORDS	24
APPENDIX III – BART PRELIMINARY INCIDENT REPORT	32
APPENDIX IV – UNBILLED CELLULAR VOICE AND TEXT MESSAGE USAGE	36
TO Voice Usage	36
TO Text Message Usage	37
Track #80 RW1 Voice Usage	40
Track #80 RW1 Text Usage	41
Track #80 RW2 Voice Usage	42
Track #80 RW2 Text Usage	43
APPENDIX V – C-LINE RADIO COMMUNICATIONS TRANSCRIPT	45
APPENDIX VI – INITIAL ESTIMATES OF MONETARY DAMAGES	53
APPENDIX VIII – BART CAR PROPULSION AND BRAKE FAULT EVENT LOGS	62
Car #1869	62
Car #1508	62

TABLE OF FIGURES

Figure 1 – Cars in Consist of Train #963	3
Figure 2 – Example Work Order/Simple Approval Forms Found at the Scene of the Accident	5
Figure 3 – BART System Map	8
Figure 4 – BART Police Collecting Accident Site Measurements.....	9
Figure 5 – Aluminum Track Gauge Lodged under Car #2528	10
Figure 6 – Visible Damage to Car #2528	11
Figure 7 – TOT Presses a Button Before Applying Emergency Braking.....	13
Figure 8 – Train Operator's Console Diagram	14
Figure 9 – Mannequins used for Site Distance Test	16

TABLE OF TABLES

Table 1 – BART Automatic Train Control Traction Power Model Definition	4
Table 2 – Summary of Damages	11

ACRONYMS AND ABBREVIATIONS

ADA	Americans with Disabilities Act
ATIS	Automated Track Information System
ATO	Automatic Train Operations
BPD	BART Police Department
Cal/OSHA	California Division of Occupational Safety and Health
CCCFD	Contra Costa County Fire Department
CFR	Code of Federal Regulations
CPUC	California Public Utilities Commission
DVR	Digital Video Recorder
GO	CPUC General Order
FTA	Federal Transit Administration
ICS	Integrated Computer System
NTSB	National Transportation Safety Board
OCC	BART Operations Control Center
OR&P	Operations Rules and Procedures Manual
POI	Point of Impact
RTSB	CPUC Rail Transit Safety Branch
PED	Personal Electronic Device, as defined in GO 172
POI	Point of Impact
SSPP	System Safety Program Plan
Staff	RTSB staff
TO	Transportation Office
TOT	Train Operator Trainee

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1 EXECUTIVE SUMMARY

On Saturday, October 19, 2013, at approximately 13:44,¹ a four car BART train, #963, collided with two roadway workers on an at-grade section of the C1 track between the Walnut Creek and Pleasant Hill stations, resulting in fatal injuries to both.

Train #963 was a non-revenue consist. At the time of the collision, a total of six persons were on-board: a transportation officer acting as a trainer, two train operator trainees, and three equipment maintenance personnel.

The fatally injured workers had received access to the wayside through a BART procedure known as "Simple Approval" which provides access without protection from moving trains and requires personnel to be aware of their surroundings and to provide their own protection. Any work performed within the trackway under Simple Approval requires a designated watchperson who must remain outside the track gauge. BART issued an emergency suspension of the practice of Simple Approval on October 20, 2013, and permanently revoked the procedure on October 23, 2013, in response to this accident.

CPUC Staff arrived onsite within hours of the collision to join BART's investigation efforts. Subsequently, the National Transportation Safety Board (NTSB) took over the investigation. Two NTSB investigators arrived onsite on Sunday, October 20, 2013, and organized a multi-party investigation including representatives from BART, CPUC, the California Division of Occupational Safety and Health (Cal/OSHA), and the Federal Transit Administration (FTA). The NTSB's investigation report remains to be published.

Staff reviewed available evidence from an investigation performed in collaboration with NTSB, BART, and Cal/OSHA, and determined the following primary and contributory causes of the accident:

Primary Cause:

1. The two roadway workers did not designate or properly implement a watchman as required for work within the trackway under BART's Simple Approval access procedures according to the Operations Rules and Procedures Manual, Rule 6217.
2. The Train Operator Trainee failed to alert the roadway workers as he approached the worksite by sounding either the electric or the air horn, in violation of the Train Operator's Manual rule 304.
3. Operations Central Control failed to identify the unique conditions of running one revenue vehicle with one team of roadway workers as sufficiently unusual that a Simple Approval could not be granted according to BART's Operations Rules and Procedures, Section 6209.

¹ All times presented in 24-hour format, Pacific Daylight Time.

BART Train Collision with Two Roadway Workers

Walnut Creek, California

October 19, 2013

Contributory Causes:

1. The two roadway workers' request for Simple Approval, rather than a Work Area Clearance, was inappropriate for the type of work to be performed according to BART's Operations Rules and Procedures, Section 6204.
2. The Train Operator Trainee was unaccustomed to mainline train operations, and was not included in BART's list of approved Train Operators prior to the labor strike. Inexperience may have contributed also to the Trainee's pressing the "Hold/Door Close" button while failing to sound the horn upon approaching the roadway workers, and waiting to brake until the train could not slow down enough for the roadway workers to seek refuge.
3. The Train Operator Trainee was not directly supervised by a certified Train Operator trainer in the operator's cabin of Train #963 at the time of the accident, in accordance with BART's Operations Rules and Procedures, Sections 1401 and 1402.
4. The Transportation Officer had been using a Personal Electronic Device throughout the day while simultaneously supervising the Train Operator Trainee, distracting from his supervisory duties and potentially violating GO 172, Sections 3.1.a and 3.1.b.

2 PRE-ACCIDENT SUMMARY

2.1 Environmental Conditions

The weather in Walnut Creek on October 19, 2014, was sunny with clear skies, and the temperature was 70°F.² The collision occurred along ground-level rails of the C1 (northbound) mainline track, near milepost (MP) 16.15. This location is within the entrance spiral of curve, and just north of curve CT-137 which runs from MP 15.63 to 15.99. The exclusive, fenced BART right-of-way runs along an embankment between Lawrence Way and Jones Road in the city of Walnut Creek, California. The tracks run approximately 5.4° east of due north on top of a soil berm 10-15 feet higher than the surrounding terrain. Auto dealerships and commercial developments are to the west of Lawrence Way, and multifamily residential units lay east of Jones Road. At 13:51 Pacific Daylight Time, the sun appeared 34.8° above the horizon and 35.7° west of due south.³

2.2 Pre-Accident Facts

2.2.1 Labor Strike

Prior to the accident of October 27, 2013, BART management and labor had been engaged in union negotiations for several months. On Friday, October 18, 2013, BART unions called a strike, causing BART to discontinue revenue service. During the strike, trained management personnel performed essential system maintenance. Additionally, BART was preparing to open limited revenue service between Oakland and San Francisco. In meetings between BART and CPUC, BART identified the personnel who would be allowed to perform safety-sensitive functions such as

² Weather Underground Historical Weather, <http://www.wunderground.com/history/>

³ NOAA Solar Position Calculator, <http://www.esrl.noaa.gov/gmd/grad/solcalc/>

Train Control and Train Operation for both revenue and non-revenue trains, and provided their training and certification records.⁴

2.2.2 Track Maintenance

The last track inspection at the location of the accident occurred on October 16, 2013, on track C1 between MP 2.71 and MP 18.45. The inspection was performed by hi-rail vehicle, and no defects were recorded.⁵

A previous train had encountered a suspension airbag deflation possibly caused by a “dip” in the tracks near MP 16.15. The two roadway workers were investigating the reported defect the time of the collision.



Figure 1 – Cars in Consist of Train #963

2.2.3 Train Maintenance

Corrective Maintenance records for the four cars of Train #963, indicate that all known defects had been corrected, and Preventative Maintenance records show each car was up-to-date at the time of the accident.⁶

2.2.4 Train Configuration and Operations

Train #963, involved in the accident and depicted in Figure 1, consisted of four cars: #2528 in front, followed by #1869, #1508, and #397. Cars #1508 and #1869 are “B” mid-train cars with no operator’s cabin, while both end cars #397 and #2528 are “C” style cars which feature an operator’s cabin on the outer ends and passenger pass-through doors on both ends. The train had picked up additional cars in Concord earlier in the morning, and delivered them to Richmond Yard for maintenance. Immediately prior to the accident, the train had travelled south from Richmond Yard to MacArthur Station (K30) on the R-Line, reversed direction, and headed north toward Pittsburg/Baypoint Station (C80) on the C-Line, along route 585.

2.2.5 Personnel Onboard Train #963

At the time of the accident, train #963 was carrying six BART employees: a Transportation Officer (TO), two Train Operator Trainees (TOTs), and three additional maintenance employees. The TO stated in an interview that he had planned to supervise the two TOTs as they operated the train throughout the day.

⁴ See Appendix I – BART Strike Operations Proposal

⁵ NTSB Factual Report DCA-14-FR-001, Bay Area Rapid Transit District Train No. 963 Collision with Two Engineering Employees on C Line at Milepost 16.2, March 25, 2014

⁶ Preventative and Unscheduled Maintenance on all revenue vehicles is recorded in BART’s Maximo Material Maintenance System Database.

BART Train Collision with Two Roadway Workers

Walnut Creek, California

October 19, 2013

Due to the labor strike, the TO and TOTs were not acting in their typical capacities. The TO had worked previously as a BART train operator and an operator trainer, but was currently assigned to manage the transportation department on the C- and K-lines. The TO claimed in his NTSB interview to have reported for duty at 03:00, although in-cab audio captured the TO stating he arrived at 02:00, over 11 hours before the accident, and began operating Train #963 shortly after. The TOTs boarded Train #963 at approximately 06:00.⁷ The TO was named among the list of qualified Train Operators for both revenue and non-revenue operations in BART's pre-strike safety meeting with CPUC, and the relevant training dates are included in Appendix I. Neither of the TOTs included on the list.

According to records obtained from the TO's cellular service provider, his device received 23 text messages sent 24 messages between 06:00 and 13:44 on October 19, 2013, including one incoming and one outgoing message less than five minutes before the collision. The device also logged 11 voice calls in the same timeframe. The TOT's phone records were also reviewed, and showed both voice and text activity in the early morning and approximately 50 minutes before the accident.⁸

2.2.6 Train Control

BART trains typically are run in Automatic Train Operation (ATO) mode. According to data logged at OCC, Train #963 was in ATO mode with a Performance Level (PL) code of PL2. Road Manual operations are speed-limited to 27 mph or less, while ATO allows for higher speeds based on a speed code and PL code. Typical operating conditions with PL2 allow a maximum possible speed of 70 mph. The complete traction power model is shown in Table 1.⁹

PL	Accel.	Speed Code							
		0	6	18	27	36	50	70	80
1	Full	0	6	18	27	36	50	70	80
2	Full	0	6	18	27	36	50	70	70
3	Full	0	6	18	27	36	44	60	70
4	Half	0	6	18	27	36	44	60	70
5	Half	0	6	15	24	32	44	50	60
6	Half	0	6	15	20	27	36	44	44

Table 1 – BART Automatic Train Control Traction Power Model Definition

2.2.7 Roadway Workers

The two roadway workers, herein referred to as RW1 and RW2, were given the radio call sign "Track 80."

⁷ Interview with the TO, appearing in NTSB's Factual Report DCA-14-FR-001

⁸ See Appendix III – BART Preliminary Incident Report

⁹ From *BART-Inter-Office Communication*. "TELS 3.0 Traction Power Computing Model." John Evans, Senior Engineer, Train Control Engineering. January 31, 1992.

**BART Train Collision with Two Roadway Workers
Walnut Creek, California
October 19, 2013**

RW1 worked at BART as a special project manager for the Tracks and Structures department. His training records indicate he had completed a 32 hour Trackway Safety Certification course on March 4, 2011, and the next recertification was required by March 4, 2014. There are no records indicating he was trained on CPUC GO 172, which restricts the use of personal electronic devices on or around trackways.

RW2 was an independent consultant contractor with BART, and is required by the BART System Safety Program Plan (SSPP), Section 1605 to receive annual Trackway Safety Certification training.

2.2.8 Simple Approval

The roadway workers, identified by radio call sign Track #80, initially requested access to the at-grade wayside between Walnut Creek (C40) and Pleasant Hill (C50) Stations through a Simple Approval at approximately 13:00.¹⁰ After defining the conditions of the approval, as required by the Operations Rules and Procedures (OR&P) Manual, Rules 6214 and 6215, the Approval was granted at approximately 13:05, and was scheduled to expire at 18:00. Track #80 failed to identify the access point to be used for entering the right-of-way during its communications with OCC. The Train Controller also failed to provide the instruction that the workers would

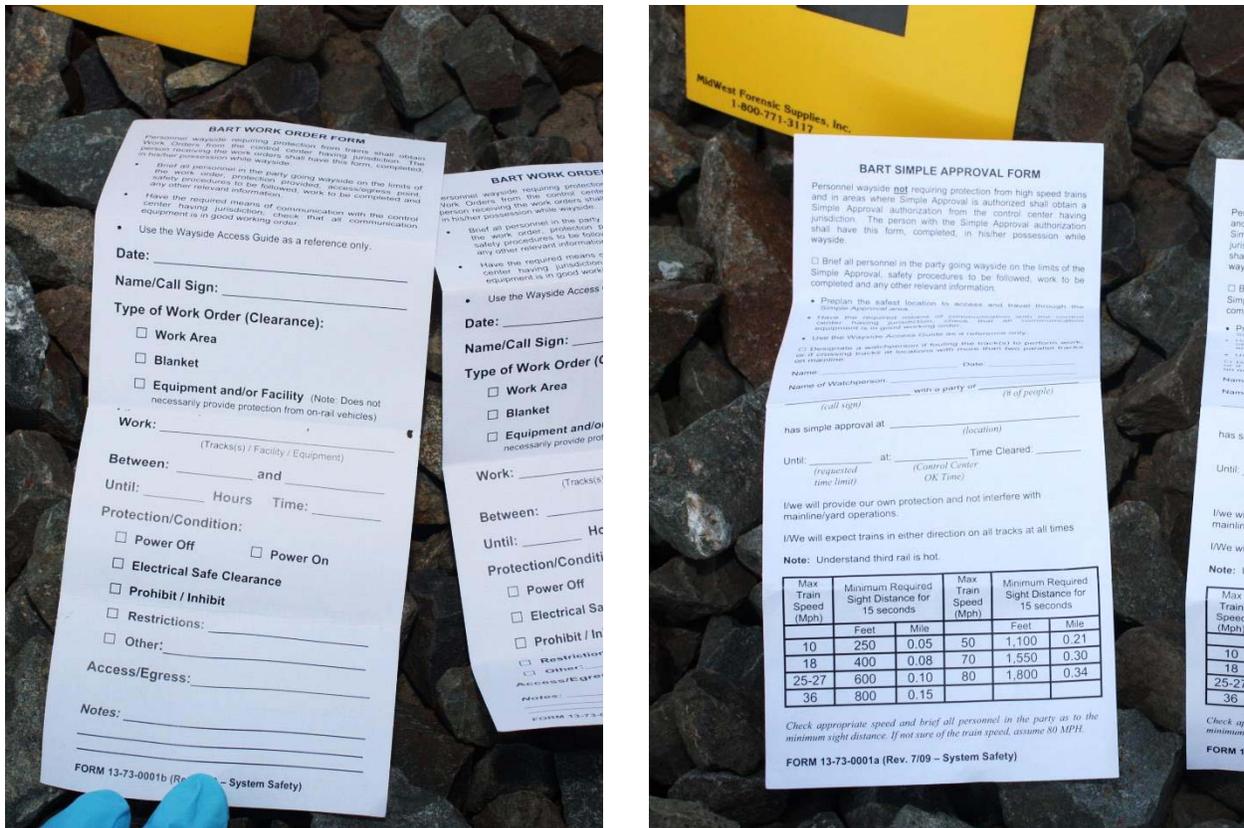


Figure 2 – Example Work Order/Simple Approval Forms Found at the Scene of the Accident

¹⁰ See Appendix V – C-Line Radio Communications Transcript

BART Train Collision with Two Roadway Workers

Walnut Creek, California

October 19, 2013

“Provide [their] own protection” as required by OR&P Manual, Rule 6215.F, but Track #80 included acknowledgement of the condition in their readback, per Rule 6215.G. In addition to the radio communication, the workers were required to complete a Simple Approval Form similar to the blank forms shown in Figure 2.

2.2.9 Wayside Worker Announcements

At the time of the accident, bart was using its own Automatic Track Information System (ATIS) to issue audible notifications to train operators regarding the locations of wayside workers. ATIS procedures had work order or simple approval information input by a Train Controller at OCC, and a computer-generated recording detailing the locations of all wayside workers is broadcast by BART radio. The information is also tabulated on monitors at Train Operator break areas. The RECORDED messages are automatically generated, but radio playback is performed only when a Train Controller issues a command. BART procedures specify that the Train Controllers are to broadcast ATIS announcements at the top and bottom, i.e. :00 and :30, of each hour, and whenever new work groups enter the wayside.¹¹

At 12:56, an ATIS message was broadcast indicating that no personnel were wayside throughout the BART system. The two involved wayside workers, with the radio call sign Track 80, received confirmation of Simple Approval from OCC at 13:05. ATIS broadcast an erroneous message at 13:06, again indicating no wayside workers. The Train Controller quickly corrected the announcement, broadcasting “And disregard. Attention all personnel, we have personnel wayside between C40 and C50, C1, C2 Tracks. Personnel Wayside.” Additionally, a correct ATIS announcement was broadcast within one minute. No further ATIS announcements were heard on the radio until the time of the accident.¹²

During post-accident interviews, one of the TOTs stated the TO was not in the operator’s cabin at the time of the announcements, but that both the TOTs were and had heard and discussed the announcement.

2.3 Accident Narrative

The TO boarded four-car train #963 before 06:00 on Saturday, October 19, 2013, and began operations out-of-service on the BART mainline. At approximately 06:00, the train arrived at Lake Merritt Station (A10) and admitted five additional personnel, including two train operator trainees. The trainees took turns operating the train in ATO and Road Manual modes throughout the rest of the morning.

While in Concord that morning, the crew of train #963 reported seeing several vandalized cars, and was instructed by OCC to deliver the cars to Richmond Yard. After completing the delivery operation, Train #963 departed Richmond, heading back to Concord, where the crew planned to break for lunch. This route requires a turn-around at the junction between the C and R lines at MacArthur Station (K30).

¹¹ BART Operations Control Center Manual Rev. 21, Rule 437B Automatic Track Information Service

¹² See Appendix V – C-Line Radio Communications Transcript

BART Train Collision with Two Roadway Workers

Walnut Creek, California

October 19, 2013

The two-man wayside crew, Track 80, received a Simple Approval from OCC to enter the right-of-way of both the C1 and C2 between Walnut Creek (C40) and Pleasant Hill (C50) Stations at 13:05. The two workers proceeded to milepost 16.15 on the C1 (northbound) track and began inspecting the track, using an aluminum rail gauge to take measurements. Their presence on the right-of-way was announced twice over the radio, at 13:06 and 13:07.

Train #963 confirmed its departure from MacArthur Station (K30) by radio at 13:20, operating in Road Manual mode to the K35 interlocking, Gate P. The train then switched into ATO with speed codes at 13:23. The train then departed the K35 interlocking on the C-line toward Rockridge Station (C10). The train control system logged train #963 passing through Rockridge Station at 13:28, Orinda Station (C20) at 13:33, Lafayette Station (C30) at 13:39, and Walnut Creek Station at 13:43.

According to an interview with the TOT operating the train at the time of the accident, he first observed the workers around a curve in the track. He then determined that they were both within gauge (between the tracks) and looking away from the train, applied emergency brakes and, after failed attempts, successfully sounded the train's horn.

BART Train Collision with Two Roadway Workers

Walnut Creek, California

October 19, 2013



Figure 3 – BART System Map

Train #963 made initial contact with the two roadway workers at approximately 13:44 while traveling 56 mph. The TOT immediately contacted OCC to announce the collision. OCC shut off traction power to the area at 13:47 and called BPD and Contra Costa County Fire Department (CCCFD).

BART Police Department (BPD) arrived on-site at approximately 13:51, establishing Incident Control and quickly located the bodies of the workers. CCCFD took control of the scene at 13:58, and pronounced both workers deceased.

BPD held the six employees onboard the train for approximately two hours following the accident to conduct interviews and perform post-accident drug and alcohol testing.

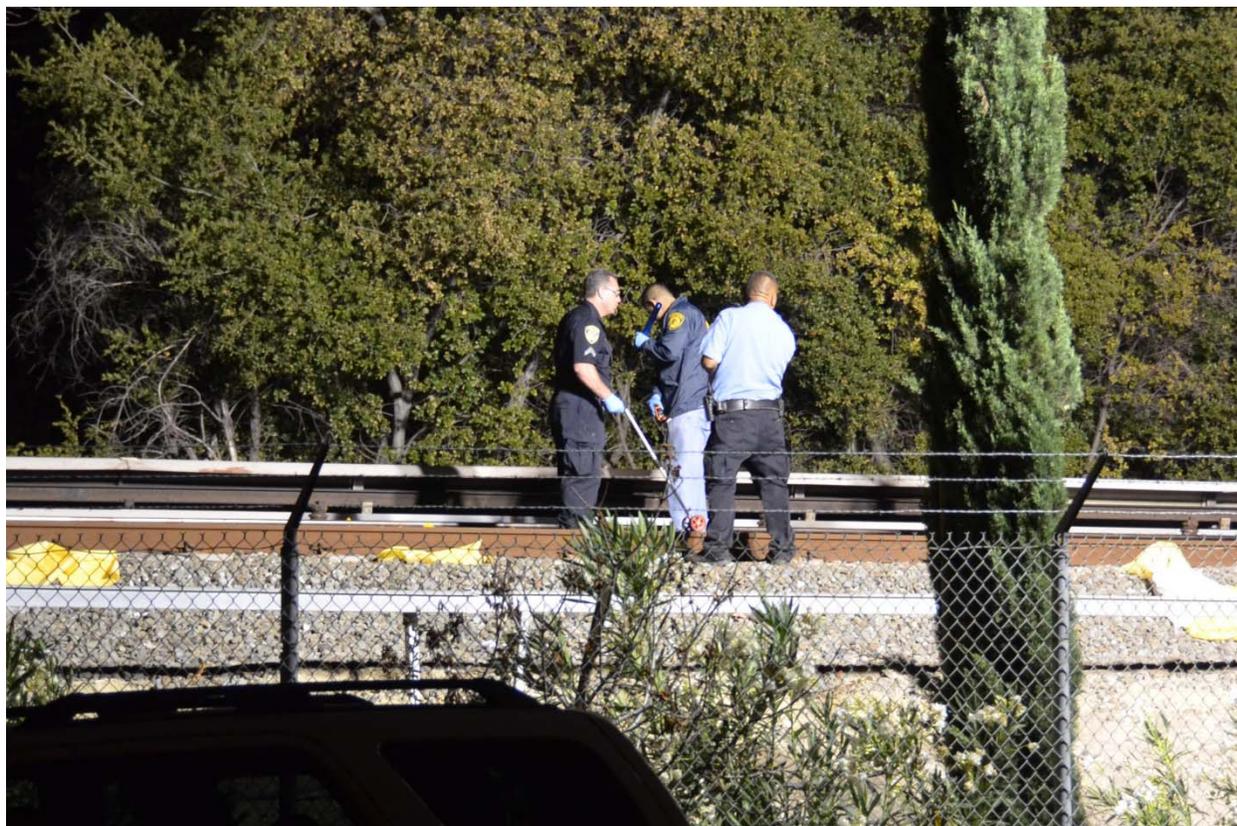


Figure 4 – BART Police Collecting Accident Site Measurements

3 EMERGENCY RESPONSE

BPD arrived at the site of the accident approximately 3 minutes after the collision and immediately setup as Incident Command. The two bodies were located and found to be unresponsive. CCCFD soon after and declared the bodies deceased, and, at approximately 13:59, took over Incident Command with BPD taking the role of Liaison. The Contra Costa County Coroner took custody and transported the two bodies off-site. At the time of this report's writing, the Coroner's report had not been released.

The BPD catalogued physical evidence of the accident, as shown in Figure 4, and held the train crew inside the train for approximately two hours. The train operator trainer and the train operator trainee both received drug and alcohol testing, as required in the Code of Federal Regulations (CFR) Title 49, Sections 655.4 and 655.44.

4 INVESTIGATION ACTIVITIES

4.1 Mechanical Inspections

Following the accident, mechanical inspectors performed an on-site visual inspections of each car in the consist, starting with the lead car #2528 and moving toward the tailing car #397. The aluminum track gauge Track 80 had been using to measure the tracks was discovered lodged under car #2528 on the right side. Car #2528 sustained damage to the left leaf of the front access door and to the lower right corner. No other defects were discovered at that time.

The consist was transported to Hayward Yard for further detailed inspections, including the undercarriages. Inspectors found that a traction motor cover was missing from car #2528, a brake caliper on car #1868 was found leaking, and a wheel on car #397 were found to have flat spots.

BART provided preliminary estimates for the damage to each of the four cars of train #963.¹³



Figure 5 – Aluminum Track Gauge Lodged under Car #2528

¹³ See Appendix VI – Initial Estimates of Monetary Damages

These values are summarized in Table 2.

Car #:	Description of Repair:	Cost:
2528	Extensive damage to front end, bio hazard clean-up (parts and labor)	\$37 207.27
1869	HVAC overhaul, electric horn (labor only)	\$2 656.50
1508	Electric coupler and inverter cover (labor only)	\$2 783.00
397	Wheel assembly (parts and labor)	\$13 550.77
Total:		\$56 197.54

Table 2 – Summary of Damages



Figure 6 – Visible Damage to Car #2528

4.2 Track Inspections

Following the accident, track inspectors found no visible indications of track geometry defects that could have contributed to the events.¹⁴

¹⁴ NTSB Factual Report DCA-14-FR-001, Bay Area Rapid Transit District Train No. 963 Collision with Two Engineering Employees on C Line at Milepost 16.2, March 25, 2014

BART Train Collision with Two Roadway Workers

Walnut Creek, California

October 19, 2013

4.3 Data Logs

Investigators inspected train control data and the train's on-board data logger to obtain precise information regarding the train's position, speed, and mode in the time leading up to the collision and immediately after.

The Integrated Computer System (ICS) provided information about when the train passed through each track circuit along the C1 Track.¹⁵

CR 14:

- Entered at 13:43:21.837
- Average speed of 63.22 mph
- Block length of 650 feet

CR 15:

- Entered at 13:43:28.847
- Average speed of 48.63 mph
- Block length of 1000 feet

CR 16:

- Entered at 13:43:42.867
- Average speed of 63.70 mph
- Block length of 663 feet

CR 17:

- Entered at 13:43:49.963
- Average speed of 74.11 mph
- Block length of 100 feet

CR 18:

- Entered at 13:43:50.883
- Average speed of 48.18 mph
- Block length of 212 feet

CR 19:

- Entered at 13:43:53.883
- Average speed of 49.71 mph
- Block length of 876 feet
- Collision occurred within this block

CR 20:

- Entered at 13:44:05.899
- Block length of 873 feet
- Train came to rest within this block

In addition to the OCC's ICS logs, investigators acquired the data loggers for each of the four involved cars, finding the following faults:¹⁶

- Car #2528: No unscheduled events

¹⁵ See Appendix VI – Initial Estimates of Monetary Damages

¹⁶ See Appendix V – C-Line Radio Communications Transcript

- Car #1869: 8 unscheduled events
- Car #1508: 4 unscheduled events
- Car #397: 10 unscheduled events

The “unscheduled events” listed above refer to momentary differences in the angular velocities between axels on a truck, indicating wheel slips associated with the emergency braking, the collision, and the presence of foreign material on the track.

4.4 *In-Cab Video Review*

NTSB requested that BART maintenance personnel retrieve the digital video recorder (DVR) from Car #2528. BART personnel immediately delivered the DVR to the NTSB’s video recorder laboratory in Washington, D.C. Representatives from each investigation party, including CPUC, were then invited to review the video in a group session, conducted at the Washington, D.C. laboratory. The video was retained by NTSB for the duration of their investigation until



Figure 7 – TOT Presses a Button Before Applying Emergency Braking

BART Train Collision with Two Roadway Workers

Walnut Creek, California

October 19, 2013

publishing their Railroad Accident Brief #15-03¹⁷.

In February, 2016, Staff requested NTSB release the video to CPUC for its investigation. RTSB received the video on February 25, 2016, and performed a review on March 1, 2016. The recording video and audio clearly depict the TOT was largely absent from the operator's cabin throughout operations preceding the accident, including the time of the collision, and indicated reluctance to perform his supervisory duties by once responding, perhaps jokingly, to the TOT's request for assistance with "How many times are you going to make me get up [from the passenger compartment]?" The TOT exhibits unfamiliarity with the train controls, often looking down at the console, asking the TO many questions, and showing difficulty in entering a route code correctly.

As the train approaches the roadway workers, the TOT appears to depress a button shortly before activating emergency braking 4.8 seconds before the train made contact with the roadway workers. Comparing Figure 7 with Figure 8, the TOT pressed the "Hold/Door Close," which is located directly above the electric horn button. No horn sound was audible in the video. After pressing the button, the TOT repeatedly pressed the emergency stop "mushroom" button while making no further attempts to sound the horn.

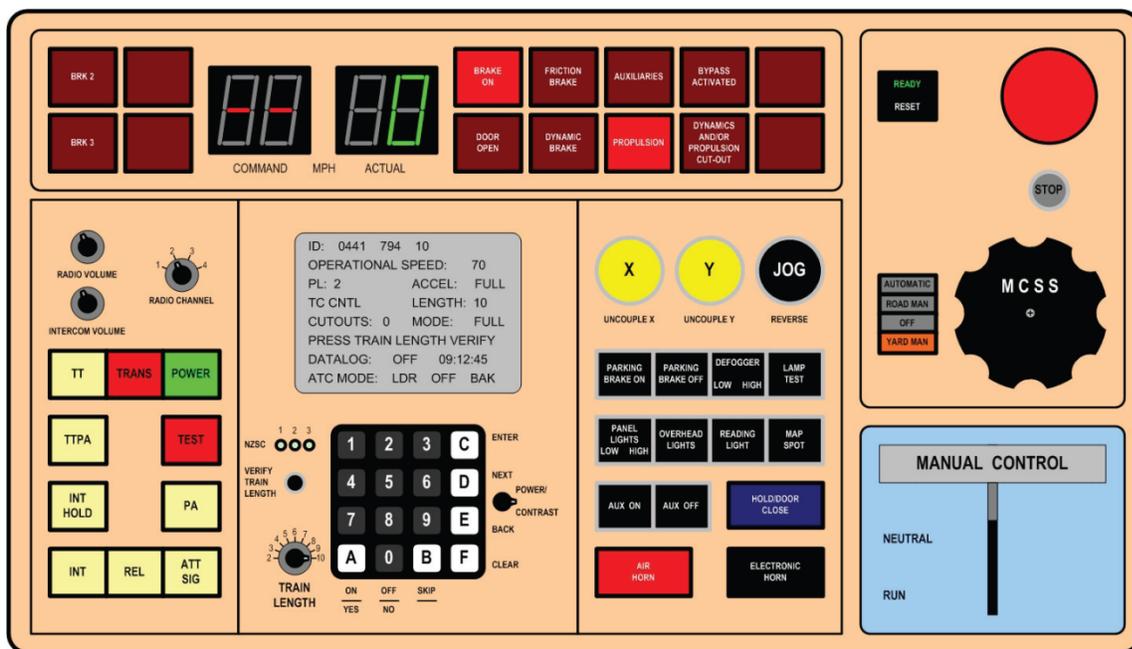


Figure 8 – Train Operator's Console Diagram¹⁸

The in-cab video also shows the speed of the train displayed on the operator's console at most times. The speed shown at moment the TOT activated emergency brakes is 68 mph, and the

¹⁷ Available through NTSB: <http://www.ntsb.gov/investigations/accidentreports/Pages/RAB1503.aspx>

¹⁸ BART Train Operator Certification Class 98 Textbook, Rev. June 2012, Page 260

speed shown at the moment of impact, 4.8 seconds later, is 56 mph. Train #963 came to a stop 25.3 seconds after the collision.

4.5 Accident Reenactment

On Wednesday, October 23, 2013, investigators from NTSB, BART, CPUC, and Cal/ OSHA participated in a series of full-scale tests at the site of the accident. Participants were situated both on a four-car consist similar to the accident train, and on the wayside near the area of impact. BART provided the test train and two certified train operators to allow for quick running direction reversals. The train embarked from Walnut Creek Station (C40) and proceeded to perform site distance tests and braking tests.

The first test brought the test train to the location of the accident, and two mannequins wearing safety vests were placed at the estimated point of impact (POI), as shown in Figure 9. The train was then reverse-run (southbound) in Road Manual mode by the second train operator at the back of the train. The train operator at the front of the train was asked to announce when the mannequins were no longer visible, and the train was stopped. Then, the train operator slowly maneuvered the train in the normal direction (northbound) to where the mannequins were first visible, then apparently within the track gauge. Both locations were verified by a CPUC investigator, and the positions were marked by wayside personnel. The distances to the estimated POI were, respectively, 1230 feet and 1135 feet.

After establishing the two locations, the train was moved south of Walnut Creek Station (C40), toward Lafayette Station (C30) and operated in ATO mode, at typical speed, northbound toward the scene of the accident for a braking test. The train operator was asked to apply emergency braking from ATO mode at the point where the mannequins were first visible, marked by traffic cones on the wayside. The stopping distance, between first application of brakes and final resting point, was approximately 1299 feet, and the train came to rest 69 feet beyond the POI.



Figure 9 – Mannequins used for Site Distance Test

A second braking test was run under similar conditions. In this trial, the train operator applied emergency braking at the location where the mannequins were apparently within the track gauge. The stopping distance was approximately 1317 feet, and the train came to rest 182 feet past the POI.

A third braking test was run, this time braking at the position estimated to be where the accident train applied emergency braking, 482 feet south of the POI. In this case, the train travelled approximately 823 feet past the POI.

Each of the tests was documented by in-cab video recorders, and by participants capturing photographs and videos from inside the train and on the wayside.

5 ANALYSIS

5.1 Maintenance Crew

The roadway workers, with radio call sign Track #80, were given wayside access through a Simple Approval, defined by the version of BART's Operations Rules and Procedures (OR&P) Manual Revision 7, Section 6200, in effect at the time of the accident. Recordings of the radio chatter indicate that the Simple Approval was requested and approved according to this section, however, the two workers failed to comply with Rule 6204, also called the 15 Second

Rule, which requires that the workers be able to clear the tracks after recognizing an approaching train 15 seconds before the train arrives at full authorized speed.

The OR&P Manual, Rule 6214 specifies what information must be provided when requesting a Simple Approval. According to the OCC radio logs, Track #80 provided all required information except one item: E. Access Point.

The roadway workers of Track #80 apparently violated Rule 6217, which requires that, whenever work is performed while fouling tracks, at least one person must be designated as a watchperson. The OR&P Manual defines a watchperson as a “qualified [trained and certified] person responsible for detecting approaching on-rail vehicles and warning the crew,” and a watchperson “shall not perform other work.”

Simple Approval is not an appropriate procedure for wayside access when all workers’ attention is to a task within the rail gauge and no watchman is present. Since no revenue trains were operating on October 19, 2014, there would have been no detriment to service by issuing a Work Area Clearance, specified in the OR&P Manual, Section 6300, and providing a form of protection from moving rail vehicles.

5.2 Operations Control Center

The Train Controller violated the OR&P, Rule 6215.F by failing to announce that the roadway workers would provide their own protection. Track #80, however, indicated they were aware of this condition of their Simple Approval in a later communication with OCC.

OR&P Rule 6209 specifies that OCC has the authority to deny a work crew’s request for Simple Approval when unusual operating conditions exist. It is up to the Train Controller’s judgment to decide when conditions are unusual. The extremely limited number of rail vehicles in operation, and the presence of uncertified trainees as train operators could be deemed unusual, but this does not constitute a definitive rule violation as the qualified and experienced Train Controller’s opinion is given precedence. Had the Train Controller invoked Rule 6209, the work could have proceeded instead under a type of Work Area Clearance.

The Train Controller also violated the OCC Manual, Section 437B, by failing to broadcast the ATIS announcement describing the location of the roadway workers at or around 13:30. While repeating the announcement at the bottom of the hour would have reminded the crew of Train #963 of the roadway workers’ presence, post-accident interviews revealed that the crew remained aware from the original announcement at 13:07. It is unlikely that this violation contributed significantly to the accident.

5.3 Train Crew

According to the TO’s interview, the only qualified Train Operator onboard Train #963 was not present in the operator’s cabin at the time of the collision or the events leading up to the accident. The TO had been working for 10 hours at the time of the accident, which is in compliance with CPUC’s requirements for hours-of-duty of Train Operators. Cellular telephone records indicate that he may have been using his device for text messaging and phone calls while simultaneously supervising the TOT, and so may have repeatedly violated GO 172,

BART Train Collision with Two Roadway Workers

Walnut Creek, California

October 19, 2013

Sections 3.1.a and 3.1.b., and BART's Use of Personal Electronic Device (PED) Policy and the Operator's Rules and Procedures Manual, Rule 1334, by not stowing his device and potentially using his phone inside the operator's cabin. Text messages sent and received less than five minutes prior to the approximate time of the accident may have distracted the TO from his supervisory duties.

Staff observed during inspections and reenactments that the forward window of a typical "C" style car has a narrow forward-facing windshield. The TOT's location away from the operator's chair combined with the distractions of his cellular telephone and the narrow windshield may have made proper observation and instruction very difficult.

The TOT operating the train at the time of the accident stated in his interview with NTSB that he had never been a revenue train operator for BART. Furthermore, the TOT was not included in BART's list of approved Train Operators for the strike. The TOT stated that he was aware of the Simple Approval in effect, and of the presence of roadway workers between Walnut Creek (C40) and Pleasant Hill (C50) Stations; however, it is evident that he lacked the necessary training and experience to act on this information in an appropriate and safe manner,. Cellular phone records and in-cab video footage do not indicate any rule violations by the TOT.

5.4 In-Cab Incident Video

The BART Train Operator Certification Textbook advises train operators to hold the right hand over the stop button while pressing the horn button with the left hand when approaching stations. This allows the operator to sound the horn while being prepared to begin stopping if necessary. While the textbook offers only guidelines, it is conceivable that a more experienced operator would have assumed this recommended position upon approaching roadway workers. Furthermore, a more experienced operator may have been better able to assess the roadway workers' position and inattention, and reacted by either sounding the louder air horn, activating emergency braking earlier, or both.

The TOT, however, did not use the two-handed technique while performing station bypasses earlier in the day. It is probable that he intended to sound the horn as the train approached the roadway workers, but instead pressed the "Hold/Door Close" button which had no effect. By failing to sound the horn, he violated the Train Operator Manual¹⁹, rule 304.

The video provides the most accurate available speed information for train #963. Given the times and speeds provided through the video, the train achieved an average braking rate of 2.53 mphps²⁰ before the collision, and 2.21 mphps after the collision.

¹⁹ BART Train Operator Manual, Book 315

²⁰ Miles per hour per second

6 CONCLUSIONS

Staff have reviewed the available evidence as outlined previously in this report, and have determined a most probable primary cause and three contributory causes. Based upon the findings of cause, Staff propose two recommendations for Corrective Actions to reduce the likelihood and severity of future accidents of similar nature.

An assessment of the noted causes and unusual operating conditions leads one to recognize that the presence of redundant protective measures may have reduced the probability of this type of accident from happening. In the case of safety, redundancy refers to multiple independent protections against accidents. That is, if one protection were to fail, another protection remains to prevent an accident. Independence of redundant protections is critical to the intended purpose of redundancies in order to avoid the case where both protections depend on the reliable operation of another system component. For example, even with two or more redundant power supplies for safety-critical devices, if each power supply runs through a common conduit, the system offers no redundant protection from, e.g., a severed conduit. In such a case, the protections all fail together due to one event. Thus, the greater the independence of redundant protections, the more truly redundant and effective in preventing a safety failure the protections are.

In the case of this accident, CPUC notes that BART had made significant changes to its rules prior to October 19, 2013, to comply with the Commission's at the time proposed General Order regarding roadway worker protection. Notably, a watchperson was then required to have no other duty than to be safely away from the tracks and look out for approaching trains, and workers must be able to identify an oncoming train and clear the trackway at least 15 seconds before its passing from either direction. However, it should be noted that these redundant measures are dependent on the same person's attentiveness and compliance. While we cannot know the thoughts of the two individuals who lost their lives in this accident, a false impression that no trains were on that line could have led to a failure to attend to the distance needed per the 15-second rule, and, at the same time, a failure to implement the watchperson protection by conferring when standing between the rails.

6.1 *Most Probable Cause*

Primary Cause

1. The two roadway workers did not designate or properly implement a watchman as required for work within the trackway under BART's Simple Approval access procedures according to the Operations Rules and Procedures Manual, Rule 6217.
2. The Train Operator Trainee failed to alert the roadway workers as he approached the worksite by sounding either the electric or the air horn, in violation of the Train Operator's Manual rule 304.
3. Operations Central Control failed to identify the unique conditions of running one revenue vehicle with one team of roadway workers as sufficiently unusual that a Simple Approval could not be granted according to BART's Operations Rules and Procedures, Section 6209.
- 4.

BART Train Collision with Two Roadway Workers

Walnut Creek, California

October 19, 2013

Contributory Causes

1. The two roadway workers' request for Simple Approval, rather than a Work Area Clearance, was inappropriate for the type of work to be performed according to BART's Operations Rules and Procedures, Section 6204. The Train Operator Trainee was unaccustomed to mainline train operations, and was not included in BART's list of approved Train Operators prior to the labor strike. Inexperience may have contributed also to the Trainee's pressing the "Hold/Door Close" button while failing to sound the horn upon approaching the roadway workers, and waiting to brake until the train could not slow down enough for the roadway workers to seek refuge.
2. The Train Operator Trainee was not directly supervised by a certified Train Operator trainer in the operator's cabin of Train #963 at the time of the accident, in accordance with BART's Operations Rules and Procedures, Sections 1401 and 1402.
3. The Transportation Officer had been using a Personal Electronic Device throughout the day while simultaneously supervising the Train Operator Trainee, distracting from his supervisory duties and potentially violating GO 172, Sections 3.1.a and 3.1.b.

6.2 Recommendations

The following two recommendations were determined to best address all known causes of the accident in question. The first recommendation was voluntarily implemented by BART on October 23, 2013, as an Interoffice Communication to OCC Staff with the subject "Simple Approvals are prohibited until further notice," followed by permanently revoked the procedures.

1. Remove Simple Approval from BART's Operations Rules and Procedures Manual.
2. Develop procedures and compliance tests to ensure that uncertified Train Operators are constantly, directly supervised by a certified Train Operator trainer during any train operations.

APPENDIX I – BART STRIKE OPERATIONS PROPOSAL

OCC Managers

Required to maintain certification on all positions in OCC. Recertification every two years.

Safety-Related Functions: Manager, Train Controller, Power/Support, Communications Specialist.

Training and Testing Criteria: OCC Manual Training, OR&P, Emergency Planning (SSPP §1103), 2012 OPS Bulletin Review, OCC Sign-For Review (OCC Train Bulletins), Wayside Access Guide Review, CPUC GO 172 and PED Review, Drug and Alcohol Testing ongoing.

Person Assigned:	Qualification:	Last Recertified:	Train Operator Recertification:
	CTO	2012-06-19	2013-06-19
	ACTO-OCC [TO]	2012-06-09	
	ACTO	2012-06-09	
	OCC Manager	2012-06-22	2013-07-02
	OCC Manager	2012-06-20	2013-07-01
	OCC Manager	2012-06-17	2013-07-01
	OCC Manager	2012-06-17	2013-07-02
	OCC Manager	2012-11-09	
	OCC Manager	2012-06-20	2013-07-04

Revenue Train Operators

Responsible for the performance of all Train Operators (T/Os), Station Agents, and Tower Foreworkers under their jurisdiction. As part of their T/O recertification, they will be required to successfully pass the Train Operator Certification Exam. Recertified every two years.

Safety-Related Function: Operation of Circulation Trains and/or Revenue Trains.

Training and Testing Criteria: OR&P, Train Operator's Manual, 2012 OPS Bulletin Review, CPUC GO 172 and PED Review, Emergency Planning (SSPP §1103), Emergency Handout Booklet, Drug and Alcohol Testing ongoing.

Person Assigned:	Qualification:	Last Recertified:	Train Operator Recertification:
	acto	2012-09-06	2013-06-19
	Training Manager	None	2013-06-19
	OCC Manager	2012-06-22	2013-07-02
	OCC Manager	2012-06-20	2013-07-01
	OCC Manager	2012-06-17	2013-07-01
	OCC Manager	2012-06-17	2013-07-02

BART Train Collision with Two Roadway Workers

Walnut Creek, California

October 19, 2013

Circulation Train Operators

Personnel have never been Train Operators. Will be required to participate in a sixteen (16) hour recertification class in addition to successfully completing Train Operator Safety and Certification exams. Two (2) days of On-the-Job Training are also required.

Safety Related Function: Operation of Circulation Trains only.

Training and Testing Criteria: Wayside Access is every two years. The training for all personnel is to be held 2013-07-31. Drug and Alcohol Testing ongoing.

Person Assigned:	Qualification:	Last Recertified:	Train Operator Recertification:
██████████	ACTO-OCC	2012-06-09	
██████████	OCC Manager	2012-06-20	2013-07-04
██████████	Maint. Manager		2013-07-04
██████████	Maint. Manager		
██████████	ACTO		

Yard Tower Controllers

Yard Tower functions will be under the direction of Transportation Managers that have been previously certified as Tower Foreworkers. Yard Tower console functions, which are not safety-related, may be carried out by qualified engineers or other non-represented professionals. Recertified every two years.

Safety-Related Functions: Yard Tower Functions.

Training and Testing Criteria: Drug and Alcohol Testing Ongoing.

Person Assigned:	Qualification:	Last Recertified:	Training Needed:
██████████	ACTO-OCC [TO]	2012-06-09	None – Previously certified as T/O and Tower Foreworker
██████████	OCC Manager	2012-06-09	None – Previously certified as T/O and Tower Foreworker
██████████	OCC Manager	2012-06-20	None – Previously certified as T/O and Tower Foreworker

BART Train Collision with Two Roadway Workers

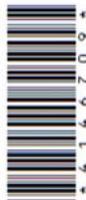
Walnut Creek, California

October 19, 2013

APPENDIX II – BART CAR MAINTENANCE RECORDS

Bay Area Rapid Transit
Maximo - Material Maintenance System

4146709: C1/C2 PM-1



Asset: 2528
Year:

C2 REVENUE CAR

Location: ODY
Manufacturer:

Operations Daily City Yard

Status: OPERATING
Type:

Sched Start:	
Sched Finish:	
Target Start:	8/29/13
Target Finish:	8/30/13
Actual Start:	9/2/13
Actual Finish:	9/2/13
Report Date:	8/29/13
Reported By:	MAXADMIN

Site:	BART
Priority:	9
Work Type:	PM
Status:	CLOSE
Parent:	
GL Account:	BARTD-0030-680010-0603634
Warranty Situation Present?	N
Component:	RSS
Position:	
Reason for Repair:	MAINT07

Job Plan:	101691
Supervisor:	
Lead:	
Owner:	
Owner Group:	
Service:	
Service Group:	
Classification:	
Work Accomplished:	PM
Part Failure:	

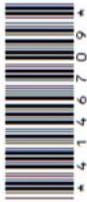
Task ID's	Description	Status	Component	Position	Reason for Repair	Work Accomplished	Part Failure	Warranty?
40	Install Floor Protective Runner	CLOSE						N
50	Clean Air Conditioning Condenser Coils	CLOSE	09-08					N
53	Clean Friction Brake Callipers	CLOSE	03-04		MAINT07	02		N
55	Clean Bombardier APSE Heatbank	CLOSE	12		MAINT07	02		N
57	Clean Hydraulic System	CLOSE	03-06		MAINT07	02		N
60	Clean Gear Unit Inspection Covers	CLOSE	07-22					N
90	Clean Wheel Witness Marks	CLOSE	07-01					N
120	Clean Evaporator Coil and Filler Box	CLOSE	05-01					N
130	Clean Air Return Grills before changing filters	CLOSE	08-09-04-02		MAINT07	02		N
200	Clean Cab Exterior	CLOSE	08-05					N
210	Clean Inertial Filter Screen (Do not wash or steam on car)	CLOSE	01-05					N
250	Remove HVAC Covers and Filters	CLOSE	07-18					N
260	Remove APSE Air Inlet Filter	CLOSE	08-09					N
270	Remove Arc Boxes and Barriers from Line Switch and Motor Control Box Contactors	CLOSE	07-08					N
280	Reinstall Arc Boxes and Barriers in Line Switch and Motor Control Box After Contact Inspection	CLOSE	07-28					N
300	Drain Moisture From Air-System Tanks and Filter Bowls	CLOSE	04-00					N
450	Check and Adjust Car Height	CLOSE	04-05					N
480	Check Current Collector Fuse U-Bolts	CLOSE	07-28					N

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Bay Area Rapid Transit
Maximo - Material Maintenance System

4146709: C1/C2 PM-1



Task ID	Description	Status	Component	Position	Reason for Repair	Work Accomplished	Part Failure	Warranty?
500	Perform Hydraulic Power Unit Checks	CLOSE	03-01					N
510	Perform Brake Control Unit Checks	CLOSE	03-03					N
540	Check HPU-BCU Filter Indicator Annunciator	CLOSE	03-01					N
550	Replace APSE Air Filter	CLOSE	11-01					N
560	Install HVAC Evaporator Air Filters	CLOSE	08-09					N
570	Install HVAC Covers	CLOSE						N
580	C-car HVAC System Check	CLOSE	08		MAINT07	44		N
590	Check Gear Unit Oil Level and Condition - see long text	CLOSE	07-22		MAINT07	06		N
593	Check Gear Unit Magnetic Plug - see long text	CLOSE	07-22		MAINT07			N
596	Drain and Replace Gear Unit Oil - see Long Text	CLOSE	07-22		MAINT07			N
600	Check Motor/Gear Unit Couplings Lubrication	CLOSE	07-21		MAINT07			N
630	Install New Traction Motor Air Filter Elements and Check Installation	CLOSE	07-01					N
640	Lubricate Brake Calipers	CLOSE	03-04					N
720	Lubricate Coupler Anchor Pin, Yoke and Head Bolts	CLOSE	01-08		MAINT07	07		N
740	Lubricate Coupler funnel, Guide Pin and Latch	CLOSE	01-08					N
770	Lubricate Side Door Exterior Crew Switches	CLOSE	02-19					N
780	Check Vehicle Interior and Exterior for Essential Decals	CLOSE	01-06					N
790	Check Vehicle Interior and Exterior for Convenience Decals	CLOSE	01-07					N
800	Lubricate End Doors	CLOSE	02-07					N
810	Lubricate Flipper Door and Check Hardware	CLOSE	02-12					N
830	Check Side Door Operator Gear Box and Mechanical Linkage	CLOSE	02-05					N
850	Check Cab Door Operation	CLOSE	02-08					N
870	Check Fire Extinguishers Tag Date	CLOSE	01-06					N
880	Check for Emergency Ladder	CLOSE	01-06					N
890	Check for Checks	CLOSE						N
900	Check Hand Hold and Access Steps	CLOSE	01-07					N
902	Check hand strap quantity and general condition per VMS 12-41 revised 7/30/12.	CLOSE	01-06-369-01		MAINT07			N
906	Complete T/M Cab Systems Check Items 1 thru 11	CLOSE						N
907	Complete ET Cab System Check Items 12 thru 32	CLOSE						N
910	Clear Propulsion and Brake Fault Data	CLOSE	07-36					N
915	Check Semiconductor Box Capacitors and Thermal Tape	CLOSE						N

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4146709: C1/C2 PM-1



Task ID	Item	Description	Component	Position	Reason for Repair	Work Accomplished	Part Failure	Warranty?	Qty	Unit Cost	Line Cost
	1005248	CABLE,BCU Y-END CUTOOUT FURON CO.P/N 36091-031,IPC:						N	1	195.93	195.93

Total Actual Materials: 195.93

Related Records	WO	Description	Class	Status	Relationship
	3033317	C1/C2 PM-1	WORKORDER	CLOSE	RELATED
	3776400	C1/C2 PM-1	WORKORDER	CLOSE	RELATED
	4038562	C1/C2 PM-1	WORKORDER	CLOSE	RELATED

Log	Date	Class	Created By	Subject	Description	Long Description
	9/3/13	WORKORDER	060424		completed assigned tasks	

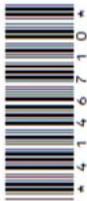
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BART Train Collision with Two Roadway Workers
Walnut Creek, California
October 19, 2013

Bay Area Rapid Transit
Maximo - Material Maintenance System

4146710: Complete PM-1 Scheduled Checks



Asset: 2528
Year: C2 REVENUE CAR

Location: ODY
Manufacturer:

Operations Daily City Yard

Status: OPERATING
Type:

CI:

Sched Start:	
Sched Finish:	
Target Start:	8/29/13
Target Finish:	8/29/13
Actual Start:	9/3/13
Actual Finish:	9/3/13
Report Date:	8/29/13
Reported By:	MAXADMIN

Site:	BART
Priority:	9
Work Type:	PM
Status:	CLOSE
Parent:	4146709
GL Account:	BARTD-0030-680010-0803634
Warranty Situation Present?	N
Component:	RSS
Position:	
Reason for Repair:	MAINT07

Job Plan:	101664
Supervisor:	
Lead:	
Owner:	
Owner Group:	
Service:	
Service Group:	
Classification:	
Work Accomplished:	06
Part Failure:	

Task ID	Description	Status	Component	Position	Reason for Repair	Work Accomplished	Part Failure	Warranty?
20	Q: Check Traction Motors	CLOSE	07-01					N
30	T: Check for Loose Tachometer Rings	CLOSE						N
40	Q: Wheel Checks	CLOSE						N
70	Q: Check Axle Roller Bearings	CLOSE						N
80	Q: Check Axle Roller Bearing Sleeves	CLOSE						N
90	Q: Check Brake Disc and Mounting Hardware	CLOSE						N
100	T: Check Brake Lining Wear	CLOSE						N
110	T: Check Brake Callipers	CLOSE						N
120	T: Check Brake Caliper Mounting Brackets	CLOSE						N
130	T: Check Caliper Pin/Bushing Wear when pads are changed	CLOSE						N
140	T: Check Brake Caliper Sliding Shaft Bore Elongation	CLOSE						N
150	T: Check Leveling Valves	CLOSE						N
160	T: Check Horizontal and Vertical Shock Absorbers	CLOSE						N
165	Q: Check Antenna Mounting Brackets for Cracks	CLOSE	10-14	MAINT07	06			N
170	T: Check Safety Wire HPU Dump Handle	CLOSE						N
180	E: Check Motor Control and Line Switch Box Contactors	CLOSE						N
190	T: Check Collector Assembly Parts for Cracks and Paddle Wear Limits	CLOSE						N
200	Q: Retractable and Automatic Car coupler Checks	CLOSE	01-08	MAINT07	06			N
210	E: Check Coupler Electrical Contacts and Cover for Damage	CLOSE						N

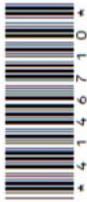
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BART Train Collision with Two Roadway Workers
Walnut Creek, California
October 19, 2013

Bay Area Rapid Transit
 Maximo - Material Maintenance System

4146710: Complete PM-1 Scheduled Checks



Task ID	Description	Status	Component	Position	Reason for Repair	Work Accomplished	Part Failure	Warranty?
220	Q: Perform Uncoupling Valve Air Leakage Test on X and Y Ends	CLOSE						N
260	Q: Check Condition of Bumper Still Mounts	CLOSE	01-07					N
265	T: Intercar Barriers Check	CLOSE	01-07-440-01		MAINT07	06		N
270	Q: General Undercar Checks	CLOSE						N
273	Q: Check ATC Vital Relays Calibration Due Date	CLOSE	10-25		MAINT07	41		N
275	Q: Associate Installed Car Sub-Asset Serial Numbers in Maximo	CLOSE						N
280	Q: Check for Grease, Oil and Air Leaks	CLOSE						N
290	T: Check Condition of Equipment Cover Latches	CLOSE						N
310	T: Check Supply of "This Door Not Working" Decal	CLOSE						N
320	T: Check Interior Car for Hazards	CLOSE	01-06					N
330	Q: Check Side Door Operation for Chattering, Binding.	CLOSE	02-06					N
340	Q: Verify Doors Pass 3/4" Dia. Rod Release Test	CLOSE	02-05					N
350	Q: Check Door Out-Sensor and Crew Switch Operation	CLOSE	02-02					N
360	Q: Check Side Door Operators Limit Switches Operation	CLOSE	02-05					N
370	Q: Check Side Door Open/Closing Timing at all Doors	CLOSE	02-05					N
380	T: Check Operation of End Doors	CLOSE	02-07					N
390	E: Check Flipper Door Operation	CLOSE	02-12					N
400	E: Door Relay Panel Checks	CLOSE						N
410	Q: Check Emergency Handle Operation	CLOSE	02-05					N

Task ID	Craft	Skill Level	Labor	Component	Position	Reason for Repair	Work Accomplished	Part Failure	Warranty?	Contract Num	Regular Hours	Premium Hours	Line Cost
M4830			055170	RSS		MAINT07	06		N		01:00	00:00	0.00
MA825			045323	RSS		MAINT07	06		N		02:00	00:00	0.00
M4830			056457	RSS		MAINT07	06		N		02:00	00:00	0.00
M4830			056288	RSS		MAINT07	06		N		01:30	00:00	0.00
000035			060424	RSS		MAINT07	06		N		02:30	00:00	0.00
Total Actual Labor:											0.00	0.00	0.00

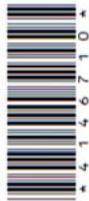
Log	Date	Class	Created By	Subject	Description	Long Description
	9/3/13	WORKORDER	055170		completed assigned inspection tasks	
	9/3/13	WORKORDER	000424		all scheduled checks completed	
Asset: 2528		C2 REVENUE CAR		Location: ODY	Operations Day City Yard	Status: OPERATING

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BART Train Collision with Two Roadway Workers
Walnut Creek, California
October 19, 2013

Bay Area Rapid Transit
Maximo - Material Maintenance System

4146710: Complete PM-1 Scheduled Checks



Year:

City:

Manufacturer:

Type:

Sched Start:	
Sched Finish:	
Target Start:	8/29/13
Target Finish:	8/29/13
Actual Start:	9/3/13
Actual Finish:	9/3/13
Report Date:	8/29/13
Reported By:	MAX-ADMIN

Site:	BART
Priority:	9
Work Type:	PM
Status:	CLOSE
Parent:	4146709
GL Account:	BARTD-0030-660010-6603634
Warranty Situation Present?	N
Component:	RSS
Position:	
Reason for Repair:	MAINT07

Job Plan:	101664
Supervisor:	
Lead:	
Owner:	
Owner Group:	
Service:	
Service Group:	
Classification:	
Work Accomplished:	06
Part Failure:	

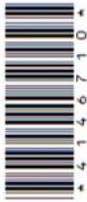
Task ID	Description	Status	Component	Position	Reason for Repair	Work Accomplished	Part Failure	Warranty?
20	Q: Check Traction Motors	CLOSE	07-01					N
30	T: Check for Loose Tractor Rings	CLOSE						N
40	Q: Wheel Checks	CLOSE						N
70	Q: Check Axle Roller Bearings	CLOSE						N
80	Q: Check Axle Roller Bearing Sleeves	CLOSE						N
90	Q: Check Brake Disc and Mounting Hardware	CLOSE						N
100	T: Check Brake Lining Wear	CLOSE						N
110	T: Check Brake Callipers	CLOSE						N
120	T: Check Brake Caliper Mounting Brackets	CLOSE						N
130	T: Check Caliper Pin/Bushing Wear when pods are changed	CLOSE						N
140	T: Check Brake Caliper Sliding Shaft Bore Elongation	CLOSE						N
150	T: Check Leveling Valves	CLOSE						N
160	T: Check Horizontal and Vertical Shock Absorbers	CLOSE						N
165	Q: Check Antenna Mounting Brackets for Cracks	CLOSE	10-14		MAINT07	06		N
170	T: Check Safety Wire HFU Dump Handle	CLOSE						N
180	E: Check Motor Control and Line Switch Box Contactors	CLOSE						N
190	T: Check Collector Assembly Parts for Cracks and Puddle Wear Limits	CLOSE						N
200	Q: Retractable and Automatic Car coupler Checks	CLOSE	01-08		MAINT07	06		N
210	E: Check Coupler Electrical Contacts and Cover for Damage	CLOSE						N
220	Q: Perform Uncoupling Valve Air Leakage Test on X and Y Ends	CLOSE						N

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10/22/2013 12:48

Bay Area Rapid Transit
Maximo - Material Maintenance System

4146710: Complete PM-1 Scheduled Checks



Task ID	Description	Status	Component	Position	Reason for Repair	Work Accomplished	Part Failure	Warranty?
260	Q: Check Condition of Bumper Sill Mounts	CLOSE	01-07					N
265	T: Inter-car Barriers Check	CLOSE	01-07-440-01		MAINT07	06		N
270	Q: General Undercar Checks	CLOSE						N
273	Q: Check ATC Vital Relays Calibration Due Date	CLOSE	10-25		MAINT07	41		N
275	Q: Associate Installed Car Sub-Asset Serial Numbers in Maximo	CLOSE						N
280	Q: Check for Grease, Oil and Air Leaks	CLOSE						N
290	T: Check Condition of Equipment Cover Latches	CLOSE						N
310	T: Check Supply of "This Door Not Working" Decal	CLOSE	01-06					N
320	T: Check Interior Car for Hazards	CLOSE	02-06					N
330	Q: Check Side Door Operation for Chattering, Binding,	CLOSE	02-05					N
340	Q: Verify Doors Pass 34" Dia. Rod Release Test	CLOSE	02-02					N
350	Q: Check Door Cut-Out Sensor and Crew Switch Operation	CLOSE	02-05					N
360	Q: Check Side Door Operators Limit Switches Operation	CLOSE	02-05					N
370	Q: Check Side Door Open/Closing Timing at all Doors	CLOSE	02-07					N
380	T: Check Operation of End Doors	CLOSE	02-12					N
390	E: Check Flipper Door Operation	CLOSE						N
400	E: Door Relay Panel Checks	CLOSE						N
410	Q: Check Emergency Handle Operation	CLOSE	02-05					N

Actual Labor

Task ID	Craft	Skill Level	Labor	Component	Position	Reason for Repair	Work Accomplished	Part Failure	Warranty?	Contract Num	Regular Hours	Premium Hours	Line Cost
MA830			055170	RSS		MAINT07	06		N		01:00	00:00	0.00
MA825			045323	RSS		MAINT07	06		N		02:00	00:00	0.00
MA830			056457	RSS		MAINT07	06		N		02:00	00:00	0.00
MA830			056288	RSS		MAINT07	06		N		01:30	00:00	0.00
000035			060424	RSS		MAINT07	06		N		02:30	00:00	0.00
Total Actual Labor:											0.00	0.00	

Log

Date	Class	Created By	Subject	Description	Long Description
9/3/13	WORKORDER	055170		completed assigned inspection tasks	
9/3/13	WORKORDER	060424		all scheduled checks completed	

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10/22/2013 12:48

BART Train Collision with Two Roadway Workers

Walnut Creek, California

October 19, 2013

APPENDIX III – BART PRELIMINARY INCIDENT REPORT

 PRELIMINARY INCIDENT REPORT		Report Date: Oct. 19, 2013	
		Incident date: Oct. 19, 2013	
Incident Description: Train 963 reported striking an individual wayside at appx. 16.1, C1 at 1344 hours. Supervisors Name: Randall Roderick Time On Scene: 1602 Hours at Operations Control Center (OCC)			
Assisting Supervisor Name :		None	Time On Scene: N/A
Incident Commander #1; ACTO		Case No. N/A	
Departments On Site: Transportation, Safety, BPD			
Equipment: N/A		Car No's.: [2528 – 1869 – 1508 – 397] All GO cars	
Damage: Undetermined at this time			Amount: Unknown
Patron(s) Injured –Number: Two		Type Injuries: Confirmed two fatalities	
Environment N/A	Milepost: Approx	Interlocking:	Time of Incident:
Location of Station: N/A	16.1-16.2 C1	N/A	1344 hours
Conditions: N/A	Track: C1		Aerial/grade/tube/tunnel: Grade; Grade
Personnel Involved:			
Employee Name: ██████████		Hire Date:	Work Hours:
		Employee I.D. 056776	RDOs: Sun-Mon 0600-1800: Tue- Sat
Status: Out of Service pending Post Accident Drug & Alcohol test results			
<p>The following is a statement given by ██████████ who stated he began his shift at 0600 hours on 10/19/2013 and reported he had adequate sleep, was well rested, no illnesses or impairments. ██████████ took a baby aspirin, high blood pressure and cholesterol medicine this morning. No other medicine was reported. He also stated no PEDs were on his position or workstation at the time of the incident. ██████████ has worked for BART for 14 ½ years and 6 ½ years in his present position of Manager, Operations Control Center (OCC).</p> <p>At the time of the incident, ██████████ was performing Train Controller duties and had been on the console since 0600 hours. Prior to the incident, ██████████ characterized the day's events a "typical". There were two trains on mainline throughout the day, one currently in Richmond Yard and the second Train 963 (T963) was returning to Concord Yard after delivering graffiti cars to Richmond Yard. Just prior to the incident, ██████████ was looking at the main display board when he heard a couple of "clicks" from a radio. ██████████ was about to ask who was calling when T963 called with a BART emergency and reported that they possibly struck people wayside at 16.1C1, a location he realized a track unit had been issued a Simple Approval (SA).</p>			

The area was isolated; third rail power removed and he contacted BPD about the situation. At 1347 hours, ACTO [REDACTED] was issued W/O's to conduct a "Walk-Around" inspection who located a body wayside. At 1355 hours, Officer #150 (Washington) became Incident Commander (IC). BPD I.C. believed there were two casualties at the incident site. The FD then became I.C. [REDACTED] continued to direct resources to the incident site.

Earlier, Track #81 called for a Simple Approval (S/A). At 1305 hours, Track #80, party of two (Track #81 was the second person in the party) was issued a (SA) for all tracks from Walnut Creek (C40) to Pleasant Hill (C50), excluding platform tracks. [REDACTED] believed during the discussion it was Track #81). At 1307 hours, an ATIS announcement was made regarding the SA issued.

Drug and Alcohol Test: Yes No

Chronological order of Events:

1344 hours: T963 reported striking individuals at approximately 16.2, C1 track. Reports they might be BART employees.

1346 hours: T963 issued hold instructions.

1346 hours: Power off at incident site

1347 hours: T963 issues Work Orders all tracks. T963 reports one body at 16.15, C1, soon after reports two bodies.

1355 hours: BPD I.C.

<p>Witness' Statement: N/A</p> <p>Drug and Alcohol Test: Yes <input checked="" type="checkbox"/> No <input type="checkbox"/></p> <p>Supervisor' Narrative: I arrives at the Operations Control Center at 1602 hours and immediately interviewed [REDACTED] on the C40 Incident that occurred at 1344 hours at approx. M.P. 16.1, C1 track. This is a preliminary report. This incident is under investigation.</p> <p>cc:</p> <ul style="list-style-type: none"> P. Oversier R. Crespo Line ACTO Operations Control Center (X6751) System Safety <p>Cc: Incident Report Revised: April 17, 1996</p>			

BART Train Collision with Two Roadway Workers

Walnut Creek, California

October 19, 2013

BAY AREA RAPID TRANSIT DISTRICT
UNUSUAL OCCURRENCE REPORT

This form to be used only for the reporting of UNUSUAL OCCURRENCES, INCIDENTS, IRREGULARITIES or PHYSICAL DAMAGE TO DISTRICT PROPERTY, including FIRE DAMAGE. In all cases of accident or personal injury, Accident/Injury Report, Form No. 0345 shall be used. The Supervisor's Report of Employee Injury, Form No. 0030 shall be used for employee injuries. See reverse side of this form for fill-in instructions and use it to record additional information.

1. DEPT. Trans SECTION OCC
4. DATE OF INCIDENT 10 19 13 HOUR 1353
2. DATE OF REPORT 10 19 13
3. FILE NO.

5. MILEPOST 16.1-16.2 TRACK NO.
6. RUN NO. T963 TRAIN NO. T963

7. IDENTIFY INDIVIDUALS INVOLVED OR WITNESSING THE INCIDENT (IF BART EMPLOYEE, IDENTIFY BY PLACING AN ASTERISK IMMEDIATELY AFTER THE EMPLOYEE'S NAME)
NAME * ADDRESS

8. DESCRIBE OCCURRENCE AND IDENTIFY SPECIFIC LOCATION (STATE FULLY AND CLEARLY WHAT HAPPENED, USING REVERSE SIDE OF FORM, IF NECESSARY):
T963 called with emergency. Reported possible strike of power wayside @ MP 16.1-16.2 (CI) held train powered off, issued work order for work-around.
NOTIFIED SPD, requested EMS completed isolation of area
NOTIFIED Chain of Command
(OVER)

9. DESCRIBE DAMAGE AND IDENTIFY PROPERTY (INCLUDING FIRE DAMAGE) (STATE FULLY AND CLEARLY, USING REVERSE SIDE OF FORM, IF NECESSARY):

10. ACTION TAKEN BY SUBMITTER (DESCRIBE CORRECTIVE ACTION TAKEN OR NEEDED TO ELIMINATE PROBLEMS, USING REVERSE SIDE OF FORM, IF NECESSARY):

11. SUBMITTED BY: (SIGNATURE) [Redacted] I.D. NO. 056776
TITLE OCC Manager

12. ACTION TAKEN BY SUPERVISOR: (SUBMIT PERSONAL OBSERVATIONS, SUGGESTIONS OR RECOMMENDATIONS, USING REVERSE SIDE, IF NECESSARY):
This incident is under investigation

REFERRED TO: POLICE SAFETY FACILITIES MAINTENANCE PASSENGER SERVICES RAIL OPS CENTRAL
STATION OPERATIONS INSURANCE OTHER
ACTION REQUIRED: INVESTIGATION INFORMATION ONLY FOLLOW-UP
SUPERVISOR'S SIGNATURE [Redacted] DATE 10/19/13

FORM NO. 0348 (REV. 4/3/92)

INSTRUCTIONS:

Line



Line

1. Enter Department and Section
2. Date: Use figures, e.g.: 11/1/71
3. File No.: Do not fill in - completed by supervisor.
4. Date of Incident: Use figures, e.g.: 11/1/71
5. Milepost: if STATION, YARD or OTHER is checked, identify. Hour: Use 24 hour system
6. Self-explanatory.
7. If more than two persons are involved, use space provided below.
8. Describe occurrence. Use space provided below if more space is needed to complete.
9. Self-explanatory. Use space provided below if more space is needed to complete.
10. Action Taken: Use space provided below if more space is needed to complete.
11. Self-explanatory.
12. Do not fill in - completed by Supervisor.
13. Action take by _____ Department (Submit personal observations, suggestions, or recommendations).

Identify by Line Number additional information:

but I had issued TBI (part 2) single approval
earlier for area: C40 to C50 Both Tracks e approx 1300

APPENDIX IV – UNBILLED CELLULAR VOICE AND TEXT MESSAGE USAGE

TO Voice Usage

Wireless

Current Usage

Details for: 510-376-4515

The following reflects current usage since your last statement

Minutes Messages Data

Download

Anytime Minutes Used : 181 minutes
 Cycle ends 11/07/2013

Previous | 1 | 2 | 3 | 4 | 5 | Next

Date	Time	Number	Minutes	Desc
10/20/2013	04:44 PM		2	INCOMING
10/20/2013	03:44 PM		8	HAYWARD
10/20/2013	03:33 PM		11	HAYWARD
10/20/2013	03:23 PM		4	OAKLAND
10/20/2013	01:44 PM		1	INCOMING
10/20/2013	12:44 PM		18	INCOMING
10/20/2013	12:32 PM		2	CONCORD
10/20/2013	12:29 PM		1	INCOMING
10/20/2013	10:28 AM		1	OAKLAND
10/20/2013	10:19 AM		3	INCOMING
10/20/2013	10:16 AM		3	INCOMING
10/19/2013	08:51 PM		3	OAKLAND
10/19/2013	07:17 PM		1	INCOMING
10/19/2013	05:08 PM		1	INCOMING
10/19/2013	04:16 PM		2	OAKLAND
10/19/2013	03:33 PM		7	OAKLAND
10/19/2013	03:28 PM		5	CONCORD
10/19/2013	03:23 PM		5	OAKLAND
10/19/2013	03:18 PM		1	INCOMING
10/19/2013	02:57 PM		3	INCOMING

Date	Time	Number	Minutes	Desc
10/19/2013	02:54 PM		3	INCOMING
10/19/2013	02:19 PM		1	INCOMING
10/19/2013	02:15 PM		2	OAKLAND
10/19/2013	02:03 PM		5	OAKLAND
10/19/2013	02:03 PM		1	OAKLAND
10/19/2013	02:02 PM		1	OAKLAND
10/19/2013	01:59 PM		3	CONCORD
10/19/2013	01:56 PM		1	INCOMING
10/19/2013	12:25 PM		1	INCOMING
10/19/2013	12:08 PM		5	INCOMING
10/19/2013	11:29 AM		2	OAKLAND
10/19/2013	10:56 AM		3	OAKLAND
10/19/2013	10:18 AM		5	INCOMING
10/19/2013	10:01 AM		5	OAKLAND
10/19/2013	09:53 AM		1	INCOMING
10/19/2013	09:48 AM		5	INCOMING
10/19/2013	09:47 AM		3	OAKLAND
10/19/2013	09:46 AM		1	OAKLAND
10/19/2013	09:45 AM		1	OAKLAND
10/19/2013	09:41 AM		5	OAKLAND

Unbilled Usage
 Cellular

182

10/19/13

BART Train Collision with Two Roadway Workers
Walnut Creek, California
October 19, 2013

TO Text Message Usage
Wireless

Current Usage

Details for: 510-376-4515



-TEXT

The following reflects current usage since your last statement

Minutes	Messages	Data
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10/19/13

Download

Cycle ends 11/07/2013

Text Messaging Usage Type:

7 Pages

Date	Time	To	From	Direction	Message Type
10/20/2013	10:07 AM			Outgoing	IN NETWORK
10/20/2013	09:24 AM			Outgoing	DOMESTIC
10/20/2013	09:21 AM			Incoming	DOMESTIC
10/19/2013	11:38 PM			Outgoing	DOMESTIC
10/19/2013	11:37 PM			Outgoing	IN NETWORK
10/19/2013	11:35 PM			Outgoing	IN NETWORK
10/19/2013	11:15 PM			Incoming	IN NETWORK
10/19/2013	09:51 PM			Outgoing	IN NETWORK
10/19/2013	09:35 PM			Incoming	IN NETWORK
10/19/2013	09:30 PM			Incoming	DOMESTIC
10/19/2013	08:42 PM			Incoming	IN NETWORK
10/19/2013	08:19 PM			Incoming	IN NETWORK
10/19/2013	08:16 PM			Outgoing	IN NETWORK
10/19/2013	08:15 PM			Outgoing	IN NETWORK
10/19/2013	08:10 PM			Incoming	IN NETWORK
10/19/2013	08:08 PM			Incoming	IN NETWORK
10/19/2013	07:54 PM			Outgoing	IN NETWORK
10/19/2013	07:52 PM			Incoming	IN NETWORK
10/19/2013	07:51 PM			Outgoing	IN NETWORK
10/19/2013	07:49 PM			Outgoing	IN NETWORK
10/19/2013	07:46 PM			Incoming	IN NETWORK
10/19/2013	07:37 PM			Outgoing	IN NETWORK
10/19/2013	07:35 PM			Incoming	IN NETWORK
10/19/2013	07:34 PM			Outgoing	IN NETWORK
10/19/2013	07:27 PM			Outgoing	IN NETWORK
10/19/2013	07:27 PM			Incoming	IN NETWORK
10/19/2013	07:16 PM			Outgoing	IN NETWORK
10/19/2013	07:09 PM			Incoming	IN NETWORK
10/19/2013	07:07 PM			Outgoing	IN NETWORK
10/19/2013	07:07 PM			Incoming	IN NETWORK
10/19/2013	06:47 PM			Outgoing	DOMESTIC
10/19/2013	06:47 PM			Incoming	IN NETWORK
10/19/2013	06:47 PM			Outgoing	IN NETWORK
10/19/2013	06:46 PM			Outgoing	IN NETWORK
10/19/2013	06:45 PM			Outgoing	IN NETWORK
10/19/2013	06:44 PM			Incoming	IN NETWORK
10/19/2013	06:43 PM			Incoming	IN NETWORK
10/19/2013	06:42 PM			Outgoing	IN NETWORK
10/19/2013	06:37 PM			Incoming	DOMESTIC
10/19/2013	06:20 PM			Outgoing	DOMESTIC

*UNBILLED
 USAGE.*

BART Train Collision with Two Roadway Workers

Walnut Creek, California

October 19, 2013

Date	Time	To	From	Direction	Message Type
10/19/2013	08:19 PM			Outgoing	IN NETWORK
10/19/2013	08:16 PM			Incoming	DOMESTIC
10/19/2013	08:15 PM			Outgoing	DOMESTIC
10/19/2013	08:15 PM			Incoming	IN NETWORK
10/19/2013	08:14 PM			Outgoing	DOMESTIC
10/19/2013	08:14 PM			Incoming	DOMESTIC
10/19/2013	08:13 PM			Outgoing	DOMESTIC
10/19/2013	08:12 PM			Outgoing	IN NETWORK
10/19/2013	08:11 PM			Incoming	DOMESTIC
10/19/2013	08:07 PM			Incoming	IN NETWORK
10/19/2013	08:06 PM			Incoming	IN NETWORK
10/19/2013	05:59 PM			Incoming	DOMESTIC
10/19/2013	05:42 PM			Outgoing	IN NETWORK
10/19/2013	04:53 PM			Incoming	IN NETWORK
10/19/2013	04:39 PM			Outgoing	IN NETWORK
10/19/2013	04:39 PM			Outgoing	DOMESTIC
10/19/2013	04:36 PM			Incoming	DOMESTIC
10/19/2013	03:58 PM			Incoming	IN NETWORK
10/19/2013	03:57 PM			Outgoing	IN NETWORK
10/19/2013	03:53 PM			Outgoing	IN NETWORK

Date	Time	To	From	Direction	Message Type
10/19/2013	03:51 PM			Incoming	IN NETWORK
10/19/2013	03:47 PM			Outgoing	IN NETWORK
10/19/2013	03:46 PM			Incoming	IN NETWORK
10/19/2013	03:45 PM			Outgoing	IN NETWORK
10/19/2013	03:43 PM			Incoming	IN NETWORK
10/19/2013	03:42 PM			Outgoing	IN NETWORK
10/19/2013	03:40 PM			Incoming	IN NETWORK
10/19/2013	03:32 PM			Outgoing	IN NETWORK
10/19/2013	03:23 PM			Outgoing	IN NETWORK
10/19/2013	03:18 PM			Incoming	IN NETWORK
10/19/2013	03:09 PM			Incoming	IN NETWORK
10/19/2013	03:09 PM			Outgoing	IN NETWORK
10/19/2013	03:08 PM			Outgoing	IN NETWORK
10/19/2013	03:08 PM			Incoming	IN NETWORK
10/19/2013	03:03 PM			Incoming	IN NETWORK
10/19/2013	03:03 PM			Outgoing	IN NETWORK
10/19/2013	02:56 PM			Incoming	IN NETWORK
10/19/2013	02:55 PM			Incoming	IN NETWORK
10/19/2013	02:53 PM			Outgoing	IN NETWORK
10/19/2013	02:41 PM			Incoming	IN NETWORK

Date	Time	To	From	Direction	Message Type
10/19/2013	02:39 PM			Outgoing	IN NETWORK
10/19/2013	02:08 PM			Outgoing	DOMESTIC
10/19/2013	02:06 PM			Incoming	DOMESTIC
10/19/2013	01:59 PM			Incoming	IN NETWORK
10/19/2013	01:48 PM			Incoming	IN NETWORK
10/19/2013	01:43 PM			Outgoing	IN NETWORK
10/19/2013	01:40 PM			Incoming	IN NETWORK
10/19/2013	01:37 PM			Outgoing	IN NETWORK
10/19/2013	01:35 PM			Incoming	IN NETWORK
10/19/2013	01:33 PM			Outgoing	IN NETWORK
10/19/2013	01:29 PM			Incoming	IN NETWORK
10/19/2013	01:25 PM			Outgoing	IN NETWORK
10/19/2013	01:21 PM			Incoming	IN NETWORK
10/19/2013	12:39 PM			Outgoing	IN NETWORK
10/19/2013	12:26 PM			Outgoing	IN NETWORK
10/19/2013	12:24 PM			Incoming	IN NETWORK
10/19/2013	11:37 AM			Outgoing	IN NETWORK
10/19/2013	11:36 AM			Outgoing	IN NETWORK
10/19/2013	11:18 AM			Outgoing	IN NETWORK
10/19/2013	10:18 AM			Outgoing	IN NETWORK

BART Train Collision with Two Roadway Workers
Walnut Creek, California
October 19, 2013

Wireless

Current Usage

Details for:

The following reflects current usage since your last statement

Minutes | Messages | Data

Download

Cycle ends 11/07/2013

Text Messaging

Previous | 10 | 11 | 12 | 13 | 14 | Next

Date	Time	To	From	Direction	Message Type
10/19/2013	10:16 AM			Incoming	IN NETWORK
10/19/2013	10:03 AM			Incoming	IN NETWORK
10/19/2013	08:50 AM			Outgoing	IN NETWORK
10/19/2013	08:50 AM			Incoming	IN NETWORK
10/19/2013	08:49 AM			Incoming	IN NETWORK
10/19/2013	08:48 AM			Outgoing	IN NETWORK
10/19/2013	08:46 AM			Incoming	IN NETWORK
10/19/2013	08:44 AM			Outgoing	IN NETWORK
10/19/2013	08:43 AM			Outgoing	IN NETWORK
10/19/2013	08:43 AM			Incoming	IN NETWORK
10/19/2013	08:36 AM			Incoming	IN NETWORK
10/19/2013	08:05 AM			Outgoing	DOMESTIC
10/19/2013	07:41 AM			Incoming	DOMESTIC
10/19/2013	07:41 AM			Incoming	DOMESTIC
10/19/2013	07:36 AM			Outgoing	DOMESTIC
10/19/2013	07:36 AM			Outgoing	IN NETWORK
10/19/2013	07:34 AM			Incoming	IN NETWORK
10/19/2013	07:31 AM			Incoming	DOMESTIC
10/19/2013	07:31 AM			Incoming	DOMESTIC
10/19/2013	07:30 AM			Incoming	IN NETWORK

Date	Time	To	From	Direction	Message Type
10/19/2013	07:27 AM			Outgoing	IN NETWORK
10/19/2013	07:25 AM			Outgoing	IN NETWORK
10/19/2013	07:22 AM			Outgoing	IN NETWORK
10/19/2013	07:21 AM			Incoming	IN NETWORK
10/19/2013	06:45 AM			Incoming	IN NETWORK
10/19/2013	06:45 AM			Outgoing	IN NETWORK
10/19/2013	06:44 AM			Outgoing	IN NETWORK
10/19/2013	06:31 AM			Outgoing	IN NETWORK
10/19/2013	06:31 AM			Outgoing	IN NETWORK
10/19/2013	06:19 AM			Incoming	IN NETWORK
10/19/2013	06:09 AM			Incoming	IN NETWORK
10/19/2013	06:02 AM			Incoming	IN NETWORK
10/19/2013	05:19 AM			Incoming	IN NETWORK
10/19/2013	04:43 AM			Outgoing	IN NETWORK
10/18/2013	11:26 PM			Outgoing	IN NETWORK
10/18/2013	11:02 PM			Incoming	IN NETWORK
10/18/2013	10:21 PM			Outgoing	IN NETWORK
10/18/2013	10:07 PM			Incoming	IN NETWORK
10/18/2013	10:07 PM			Incoming	IN NETWORK
10/18/2013	10:05 PM			Outgoing	IN NETWORK

BART Train Collision with Two Roadway Workers

Walnut Creek, California

October 19, 2013

Track #80 RW1 Voice Usage

UNBILLED
USAGE
Cellular CALLS

Wireless

Current Usage

Details for: 510-301-3117

The following reflects current usage since your last statement

Minutes Messages Data

Download

Anytime Minutes Used : 98 minutes
Cycle ends 11/07/2013

1 | 2 | Next

Date	Time	Number	Minutes	Desc
10/19/2013	12:56 PM	[REDACTED]	1	OAKLAND
10/19/2013	12:04 PM	[REDACTED]	1	INCOMING
10/18/2013	07:15 PM	[REDACTED]	6	INCOMING
10/18/2013	03:29 PM	[REDACTED]	3	INCOMING
10/18/2013	01:58 PM	[REDACTED]	4	HAYWARD
10/18/2013	10:32 AM	[REDACTED]	1	INCOMING
10/17/2013	06:18 PM	[REDACTED]	7	INCOMING
10/16/2013	01:19 PM	[REDACTED]	5	INCOMING
10/15/2013	06:19 PM	[REDACTED]	2	INCOMING
10/15/2013	04:09 PM	[REDACTED]	2	INCOMING
10/15/2013	12:52 PM	[REDACTED]	4	HAYWARD
10/14/2013	04:18 PM	[REDACTED]	2	INCOMING
10/14/2013	03:28 PM	[REDACTED]	1	OAKLAND
10/14/2013	02:32 PM	[REDACTED]	1	INCOMING
10/14/2013	12:30 PM	[REDACTED]	1	INCOMING
10/14/2013	11:42 AM	[REDACTED]	16	INCOMING
10/14/2013	09:20 AM	[REDACTED]	2	INCOMING
10/11/2013	04:24 PM	[REDACTED]	1	FRNK MAIN
10/11/2013	02:12 PM	[REDACTED]	4	INCOMING
10/11/2013	11:54 AM	[REDACTED]	4	INCOMING

1 PAGE

Track #80 RW1 Text Usage

Wireless

Unbilled Usage

Current Usage

TEXT

Details for: 510-301-3117

The following reflects current usage since your last statement

1 page

Minutes Messages Data

Download

Cycle ends 11/07/2013

Text Messaging Usage Type:

Date	Time	To	From	Direction	Message Type
10/19/2013	02:49 PM			Incoming	DOMESTIC
10/19/2013	02:49 PM			Incoming	DOMESTIC
10/18/2013	08:55 AM			Outgoing	DOMESTIC
10/18/2013	08:54 AM			Incoming	DOMESTIC
10/18/2013	08:50 AM			Outgoing	DOMESTIC
10/18/2013	08:48 AM			Incoming	DOMESTIC
10/18/2013	08:43 AM			Incoming	DOMESTIC
10/18/2013	08:43 AM			Incoming	DOMESTIC
10/09/2013	10:17 AM			Outgoing	IN NETWORK
10/09/2013	10:16 AM			Incoming	IN NETWORK

BART Train Collision with Two Roadway Workers

Walnut Creek, California

October 19, 2013

Track #80 RW2 Voice Usage

Wireless



Current Usage

Details for: 510-910-5169

The following reflects current usage since your last statement

Minutes Messages Data

Download

Anytime Minutes Used : 113 minutes
Cycle ends 11/07/2013

Previous | 1 | 2 | 3 | 4 | Next

Date	Time	Number	Minutes	Desc
10/20/2013	01:37 PM	[REDACTED]	7	INCOMING
10/20/2013	01:24 PM	[REDACTED]	3	OAKLAND
10/20/2013	01:14 PM	[REDACTED]	10	INCOMING
10/20/2013	12:44 PM	[REDACTED]	2	FRFLD-SUIS
10/20/2013	10:02 AM	[REDACTED]	14	INCOMING
10/20/2013	09:34 AM	[REDACTED]	11	OAKLAND
10/20/2013	06:44 AM	[REDACTED]	2	VOICE MAIL
10/19/2013	09:01 PM	[REDACTED]	19	INCOMING
10/19/2013	07:51 PM	[REDACTED]	7	OAKLAND
10/19/2013	07:25 PM	[REDACTED]	6	FRFLD-SUIS
10/19/2013	07:17 PM	[REDACTED]	6	OROVILLE
10/19/2013	07:14 PM	[REDACTED]	1	INCOMING
10/19/2013	07:11 PM	[REDACTED]	3	VACAVILLE
10/19/2013	05:02 PM	[REDACTED]	9	VACAVILLE
10/19/2013	12:54 PM	[REDACTED]	5	VACAVILLE
10/19/2013	06:29 AM	[REDACTED]	3	INCOMING
10/19/2013	05:59 AM	[REDACTED]	1	OAKLAND
10/18/2013	09:03 AM	[REDACTED]	2	INCOMING
10/18/2013	07:49 AM	[REDACTED]	2	VACAVILLE
10/17/2013	06:03 PM	[REDACTED]	2	INCOMING

cellular
unbilled usage

1 page

10/19/13

BART Train Collision with Two Roadway Workers
Walnut Creek, California
October 19, 2013

Track #80 RW2 Text Usage

Wireless

Current Usage

Details for: 510-810-5169

The following reflects current usage since your last statement

Minutes Messages Data

Download

Cycle ends 11/07/2013

Text Messaging Usage Type:

Previous | 2 | 3 | 4 | 5 | 6 | Next

Date	Time	To	From	Direction	Message Type
10/20/2013	10:28 AM			Incoming	IN NETWORK
10/20/2013	09:32 AM			Incoming	IN NETWORK
10/20/2013	09:23 AM			Outgoing	IN NETWORK
10/20/2013	09:21 AM			Outgoing	IN NETWORK
10/20/2013	09:20 AM			Incoming	IN NETWORK
10/20/2013	09:17 AM			Incoming	IN NETWORK
10/20/2013	08:28 AM			Incoming	IN NETWORK
10/20/2013	08:12 AM			Incoming	DOMESTIC
10/20/2013	07:56 AM			Incoming	DOMESTIC
10/20/2013	06:40 AM			Outgoing	IN NETWORK
10/19/2013	11:01 PM			Incoming	DOMESTIC
10/19/2013	10:43 PM			Incoming	IN NETWORK
10/19/2013	09:23 PM			Outgoing	IN NETWORK
10/19/2013	09:02 PM			Incoming	IN NETWORK
10/19/2013	09:00 PM			Incoming	IN NETWORK
10/19/2013	08:57 PM			Outgoing	IN NETWORK
10/19/2013	08:57 PM			Outgoing	IN NETWORK
10/19/2013	08:52 PM			Outgoing	IN NETWORK
10/19/2013	08:43 PM			Incoming	IN NETWORK
10/19/2013	07:40 PM			Incoming	DOMESTIC

Date	Time	To	From	Direction	Message Type
10/19/2013	07:34 PM			Incoming	IN NETWORK
10/19/2013	07:34 PM			Outgoing	IN NETWORK
10/19/2013	07:33 PM			Outgoing	DOMESTIC
10/19/2013	05:44 PM			Incoming	IN NETWORK
10/19/2013	05:02 PM			Outgoing	DOMESTIC
10/19/2013	04:56 PM			Incoming	IN NETWORK
10/19/2013	04:39 PM			Incoming	DOMESTIC
10/19/2013	04:08 PM			Incoming	DOMESTIC
10/19/2013	04:04 PM			Incoming	DOMESTIC
10/19/2013	04:01 PM			Incoming	IN NETWORK
10/19/2013	04:00 PM			Outgoing	IN NETWORK
10/19/2013	04:00 PM			Incoming	IN NETWORK
10/19/2013	03:59 PM			Outgoing	IN NETWORK
10/19/2013	03:47 PM			Incoming	IN NETWORK
10/19/2013	03:44 PM			Incoming	IN NETWORK
10/19/2013	03:43 PM			Incoming	IN NETWORK
10/19/2013	03:36 PM			Outgoing	IN NETWORK
10/19/2013	03:35 PM			Outgoing	DOMESTIC
10/19/2013	03:34 PM			Incoming	IN NETWORK
10/19/2013	03:33 PM			Outgoing	IN NETWORK

TEXT
UNBilled Usage

3 pages

10/19/13

BART Train Collision with Two Roadway Workers

Walnut Creek, California

October 19, 2013

Date	Time	To	From	Direction	Message Type
10/19/2013	03:32 PM	[REDACTED]	[REDACTED]	Incoming	IN NETWORK
10/19/2013	03:32 PM	[REDACTED]	[REDACTED]	Outgoing	IN NETWORK
10/19/2013	03:31 PM	[REDACTED]	[REDACTED]	Outgoing	IN NETWORK
10/19/2013	03:30 PM	[REDACTED]	[REDACTED]	Outgoing	IN NETWORK
10/19/2013	03:30 PM	[REDACTED]	[REDACTED]	Incoming	IN NETWORK
10/19/2013	03:30 PM	[REDACTED]	[REDACTED]	Incoming	IN NETWORK
10/19/2013	03:30 PM	[REDACTED]	[REDACTED]	Incoming	IN NETWORK
10/19/2013	03:30 PM	[REDACTED]	[REDACTED]	Incoming	IN NETWORK
10/19/2013	03:30 PM	[REDACTED]	[REDACTED]	Incoming	IN NETWORK
10/19/2013	12:54 PM	[REDACTED]	[REDACTED]	Incoming	DOMESTIC
10/19/2013	06:43 AM	[REDACTED]	[REDACTED]	Incoming	DOMESTIC
10/19/2013	06:25 AM	[REDACTED]	[REDACTED]	Outgoing	DOMESTIC
10/19/2013	06:07 AM	[REDACTED]	[REDACTED]	Incoming	DOMESTIC
10/18/2013	09:21 PM	[REDACTED]	[REDACTED]	Outgoing	DOMESTIC
10/18/2013	09:20 PM	[REDACTED]	[REDACTED]	Incoming	DOMESTIC
10/18/2013	06:18 PM	[REDACTED]	[REDACTED]	Incoming	IN NETWORK
10/18/2013	06:07 PM	[REDACTED]	[REDACTED]	Incoming	DOMESTIC
10/18/2013	06:07 PM	[REDACTED]	[REDACTED]	Outgoing	IN NETWORK
10/18/2013	06:06 PM	[REDACTED]	[REDACTED]	Incoming	IN NETWORK
10/18/2013	05:50 PM	[REDACTED]	[REDACTED]	Outgoing	IN NETWORK

APPENDIX V – C-LINE RADIO COMMUNICATIONS TRANSCRIPT

12:55:05

OPS HOME

F1510191656149000016.wav

Central, Track 81.

Track 81, go ahead.

Uh, this is Track 81. I'm, uh, at the Maintenance Spur at Oakland Shops waiting for Simple Approval to, uh, A15 Interlocking to meet, uh, a train for track inspection.

Uh, Track 81 we just had a couple situations pop up at Richmond and Concord, both trains I have involved it looks like they're going to be involved issues in the yard. Uh, maybe I have one that's at Embarcadero pick you up and you'd have to go to Richmond with them. I can't tell you how long you'd be up there, or do you want to wait until later?

Uh, I don't want to interfere with your other, uh, issues so, uh, why don't I just, uh, check back with you in a few hours.

That'll work, thank you sir.

Track 81 out.

12:56:37

TRN CNTRL 03

F1510191957300003007.wav

Central, [Train Controller].

[Train Controller], [RW1].

Hey.

Hey, how are you doing today?

Alright.

Enjoying yourself, I bet.

Lovin it, right.

You 11 to 11 or what?

6 to 6. Yah.

Well I'm 11 to 11 so.

Right. Well you looking to do track inspection today?

Yah, well yah I'm up at uh, near C47 between C47 and C45 and we're going to take some track measurements up there. So, can I ask for a simple approval, up there? Is there anybody on like Power Support or...

No, you just come up on the radio and I'll issue it to you.

Ok, what channel should I use there, just regular...

Everybody's on Ops Home.

Ops Home, ok alright, I'll give you a call

Alright.

BART Train Collision with Two Roadway Workers
Walnut Creek, California
October 19, 2013

12:58:38

OPS HOME

F1510191958489000016.wav

This is a message from BART Operations. There are no personnel wayside.

12:59:21

OPS HOME

F1510192001369000016.wav

BART Central, Track 80.

Track 80, Central.

Track 80 with a party of two requests Simple Approval between C45 and C47 until 1400 hours.

10-4.

Tango 44.

Go ahead the 44.

Is the hi-railer on uh Richmond Yard shop talkgroup?

I believe so. I'd just like him to have a regular radio so we can make this move.

Correct. And he wanted to make sure to get the right one.

Or we could give him yours.

Hi-railer Richmond, do you copy?

Uh, this portable does not have the talkgroup, he's going back to the office to get one.

Well, we could do it on this talkgroup if you gave him your radio.

If we did it on OpsHome Central would have to put out a 10-3, 10-3 all units not transmit. Let's see if he can get a Shop portable.

Standby, this is Richmond Shop Hi-railer. Do you copy?

Affirmative.

Okay, we're good to go.

Central, Tango 44.

Tango 44, Central.

Can you give us a 10-33 for this move?

Attention all units, attention all units. 10-33 in effect at Richmond Yard. 10-33 for the OpsHome talkgroup at this time. 1301.

Thank you. Hi-railer, you're good to proceed. Copy that. Proceeding forward.

10-3 Central, it's a 10-3. All units it's a 10-3.

10-3 is in effect. I might have said 10-33.

BART Train Collision with Two Roadway Workers
Walnut Creek, California
October 19, 2013

01:04:17 OPS HOME F1510192004359000016.wav

Track 80, Central.

Track 80, go.

Give me the area you needed Simple for again.

Let's make it C40 to C50.

01:04:53 OPS HOME F1510192006039000016.wav

Track 80, party of two, you have a Simple Approval for the C1, C2 Track from C40 to C50 Stations until time 1800 hours. Readback.

Track 80 with a party of two has Simple Approval between C40 and C50 until 1800 did you say?

Readback is correct. And restriction this is at-grade only, at-grade only. Not inclusive of any bridges or platforms. Readback.

At-grade only and not inclusive of any aerial structures or bridges and uh, we will provide our own protection and not interfere with mainline or yard operations. Expect movement of on-rail vehicles at any time on any track in any direction, And understand that the third rail is hot.

1305.

1305.

01:06:30 OPS HOME F1510192006549000016.wav

This is a message from bart Operations. There are no personnel wayside.

And disregard. Attention all personnel, we have personnel wayside between C40 and C50, C1, C2 Tracks. Personnel wayside.

01:07:25 OPS HOME F1510192007399000016.wav

This is a message from bart Operations. There are personnel wayside at one location. Between Walnut Creek and Pleasant Hill stations.

01:17:44 OPS HOME F1510192017559000016.wav

And Train 963 report at the Bay Point end of your train. Load destination 585.

01:20:01 TRNOP C F1510192020109000017.wav

Central, Train 963.

01:20:13 TRNOP C F1510192020269000017.wav

10-4, I'm on the Bay Point end with no speed codes and we're going to stop off at, uh, Pittsburg-Bay Point.

01:20:22 OPS HOME F1510192020359000016.wav

Uh, 10-4. And 963, in Road Manual run the C3 Track to K35 Gate Papa. Readback.

BART Train Collision with Two Roadway Workers

Walnut Creek, California

October 19, 2013

01:21:03 OPS HOME F1510192021119000016.wav
And 963 to K35 Gate Papa. Readback.

01:21:08 TRNOP C F1510192021199000017.wav
Yeah, copy. Gate 35, uh, Papa.

01:21:14 OPS HOME F1510192021279000016.wav
Your readback is correct. I indicate route K35 Charlie Kilo. ATO with speed codes. 1321 is your time.

01:23:24 OPS HOME F1510192023369000016.wav
Central 6, 963 is ATO.

01:34:44 OPS HOME F1510192034529000016.wav
Central, Train 963.

01:35:16 OPS HOME F1510192035329000016.wav
Central, Train 963.
963, Central.
Just departed Orinda with no speed codes.

01:35:35 OPS HOME F1510192035529000016.wav
10-4. Routes coming up and ensure you have 585 loaded.
Understand 585 code. Copy.

01:43:21 OPS HOME F1510192043289000016.wav
<static>

01:43:32 OPS HOME F1510192043389000016.wav
<static>

01:43:38 OPS HOME F1510192043529000016.wav
And Train 963, I have routing at C53 C54 cancelled. Let me know when ready to proceed ahead after your break.

01:44:04 OPS HOME F1510192044119000016.wav
<static>

BART Train Collision with Two Roadway Workers
Walnut Creek, California
October 19, 2013

01:44:12 OPS HOME F1510192045139000016.wav

BART emergency. BART emergency.

BART emergency. Go ahead, Central.

Central, Train 963. We just struck some individuals at approximately 16.2 on the C1 Track.

10-4, understand there were individuals <broken> the track, 15.2 on the C1.

Approximately 16.2 on the C1 Track.

Track 80, Central.

Central, be advised it may be BART employees.

Track 80, Central.

01:45:14 OPS HOME F1510192045229000016.wav

Track 80, Central.

01:45:23 OPS HOME F1510192045359000016.wav

Train 963, get ready for work orders to go wayside.

01:45:45 OPS HOME F1510192046099000016.wav

Train 963 work all tracks. Train 963 hold position. Readback.

Train 963 hold position.

01:46:13 OPS HOME F1510192046209000016.wav

<static>

01:46:28 OPS HOME F1510192046399000016.wav

Central, do you have power dropped?

Standby, dropping power at this time.

01:46:56 OPS HOME F1510192047459000016.wav

Train 963, I indicate power is down in your area. Train 963 work all tracks C45, C47 until 1800 hours.
Readback.

963 work all tracks C45, C47 until 1900 hours.

Readback is correct. 1347 is your time. I indicate power is off in your work area. We had two individuals working in that area performing inspection. 1347 is your time. I cannot get ahold of them.

Yeah, 10-4. Their truck is right outside one of the maintenance of way gates. Uh, we'll keep you posted.
Two of us are going to exit the train at this time.

10-4

01:48:42 OPS HOME F1510192048579000016.wav

██████ at Richmond. How fast can you get back this way?

I'm boarding up Transfer 2. I'm boarding up Transfer 2, setup a dispatch.

01:49:01 OPS HOME F1510192049139000016.wav

Also could you ask ████████████████████, I don't have his, uh, personal number.

I'll call him ████████

**BART Train Collision with Two Roadway Workers
Walnut Creek, California
October 19, 2013**

01:49:23	OPS HOME	F1510192050099000016.wav
----------	----------	--------------------------

963, BART PD en route. EMS en route. Advisory.

10-4, we need BPD. We do have witnesses.

10-4. And confirm, you have person under the train?

That is a negative. We don't think there's anyone under the train.

We can ask, uh, the tech on board the train—ask them to, uh, check please.

Okay. And 10-4, and confirm you are at-grade in that area only. At-grade, correct?

Yeah, that is correct. We're coming across one of the bodies now we think.

01:50:13	OPS HOME	F1510192050279000016.wav
----------	----------	--------------------------

Central, we definitely have one body at—let me give you a mile post. Hold on.

01:50:28	OPS HOME	F1510192050449000016.wav
----------	----------	--------------------------

One body in the middle of the trackway, 16.15, C1.

01:51:04	OPS HOME	F1510192051169000016.wav
----------	----------	--------------------------

And again, uh, Train 963 understand your using the term body.

01:51:28	OPS HOME	F1510192051479000016.wav
----------	----------	--------------------------

...we have a second victim. Both are deceased. Definitely BART employees. This one is at about...just outside of A45...excuse me, C45 delta.

01:51:52	OPS HOME	F1510192052009000016.wav
----------	----------	--------------------------

10-4. BART PD on scene.

01:52:46	IC COMMAND 1	F1510192052569001012.wav
----------	--------------	--------------------------

Incident Command, this is BART PD. Copy?

01:52:52	OPS HOME	F1510192053249000016.wav
----------	----------	--------------------------

Central, show BART Police on scene.

10-4.

Central, Tango 1.

Tango 1 go.

Can you request the data logger off?

10-9?

Data logger off.

10-4. 963, if anyone is left on the train, data logger off.

01:54:22	IC COMMAND 1	F1510192054319001012.wav
----------	--------------	--------------------------

Incident command, this is BART PD. Do you copy?

01:54:28	OPS HOME	F1510192054399000016.wav
----------	----------	--------------------------

Central, 963. Should we go to Incident Command?

01:54:31	IC COMMAND 1	F1510192054439001012.wav
----------	--------------	--------------------------

<static>
BART PD on Incident Command. Standby

**BART Train Collision with Two Roadway Workers
Walnut Creek, California
October 19, 2013**

01:54:42 OPS HOME F1510192054549000016.wav
963, <?> let's go to Incident Command please.
10-4.

01:54:53 IC COMMAND 1 F1510192055169001012.wav
K, Train 963, again.
Train 963, Central.
BART PD is on scene. EMS has been called. Uh, how many party or how many people in your party are on the train?

01:54:56 OPS HOME F1510192055049000016.wav
<static>

01:55:20 TRNOP C F1510192055309000017.wav
Central, total number in the party on the train was six.

01:55:34 TRNOP C F1510192055409000017.wav
10-4, six.

01:55:49 OPS HOME F1510192055579000016.wav
<static>

01:55:31 IC COMMAND 1 F1510192056269001012.wav
Incident Command, can you copy?
Okay, uh, Incident Command, uh, Officer state your name again, or Officer 150.
Officer Washington, 150.
Officer Washington, 150, you are the Incident Command of the Walnut Creek incident at 1355.
Understand you're on site now.
Affirm.
And can you confirm two casualties?
10-4. I have two bodies on the C1 side. The first one is between 16.2 and 16.1.
Sixteen one and sixteen two.

01:56:29 IC COMMAND 1 F1510192056509001012.wav
<background: We actually did not witness anything. The guy that actually saw it is still on the train. 10-4>
BART PD. Incident Command this is BART PD, I have Fire on scene.

01:57:25 IC COMMAND 1 F1510192057439001012.wav
Train 963, you on Incident Command with us?
BART PD, 10-9?
Negative, calling Train 963.

01:57:38 TRNOP C F1510192057489000017.wav
Train 963, you are...I need you to switch over to Incident Command. BART PD has the incident.

BART Train Collision with Two Roadway Workers

Walnut Creek, California

October 19, 2013

01:57:44 IC COMMAND 1 F1510192058199001012.wav

Incident Command, this is BART PD 1. Confirm we have power down on the C1 side.

Incident Command, BART PD 1. That's affirmative. We're power off on all tracks between C35 Alpha, Delta and C53 Delta, Bravo. Correction, C53 Bravo, Charlie.

<background: we're in the middle of the trackway...> BART PD copy.

01:58:35 OPS HOME F1510192058429000016.wav

<static>

01:58:40 IC COMMAND 1 F1510192058529001012.wav

Incident Command, this is BART PD 1.

01:58:54 IC COMMAND 1 F1510192059369001012.wav

BART PD, Incident Co <broken>

I have Contra Costa Fire, [REDACTED] will be taking over as Incident Commander. I'll be standing by as Liaison.

10-4. I understand Contra Costa Fire Department, Battalion Commander [REDACTED], is the Incident Commander. BART PD 1 is now the Liaison.

10-4. And I confirmed with, um, [REDACTED], he pronounced both parties are deceased.

10-4.

No further transmissions



INTER-OFFICE MEMORANDUM

TO: [REDACTED] October 22, 2013
FROM: [REDACTED]
SUBJECT: Preliminary Cost Estimate for Repair of car 2528

Incident/ Date: Incident at C45 on 19,2013

Location: C1 Track North of Walnut Creek Station C45 at Milepost 16.1

Parts and labor costs required to repair vehicle(s):

Parts and Descriptions	Parts	Labor
Flipper door (L/H)	\$5,778.07	\$220.00
Flipper door repair (R/H)		\$1,155.00
Caliper repair		\$220.00
Traction Motor cover	\$102.19	
Air compressor cover/cage repair and overhaul		\$330.00
Leveling valve (L/H-Y end) overhaul		\$220.00
Leveling valve linkage	\$43.28	\$55.00
Collector assembly	\$946.62	\$110.00
PSID antenna (L/H)	\$1,469.50	\$110.00
ID transmit antenna (L/H)	\$1,022.27	\$110.00
Air horn	\$814.54	\$55.00
Track signal antenna (L/H)	\$875.20	\$55.00
Cab repair and paint	\$550.00	\$5,775.00
Bio Hazard clean up (Aftermath Co.)		\$12,255.00
*This is a preliminary cost estimate. Repair or replacement costs may change/increase once work is started.		
Misc. TVM		
FW II Hours		\$82.50
Total Parts/Labor	\$11,801.85	\$20,752.50
Contingency 15%	\$4,853.12	
Grand Total	\$37,207.27	

Cc: [REDACTED]

BART Train Collision with Two Roadway Workers

Walnut Creek, California

October 19, 2013

Appendix VII – Train #963 Speed Analysis

Speed Calculations for 10/19/2013 Incident

Line No.	Track Circuit	From	To	Block Length (feet)	Block Length (Miles)	MAS (MPH)	Block Entry Time	Entry Time Next Block	Travel Time (sec)	Travel Time (hr)	Calculated Average Block Speed (MPH)	Notes
1	CR5B	1713+00	1724+00	1100	0.2083	70	13:41:40.029	13:41:50.964	10.94	0.0030	68.59	
2	CR6B	1724+00	1734+00	1000	0.1894	50	13:41:50.964	13:42:02.310	11.35	0.0032	60.09	
3	CR7B	1734+00 1736+92 1744+00	1736+96 1744+00	1004	0.1902	50	13:42:02.310	13:42:16.581	14.27	0.0040	47.96	Equation in track circuit
4	CR8B	1744+00	1749+92	592	0.1121	50	13:42:16.581	13:42:25.007	8.43	0.0023	47.90	
5	CR9B	1749+92	1760+53	1061	0.2009	50	13:42:25.007	13:42:39.779	14.77	0.0041	48.97	
6	CR10B	1760+53 1763+08 1764+00	1762+88 1764+00	327	0.0619	36	13:42:39.779	13:42:45.035	5.26	0.0015	42.42	Equation in track circuit
7	CR11B	1764+00	1772+08	808	0.1530	36	13:42:45.035	13:43:01.809	16.77	0.0047	32.84	
8	CR12	1772+08	1779+68	760	0.1439	36	13:43:01.809	13:43:15.829	14.02	0.0039	36.96	Walnut Creek (C40) Station
9	CR13	1779+68	1783+50	382	0.0723	50(CR12)70	13:43:15.829	13:43:21.837	6.01	0.0017	43.35	
10	CR14	1783+50	1790+00	650	0.1231	50(CR12)70	13:43:21.837	13:43:28.847	7.01	0.0019	63.22	
11	CR15	1790+00	1800+00	1000	0.1894	80	13:43:28.847	13:43:42.867	14.02	0.0039	48.63	
12	CR16	1800+00 1805+47 1806+63	1805+47 1806+63	663	0.1256	80	13:43:42.867	13:43:49.963	7.10	0.0020	63.70	B point in track circuit
13	CR17	1806+63 1855+22	1806+74 1856+11	100	0.0189	80	13:43:49.963	13:43:50.883	0.92	0.0003	74.11	Equation in track circuit. C45 interlocking
14	CR18	1856+11	1858+23	212	0.0402	80	13:43:50.883	13:43:53.883	3.00	0.0008	48.18	C45 interlocking
15	CR19	1858+23	1866+99	876	0.1659	80	13:43:53.883	13:44:05.899	12.02	0.0033	49.71	No occupancy detected in next track circuit.
16	CR20	1866+99	1875+72	873	0.1653	80	13:44:05.899	N/A				Incident train stopped in CR19 and CR20 track circuits.
17	CR21	1875+72 1883+32	1883+32 1884+37	865	0.1638	70	N/A					

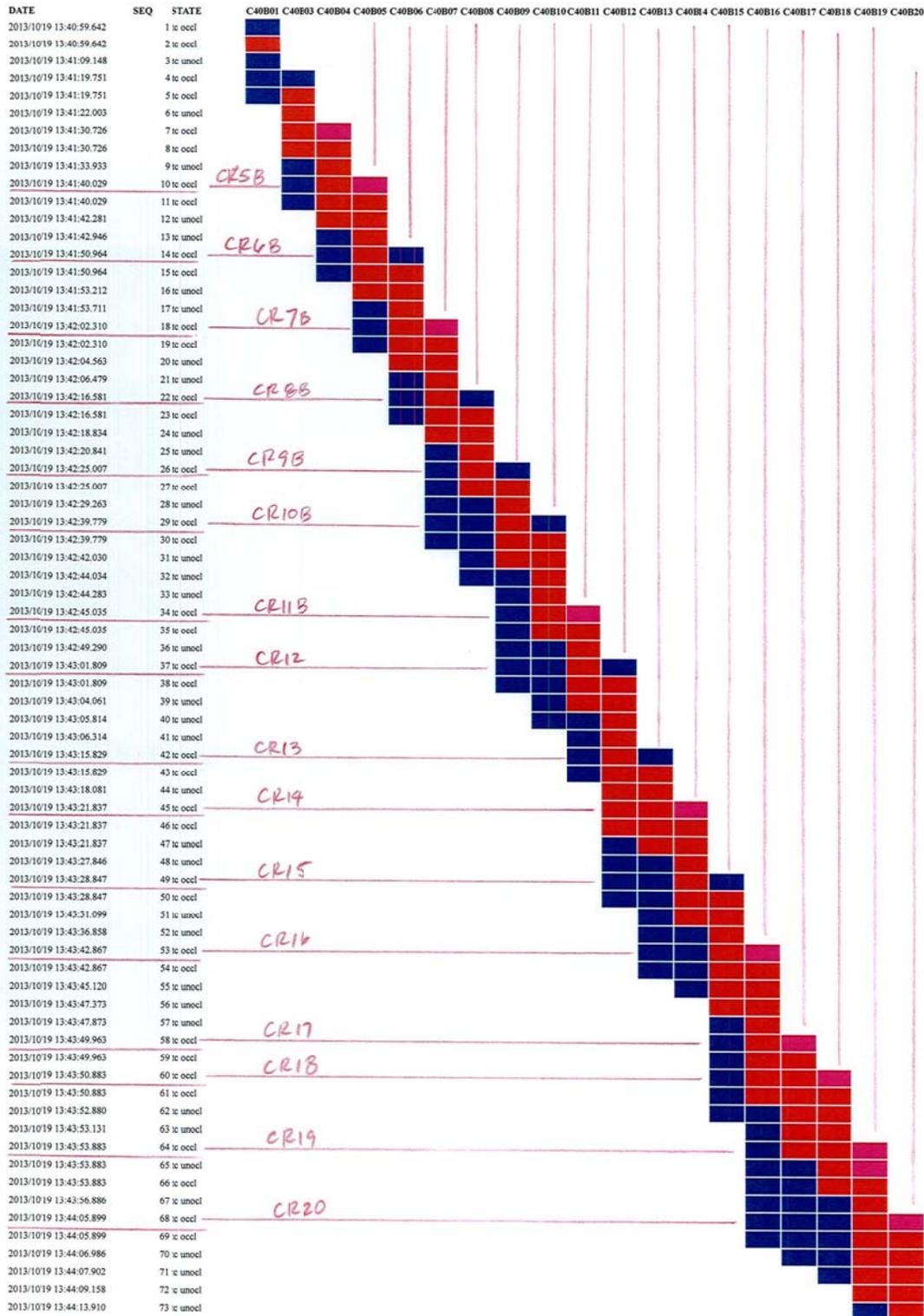
Page 1 of 1

Date and Time Printed: 10/20/2013 @ 12:59 PM

BART Train Collision with Two Roadway Workers Walnut Creek, California October 19, 2013

Output

<http://ibart.bart.gov/wmisc/tcview/TcView.jsp>



APPENDIX VIII – BART CAR PROPULSION AND BRAKE FAULT EVENT LOGS

Car #1869

Event Viewer v2.0.4

File Options Delete Help

File : e:\oct19i~1\1869\bapr1019.flg

Sub System
 BART A.C. Propulsion - FIMS System

Time Saved
 19:40:32

10-19-2013

Software version
 REV025

Sort by
 Date
 Car Id
 Event Name
 No Sort

Range
 From: ALL
 To: ALL

Page Number: 6

Car	Date	Time	Event Type
1869	10/19/13	09:04:40	HVAC AC #5 Fault
1869	10/19/13	09:41:31	Misc Prop Fault
1869	10/19/13	09:50:48	Misc Prop Fault
1869	10/19/13	09:51:18	Misc Prop Fault
1869	10/19/13	10:13:43	X-End Local Control Fault
1869	10/19/13	11:22:22	Misc Prop Fault
1869	10/19/13	12:42:35	High Acceleration Detected
1869	10/19/13	18:26:35	Warning : Fire Dim Test Failed
1869	10/19/13	18:26:38	Warning : Fire Dim Test Failed
1869	10/19/13	18:26:58	Inverter Power Supply Fault
1869	10/19/13	18:26:58	Inverter Power Supply Fault

Variable	Value
Truck ID	Truck X
Odometer Mileage	77785.13 mi
Mode Request	Emergency
Propulsion System State	Brake NR
speed	45.38 MPH
Battery Voltage	33.63 V
Rate - Of Tach 1	-15.465 MPH/s
Rate - Of Tach 2	-14.5225 MPH/s
Rate - Of Tach 3	-1.0625 MPH/s
Rate - Of Tach 4	-1.3925 MPH/s

Car #1508

Event Viewer v2.0.4

File Options Delete Help

File : e:\oct19i~1\1508\bapr1019.flg

Sub System
 BART A.C. Propulsion - FIMS System

Time Saved
 21:05:35

10-19-2013

Software version
 REV025

Sort by
 Date
 Car Id
 Event Name
 No Sort

Range
 From: ALL
 To: ALL

Page Number: 4

Car	Date	Time	Event Type
1508	10/19/13	11:11:52	Y-End Inverter Failure
1508	10/19/13	11:11:52	X-End Inverter Failure
1508	10/19/13	11:23:44	Misc Prop Fault
1508	10/19/13	12:43:58	High Acceleration Detected
1508	10/19/13	12:44:03	Tachometer Glitch Fault
1508	10/19/13	12:44:08	Dynamic Brake X Failed
1508	10/19/13	12:44:09	X-End Dynamic Brake Failure
1508	10/19/13	12:44:10	Tachometer Glitch Fault
1508	10/19/13	18:27:57	Warning : Fire Dim Test Failed
1508	10/19/13	18:28:00	Warning : Fire Dim Test Failed
1508	10/19/13	18:28:20	FIMS Main Started
1508	10/19/13	18:28:20	Inverter Power Supply Fault

Variable	Value
Truck ID	Truck X
Odometer Mileage	34025.29 mi
Mode Request	Emergency
Propulsion System State	Open- Disable
speed	35.87 MPH
Battery Voltage	33.95 V
Tach Number	Tach 1
Tach Fault Count	1
Motor X1 Y3 Speed	1793 RPM
Motor X2 Y4 Speed	2254 RPM

BART Train Collision with Two Roadway Workers
Walnut Creek, California
October 19, 2013

Event Viewer v2.0.4

File Options Delete Help

File : e:\oct19i~1\1508\bapr1019.flg

Sub System
BART A.C. Propulsion - FIMS System

Time Saved
21:05:35

10-19-2013

Software version
REV025

Sort by
 Date
 Car Id
 Event Name
 No Sort

Range
 From: ALL
 To: ALL

Page Number: 4

Car	Date	Time	Event Type
1508	10/19/13	11:11:52	Y-End Inverter Failure
1508	10/19/13	11:11:52	X-End Inverter Failure
1508	10/19/13	11:23:44	Misc Prop Fault
1508	10/19/13	12:43:58	High Acceleration Detected
1508	10/19/13	12:44:03	Tachometer Glitch Fault
1508	10/19/13	12:44:08	Dynamic Brake X Failed
1508	10/19/13	12:44:09	X-End Dynamic Brake Failure
1508	10/19/13	12:44:10	Tachometer Glitch Fault
1508	10/19/13	18:27:57	Warning : Fire Dim Test Failed
1508	10/19/13	18:28:00	Warning : Fire Dim Test Failed
1508	10/19/13	18:28:20	FIMS Main Started
1508	10/19/13	18:28:20	Inverter Power Supply Fault

Variable	Value
Truck ID	Truck X
Odometer Mileage	34025.24 mi
Mode Request	Emergency
Propulsion System State	Brake NR
speed	43.71 MPH
Battery Voltage	33.90 V
Rate - Of Tach 1	-4.18 MPH/s
Rate - Of Tach 2	-4.1325 MPH/s
Rate - Of Tach 3	-15.505 MPH/s
Rate - Of Tach 4	-16.9075 MPH/s

Event Viewer v2.0.4

File Options Delete Help

File : e:\oct19i~1\1508\bapr1019.flg

Sub System
BART A.C. Propulsion - FIMS System

Time Saved
21:05:35

10-19-2013

Software version
REV025

Sort by
 Date
 Car Id
 Event Name
 No Sort

Range
 From: ALL
 To: ALL

Page Number: 4

Car	Date	Time	Event Type
1508	10/19/13	11:11:52	Y-End Inverter Failure
1508	10/19/13	11:11:52	X-End Inverter Failure
1508	10/19/13	11:23:44	Misc Prop Fault
1508	10/19/13	12:43:58	High Acceleration Detected
1508	10/19/13	12:44:03	Tachometer Glitch Fault
1508	10/19/13	12:44:08	Dynamic Brake X Failed
1508	10/19/13	12:44:09	X-End Dynamic Brake Failure
1508	10/19/13	12:44:10	Tachometer Glitch Fault
1508	10/19/13	18:27:57	Warning : Fire Dim Test Failed
1508	10/19/13	18:28:00	Warning : Fire Dim Test Failed
1508	10/19/13	18:28:20	FIMS Main Started
1508	10/19/13	18:28:20	Inverter Power Supply Fault
1508	10/19/13	18:28:20	Inv. Power Supply Fault
1508	10/19/13	18:28:21	Misc Prop Fault
1508	10/19/13	18:28:21	Zero Speed Relay Failed
1508	10/19/13	18:37:44	X-End Local Control Fault
1508	10/19/13	18:37:44	Y-End Local Control Fault
1508	10/19/13	20:01:05	Warning : Fire Dim Test Failed
1508	10/19/13	20:01:08	Warning : Fire Dim Test Failed

Variable	Value
Truck ID	Truck X
Odometer Mileage	34025.34 mi
Mode Request	Emergency
Propulsion System State	Open- Disable
speed	23.34 MPH
Battery Voltage	33.90 V
Software Control State	1
Line Voltage	1129 V
Link Voltage	2 V
Inverter Status	5.00
Truck Cutout	0
SPM open dis request	0x0
P-signal Trainline	0.03 mA
Dynamic Brake Cutout	0
Initial Brake Request F	1
Motion Faults	0x0
Motion Request	6
Fault Time	5000 mS

BART Train Collision with Two Roadway Workers

Walnut Creek, California

October 19, 2013

Event Viewer v2.0.4

File Options Delete Help

File : e:\oct19i~1\1508\bapr1019.flg

Sub System
BART A.C. Propulsion - FIMS System

Time Saved
21:05:35

Software version
REV025

Sort by
 Date
 Car Id
 Event Name
 No Sort

Range
 From: ALL
 To: ALL

Page Number: 4

Car	Date	Time	Event Type
1508	10/19/13	11:11:52	Y-End Inverter Failure
1508	10/19/13	11:11:52	X-End Inverter Failure
1508	10/19/13	11:23:44	Misc Prop Fault
1508	10/19/13	12:43:58	High Acceleration Detected
1508	10/19/13	12:44:03	Tachometer Glitch Fault
1508	10/19/13	12:44:08	Dynamic Brake X Failed
1508	10/19/13	12:44:09	X-End Dynamic Brake Failure
1508	10/19/13	12:44:10	Tachometer Glitch Fault
1508	10/19/13	18:27:57	Warning : Fire Dim Test Failed

Variable	Value
Truck ID	0xFFFF
Odometer Mileage	34025.34 mi
Mode Request	Emergency
Propulsion System State	Open- Disable
speed	22.53 MPH
Battery Voltage	33.95 V

Event Viewer v2.0.4

File Options Delete Help

File : e:\oct19i~1\1508\bapr1019.flg

Sub System
BART A.C. Propulsion - FIMS System

Time Saved
21:05:35

Software version
REV025

Sort by
 Date
 Car Id
 Event Name
 No Sort

Range
 From: ALL
 To: ALL

Page Number: 4

Car	Date	Time	Event Type
1508	10/19/13	11:11:52	Y-End Inverter Failure
1508	10/19/13	11:11:52	X-End Inverter Failure
1508	10/19/13	11:23:44	Misc Prop Fault
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1508	10/19/13	12:44:09	X-End Dynamic Brake Failure
1508	10/19/13	12:44:10	Tachometer Glitch Fault
1508	10/19/13	18:27:57	Warning : Fire Dim Test Failed
1508	10/19/13	18:28:00	Warning : Fire Dim Test Failed
1508	10/19/13	18:28:20	FIMS Main Started

Variable	Value
Truck ID	Truck X
Odometer Mileage	34025.35 mi
Mode Request	Emergency
Propulsion System State	Open- Disable
speed	17.36 MPH
Battery Voltage	33.92 V
Tach Number	Tach 1
Tach Fault Count	2
Motor X1 Y3 Speed	625 RPM
Motor X2 Y4 Speed	1123 RPM