Federal Railroad Administration, Office of Railroad Safety

Accident Investigation Summary Report HQ-2022-1548

Caltrain Commuter Railroad Co. (PCMZ) – Collision and Derailment
San Bruno, California
March 10, 2022

1. Executive Summary

On March 10, 2022, Caltrain Commuter Railroad Company (PCMZ) southbound Train No. 506, consisting of one locomotive and five passenger cars, struck three stationary on-track maintenance vehicles on main track 2 (MT-2) at Milepost (MP) 11.6 in San Bruno, California.

Balfour Beatty Construction, a contractor for PCMZ, was conducting maintenance work at MP 11.6. At approximately 10:33 a.m., PDT, the train, traveling at 63 mph on MT-2, collided with the maintenance vehicles, which included two flatbed trucks with telescopic boom cranes and one heavy-duty pickup truck. The collision caused a fire from spilled fuel, affecting the first passenger car 3819 in the train consist and resulting in the destruction of all maintenance vehicles. The front truck of the locomotive derailed, while the passenger cars remained on the rails.

Fourteen individuals were reported injured, including 12 passengers, 1 train crew member, and 1 construction contractor. There were no fatalities.

Damage estimates include $2,000,000 to the equipment and $168,955 to track and associated structures.

The Federal Railroad Administration (FRA) investigation determined the probable cause of the accident was the inadequate job safety briefing, and the failure of the roadway worker in charge (RWIC) to notify the construction crew before lifting the track protection. A contributing factor by the RWIC was determined to be fatigue.

Accident Sequence of Events

On March 10, 2022, PCMZ southbound Train No. 506 was a passenger train composed of one locomotive and five passenger cars. The train departed San Francisco Yard, destined for San Jose, California. Prior to departure, the train underwent a Class 1 air brake inspection, exterior/interior calendar day inspection, and a locomotive daily inspection, all performed by qualified maintenance personnel. The train had no equipment restrictions.

The train crew, consisting of an engineer, conductor, and assistant conductor, reported for duty at their home terminal. The engineer reported at 3:54 a.m., PDT, while the conductor and assistant conductor reported at 4:54 a.m., PDT. All crew members had completed their statutory off-duty rest periods before reporting for duty. The engineer was positioned at the locomotive controls, the conductor was in the first passenger car behind the locomotive, and the assistant conductor was in the fifth passenger car.

Train 506 was operating on the Caltrain Rail Corridor (CRC), which runs geographically from north to south with a maximum authorized speed of 79 mph. The CRC utilizes signal indication with a traffic control system and a positive train control overlay. From MP 10.9 to MP 11.6, main track 2 is constructed with 136-pound continuous welded rail supported by concrete crossties and box-anchored on every crosstie. At MP 11.4, MT-2 features a 50-minute curve with 1-1/2 inches of superelevation, transitioning to tangent track at MP 11.6.

At MP 11.6, Balfour Beatty, a construction contractor, was performing work on MT-2. The work was managed by Transit America Services, Inc., who provided the roadway worker in charge (RWIC). Although the RWIC was not present at the work site, there was a sub-group coordinator with the work group and was present at the job briefing.

The job briefing was conducted at approximately 8:00 a.m., PDT, and the construction crew began work at approximately 9:50 a.m., PDT. The RWIC had initially provided track and time protection for movement into the work zone, but for an unknown reason released the MT-2 track and time authorization at 9:58 a.m., PDT, that was protecting the crew.

At approximately 10:33 a.m., PDT, Train 1, traveling at 63 mph on MT-2, collided with 3 stationary on-track maintenance vehicles at MP 11.6. The maintenance vehicles included two flatbed trucks with telescopic boom cranes and one heavy-duty pickup truck. Fuel spillage from the damaged vehicles ignited a fire that spread to the first passenger car (3819) in the train consist. The collision resulted in the destruction of all maintenance vehicles and the derailment of the front truck of locomotive 919. All passenger cars remained on the rails.

Figure 1: One of the maintenance vehicles and the locomotive following the collision.

The engineer exited the locomotive and was assisted by first responders shortly after the accident. The conductor and assistant conductor began evacuating passengers towards the last car (4026).

First responders from multiple jurisdictions, including the City of San Bruno and surrounding areas, arrived at the scene. The fire was extinguished by 11:14 a.m., PDT. Fourteen individuals were reported injured, including 12 passengers, 1 train crew member, and 1 construction contractor. No fatalities occurred.

Damage estimates include $2,000,000 for equipment and $168,955 for track and associated structures. No other hazardous materials were involved, and no further evacuations were required.

Figure 2: Damaged Equipment

2. INVESTIGATION AND ANALYSIS

The FRA investigation, which began on March 12, 2022, found no deficiencies or irregularities related to the track structure, signal system, train operation, dispatcher actions, mechanical condition of the equipment, or employee training and qualifications. Toxicological testing confirmed that the crew was not impaired by drugs or alcohol.

The investigation established that the train was operated in compliance with federal regulations and railroad operating rules. The locomotive event recorder data demonstrated that the train accelerated and applied emergency brakes as required, while the dispatcher adhered to all protocols, and track and rail inspections revealed no defects.

Despite proper qualifications and no significant safety violations in internal audits or disciplinary records, the investigation identified critical issues with the Roadway Worker Protection (RWP) program. PCMZ's failure to maintain qualifications records as mandated by § 214.343(d) and discrepancies in job safety briefing were significant. Regarding the safety briefing, interviews revealed a lack of consensus on safety briefing details, such as who was present and adequacy of communication about track authority release.

Roadway Worker Interviews

The RWIC's failure to communicate effectively and conduct a thorough safety briefing led to the cause and severity of the accident.

RWIC Fatigue
Using the Fatigue Audit InterDyne (FAID) model, the FRA assessed the RWIC's work and sleep schedule for the 10 days prior to the accident. The RWIC had a peak FAID score of 108 on the day of the accident, indicating significant fatigue.

FRA FAID analysis indicated that the RWIC experienced high levels of fatigue, with a peak FAID score of 108 on the day of the accident. This level of fatigue was likely a significant contributing factor to the accident.

3. CONCLUSION

FRA determined that the inadequate job safety briefing, failure to communicate the release of track authority, and RWIC fatigue were significant contributing factors to the accident. The investigation did not identify deficiencies in other operational areas, but the failure to maintain qualifications records and communication lapses were critical issues that warrant further attention.