



CORRECTIVE ACTION PLAN
SUBMITTED PURSUANT TO 4 CCR 723-7-7349(c)
FOR
LIGHT RAIL VEHICLE SPEEDING/DERAILMENT
A1-01282019
REGIONAL TRANSPORTATION DISTRICT-DENVER

May 23, 2019

Colorado PUC E-Filings System

4 CCR 723-7-7347 (a)(I)

On January 28, 2019, at approximately 7:17 AM, an inbound Light Rail Train #25 and Light Rail Vehicle 316 (hereafter #25 or 316) derailed at the intersection of South Sable Boulevard and East Exposition Avenue in Aurora, CO; approximate speed for #25 was 38 MPH in a curve posted as 10 MPH. Train #25 (single vehicle consist) was on the second trip from Peoria Station (R-Alignment) to Lincoln Station (South East Alignment); weather conditions on January 28, 2019, were heavy, wet snow with accumulating snow on all flat surfaces (sidewalks, street pavement, embedded rail tracks, etc.). Train #25 derailed the entire consist moving from the inside track on the curve (A Track for R-Line trains) to the outside track (B Track for R-Line trains); when #25 halted forward movement, only the operating cab truck set was “re-railed” on the B-Track with the center and trailing truck sets in contact with concrete pavement. Due to the manner of the derailment with associated speed, the movement of #316 was extreme; occupants (hereafter passengers or passenger) were subjected to extreme rocking motions that resulted in loss of footing and seated positions within the vehicle. During the derailment, #316 began to tilt or lean to the outside of the curve; the tires on the right side of the vehicle lost contact with the rail, with only the left side tires remaining in contact with the changing surfaces. The tilt of #316 to the left placed extreme forces and weight onto concentrated points along the vehicle’s length; the doors and stepwells along the left side of #316 bore the greatest burden of the vehicle’s weight. The frames of the doors and the stepwells are not designed to sustain the weight loads exerted on them by the leaning vehicle; at this point the doors and stepwells began to flex and deform. During this same time frame, a passenger had begun losing footing (from a standing position within #25) and struck the vehicle doors repeatedly; eventually, this passenger was ejected from the interior of #316 through the doors and out onto the snow covered pavement. During the ejection process, the passenger’s left lower leg (above the foot but below the knee) was pinned between the pavement and #316’s doorframe; the passenger’s left lower leg was amputated by the crushing force of #316 into the concrete pavement. Other passengers within #316 receive less serious injuries or no injury at all from the derailment. As a result of this accident and subsequent investigation RTD is submitting a Corrective Action Plan (hereafter CAP) to the Colorado Public Utilities as required by 4 CCR 723-7-7348, reference written report A1-01282019 dated on March 14, 2019.

4 CCR 723-7-7347(b)(I)

The Regional Transportation District (RTD) is reporting CAP-01282019 because of the nature of the accident; a transit vehicle derailment with passenger injuries, one with significant bodily injury (SBI). RTD reported A1-01282019 to the PUC consistent with 4CCR 723-7-7347. The associated Corrective Active Plan (CAP) tracking number is CAP-01282019. During the investigation of A1-01282019, RTD identified the following:

- Train #25 entered the curve at Sable and Exposition at approximately 38 MPH
 - The curve is posted with a speed limit of 10 MPH

The accident reconstructionist determined that while it was snowing at the time of the derailment of #25, the weather did not contribute to the vehicle derailing. There were no defects in the infrastructure or with #316; therefore, only human factors remain as the cause of the event.

Utilizing RTD's hazard management program contained in RTD's Commission approved Public Transit Agency Safety Plan (PTASP), RTD evaluated the probabilities of occurrence similar to January 28, 2019; RTD evaluated for actual operational data and compared what is probable based on the noted event. RTD has determined this hazard to have an operational hazard risk index of 2D/E or acceptable with review (Mil-Std 882E); however, based on data for #25 on the day of the event, the hazard risk index would be 2A. Reference the hazard analysis included as Attachment 1.

4 CCR 723-7-7347(b)(II)

Following the accident A1-01282019, RTD convened a series of meetings with Rail Operations, Maintenance of Way, Training and Safety to discuss the events and possible mitigation measures. As a result, RTD proposes the following actions:

- Evaluate current "return to work" policies and procedures for RTD staff authorized to operate trains; a specific focus on employees returning from extended time away
 - Classroom time combined with revenue service performed on all lines of service
 - ≤30 days from last regularly scheduled shift
 - ≥31 days but ≤60 days from last regularly scheduled shift
 - ≥61 days but ≤90 days from last regularly scheduled shift
 - ≥91 days but ≤180 days from last regularly scheduled shift
 - ≥181 days but ≤364 days from last regularly scheduled shift
- Investigate/Assess/Implement Psychological Fitness for Duty (PFFD) policies and procedures under direction of the District's medical provider for "return to work" programs
 - RTD to consider outside counsel in developing PFFD program consistent with established case law on matter
- Rail Operations shall develop means and methods for evaluating and tracking all train operators:
 - At least quarterly
 - Announced ride checks/efficiency evaluations
 - Unannounced ride checks/efficiency evaluations
 - Operating Rule Violations
 - Moving (speed, unfavorable signals ("Red Signal Violations"), switches (trailed or "split"))
 - Other Rules determined to influence safe operations
 - Develop and implement programs that address identified deficiencies in the above areas (training/retraining, disciplinary actions (consistent with collective bargaining agreement))
- The Transportation Department shall review and reassess training materials, to include Standard Operating Procedures and Rule Book material; focus to inclement weather operations

- Confirm current placement and add permitted speed signs in multiple locations to include both Downtown Denver and the R-Line in Aurora, CO
- Publish a bulletin that is signed for by Operators regarding permitted speed on the alignments and adherence to posted speeds
- Train Orders shall remind Operators of speed limits on the alignment
- Implement a Field Supervisor campaign focused on speed adherence; violations of posted speeds triggers face to face meeting with Operator regarding speeding

Following the implementation of this mitigation program, RTD determined this hazard to have a residual risk index of 2D/E or acceptable with review; reference the hazard analysis included as Attachment 1.

4 CCR 723-7-7347(b)(III)

RTD reviewed possible interim measures to mitigate the noted condition and determined that Rail Operations would take immediate corrective actions as noted above.

In addition to the above immediate mitigation measures, the RTD and specifically Rail Operations will continue to investigate and evaluate other means and methods to manage similar risks involved in the January 28, 2019, event; this includes possible technologies to monitor and control train speeds.

4 CCR 723-7-7347(b)(IV)

Regarding implementation schedule, RTD has implemented the above noted interim corrective actions.

PROJECT DURATION

The above noted actions proposed by the RTD will be incorporated as routine actions for all Divisions and specifically Transportation. The RTD will continuously investigate and evaluate other means and methods to manage similar noted risks.

4 CCR 723-7-7347(b)(V)

The above interim actions taken by the RTD and Rail Operations Transportation incorporates a monitoring element; noncompliance with permitted speeds by train Operators will follow the established disciplinary process as outlined in the Collective Bargaining Agreement (CBA). The RTD Safety Division will monitor compliance with the proposed corrective actions through documentation reviews both ongoing and as part of the internal Safety Division review process described in the PTASP.

4 CCR 723-7-7347(b)(VI)

The RTD department responsible for implementing this corrective action is Rail Operations and specifically the Transportation Division. This effort will be monitored by RTD's Executive Safety and Security Committee under the direction of the Assistant General Manager, Safety, Security and Facilities.

4 CCR 723-7-7347(b)(vii)

The RTD will await any specific actions required by the Utilities Commission related to this CAP.

REFERENCES AND RESOURCES

The attached documents are provided as reference and resources for this Corrective Action Plan:

Attachment 1

Hazard Analysis



Dan McClain
Senior Manager, Safety and Environmental Compliance

May 23, 2019