

## Commentary

# Metro train lines need better intersection safety design

By Najmedin Meshkati and James E. Moore, II

The March 28 collision near the University of Southern California between an Expo Line train and an automobile attempting to enter the campus points to a persistent concern: The Los Angeles rail transit system is not acceptably safe.

Metrolink's aggressive deployment of Positive Train Control will pay a substantial safety dividend for the commuter rail system, but elements of the light rail system are a growing problem.

The 22-mile Blue Line running between Los Angeles and Long Beach opened in 1990. By 2013, the line had accounted for 123 fatalities, one of the worst safety records in the nation, and by some measures the very worst. Many of these deaths were suicides, but the number of accidental deaths attributed to the Blue Line remains exceptionally and unacceptably high. Long term, we expect the performance of the 15-mile Expo Line running between Los Angeles and Santa Monica could be even worse, because it is being constructed with even lower design intersections than was the Blue Line.

The problem with both lines is the high number of unprotected, at-grade intersections. These level-grade crossings are high-risk accident areas that bring autos, buses, trucks, bicycles and pedestrians into conflict with trains, with predictably fatal results.

The agency mostly attributes problems with light rail safety to human error, but this is an oversimplification of a much more complex human-system interaction that also includes design-induced errors. Design-induced errors are one of the most important problems plaguing railroads, and have been identified



STAFF FILE PHOTO

A man was struck by a southbound Metro Blue Line train at the 5th Street Station in Long Beach on Nov. 19, 2012. The train was just pulling out of the station and was moving at a slow speed when it hit the pedestrian, according to Will Nash, a spokesman with the Long Beach Fire Department.

as a major cause of grade-crossing accidents.

A study conducted by the Federal Transit Administration (FTA) on 10 light rail systems across the nation revealed that motor vehicle turns in front of overtaking light rail trains account for the largest proportion of accidents, 56 percent in Los Angeles. On many occasions, this is due to a lack of warning signs or of a gate preventing a left turn across the tracks. In some cases, drivers in a hurry will deliberately drive around closed gates that are intended to block traffic from crossing the tracks. Even if a warning is already given, vehicles may not have ample time to clear the tracks.

The patterns that lead to these results are well understood. Drivers might make illegal left turns across the rail right-of-way immediately after termination of their protected left-turn phase, fail to stop on a cross street after the green traffic signal indication has been preempted by a train, or vi-

olate No Left/Right Turn signs where turns were previously allowed prior to construction. Some drivers confuse signals intended for the train with traffic signals, especially left turn signals, or make judgment errors as the result of unexpectedly complex intersection geometry.

Fortunately, light rail intersections can be designed to mitigate the possibility of such outcomes if we base designs around an understanding of the abilities and limitations of the rail system users and operators, and recognition of the differences between individuals. In familiar situations, humans tend to perform their tasks in an automated fashion. In hazardous situations, system managers must make sure that human behavior is more active and conscious. The goal must be to make all participants in traffic situations aware of potential hazards, which then requires their full and immediate attention. Safe crossing de-

sign entails eliminating potential hazards, mitigating risks if the hazards that cannot be completely eliminated, and providing warning signs if potential risks cannot be completely mitigated. Unfortunately, the grade-level intersections along the Blue and Expo Lines were not designed in this way.

A driver-centered design paradigm should replace the old practice. At a minimum, pedestrian gates and fences should be installed at all intersections along the Expo Line, and four quadrant traffic gate systems should be installed to prevent motorists from driving around the gates. Visual warnings should be used in conjunction with audible warnings to alert pedestrians and motorists of approaching trains and offer directions to implement safe behavior.

We think that the agency relies too heavily on the design immunity afforded it by California Government Code §830.6. Once the Cali-

fornia Public Utilities Commission approves intersection designs, the MTA is shielded from all liability for dangerous conditions resulting from its designs. It is no surprise then, that lessons learned as a result of intersection fatalities on the Blue Line have had little to no impact on the intersection designs for the Expo Line. Unfortunately, much of the Expo Lines runs along a pre-existing freight railroad right-of-way with many grade-level intersections.

The core problem is the state of safety culture at the MTA, and how safety responsibility and accountability are defined, assessed and rewarded within the agency and its Exposition Light Rail Construction Authority. Since the MTA is not held accountable for safety deficits associated with intersection design flaws, it does not make intersection safety the priority that the public interest merits.

County Supervisor Mi-

chael Antonovich, an MTA director, has recognized the vital importance and been an advocate of safety culture since October 2011, when he presented a strong motion about this issue to the MTA board. Most recently, on Feb. 26, 2015, Mr. Antonovich and his fellow MTA director and county Supervisor Hilda Solis, presented a motion at the MTA Board of Directors to address "MTA Rail Red Light Violations and Agency Safety Culture."

There is a way forward. If the MTA's new chief, Philip Washington, and the Exposition Light Rail Construction Authority intend to achieve the public's trust, they should objectively assess and improve their safety practices by conducting a thorough analysis of their safety culture, preferably under the oversight of an independent, external oversight entity.

Ultimately, the agency must better reconcile short-term construction and long-term operational objectives within the organization. This means ending the practice of sequestering design and build responsibility for tracks in the Construction Authority while relegating responsibility for train operations to a separate entity within the agency. At present, the agency is organized in a way that ensures a piecemeal approach to safety, and that requires trial and error once trains start rolling on new lines. Some of these errors will be lethal.

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