

PUBLIC UTILITIES COMMISSION OF THE STATE OF CALIFORNIA

SAFETY DIVISION  
Rail Transit Safety Section

RESOLUTION ST-17  
Date: Nov. 22, 1994

R E S O L U T I O N

RESOLUTION ST-17. AUTHORITY GRANTING LOS ANGELES COUNTY METROPOLITAN TRANSPORTATION AUTHORITY (LACMTA) AN EXEMPTION FOR THE METRO GREEN LINE (MGL) FROM THE PROVISION IN GENERAL ORDER 127, SECTION 3.8b THAT REQUIRES THE SAFE SPEED-DISTANCE PROFILE TRANSITION FROM A HIGHER TO LOWER SPEED LIMIT TO INCLUDE THE DISTANCE THE TRAIN TRAVELS FOR THREE SECONDS AT THE LOWER SPEED.

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SUMMARY

By letters dated August 24, 1994 and October 27, 1994, the Los Angeles County Metropolitan Transportation Authority (LACMTA) requests that in lieu of the General Order 127, Section 3.8(b) requirement to include the distance traveled for three seconds at the lower speed, LACMTA be allowed to substitute the distance the train will travel under both overspeed and train runaway conditions when determining the safe speed-distance profile transition from a higher to lower speed limit for the MGL.

BACKGROUND

The safe speed-distance profile transition in G.O. 127 is based on the Bay Area Rapid Transit District (BART) train control specification. This specification requires that when a train traverses from a higher speed zone to a lower speed zone, the lower speed command be transmitted at a point preceding the entrance to the lower speed zone by a distance equal to the sum of the following:

1. The maximum open-loop braking distance of the train.
2. The distance the train travels in 3 seconds at the higher speed.
3. The equipment reaction time distance at the higher speed.
4. The distance the train travels in 3 seconds at the lower speed.
5. The equipment reaction time distance at the lower speed.

Conditions 2 and 4 as listed above were included in the BART specification to assure that the train would be traveling at the lower speed prior to entering the lower speed zone under overspeed and train runaway conditions without actually determining the distance a train might travel under such conditions.

### DISCUSSION

The LACMTA is seeking approval to deviate from the requirement to include the distance the train travels in 3 seconds at the lower speed in the calculation of the safe speed-distance profile transition from a higher to lower speed limit. Instead, LACMTA is proposing to substitute the distance a train would travel if overspeed and runaway conditions were to occur. The MGL automatic train control system employs vital safe speed-distance profiles to enforce train performance. The wayside equipment continually communicates the line speed, target speed, and distance to go to the train in each track circuit. The vehicle's Automatic Train Protection equipment then generates the safe braking distance profile using train information generated by the wayside equipment. When the train traverses from a higher speed limit to a lower speed limit, the train control equipment ensures that the train follows a safe speed-distance profile transition that prevents the vehicle from exceeding the lower speed limit. The MGL safe braking distance model is more conservative than the General Order 127, Section 3.8(b) requirement for the following reasons:

1. In the MGL safe braking distance model, when a train traverses from a higher to a lower speed limit, the train is assumed to travel at the higher speed plus 1.5 mph overspeed for 3.75 seconds. In comparison General Order 127, Section 3.8(b) only requires the distance the train travels at the higher speed for three seconds.
2. The MGL safe braking distance model takes into account the condition of train runaway. At the end of 3.75 seconds the MGL model assumes the train goes through a power cut and emergency brake build-up time. During the power cut time, the train accelerates for 0.5 second to account for runaway. During the emergency brake build-up time, the train coasts dependent on grade for one second. At the end of all this time, the vehicle begins braking at 1.12 mphs, adjusted for grade.

By substituting the distance a train travels under overspeed and runaway conditions for the distance a train travels for three seconds at the lower speed, the MGL safe braking distance model is more conservative than if the model were designed exactly as required in accordance with General Order 127, Section 3.8(b).

**PROTESTS**

There are no known protests to this request.

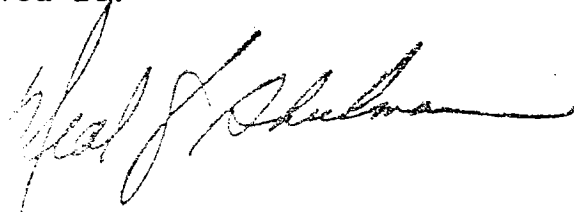
**FINDINGS**

Staff has reviewed LACMTA's request and finds it acceptable. Approval to substitute the distance a train travels under overspeed and runaway conditions for the distance a train travels for three seconds at the lower speed when determining the safe speed-distance profile transition from a higher to lower speed limit is safe and reasonable.

**THEREFORE, IT IS ORDERED that:**

The Los Angeles County Metropolitan Transportation Authority (LACMTA) is granted authority to deviate from Section 3.8(b) of General Order 127 in the construction and operation of its Metro Green Line (MGL) transit system provided it substitutes the inclusion of overspeed and train runaway conditions as described under the DISCUSSION above for the three seconds at the lower speed requirement contained in General Order 127, Section 3.8(b).

I hereby certify that this Resolution was adopted by the Public Utilities Commission at its regular meeting on Nov. 22, 1994. The following Commissioners approved it:



Executive Director

DANIEL Wm. FESSLER  
President  
PATRICIA M. ECKERT  
NORMAN D. SHUMWAY  
P. GREGORY CONLON  
JESSIE J. KNIGHT, Jr.  
Commissioners