National Transportation Safety Board
Washington, D.C. 20594

Office of Railroad, Pipeline and Hazardous Materials

NTSB Sight Distance Observations

Incident: Collision on January 26, 2005 at about Milepost 6.51 on Metrolink Valley Subdivision, Glendale, California

Sight distance observations were conducted on the morning of February 6, 2005. The purpose of the observations was to approximate the distance that a motor vehicle on the track was visible from a moving cab car. The time of day was relatively similar as were the weather conditions (weather information attached). The equipment used was similar to the two trains involved in the collision. Several conditions relating to the morning of the collision could not be replicated. Specifically, the observation runs were made at slow speed[1] while the incident train was traveling at or near the track speed of 79 mph. A replica vehicle was used and the sight distance observers knew in advance what they were looking for, where it was located and they were focused on noting its location at the first opportunity.

Equipment and Positioning:

A three-car train with one locomotive (630-136-188-853 east to west) was positioned on main track two with its east[2] end at Mile Post 7.0. Metrolink cab car 630 was the east car on this train. This was similar equipment to Metrolink Train 100 on the day of the collision. The cab car headlight was set to bright. This train is identified in this report as the "observation train".

A three-car train with one locomotive (876-167-143-616 west to east) was positioned on main track one with the locomotive on the west end, stopped just on the east end of the curve on the west side of Glendale station. This was similar equipment to Metrolink Train 901 on the day of the collision. At this point, the locomotive headlight was visible from the cab car stopped at MP 7.0 on main track two. The locomotive headlight was set to dim.

A replica of the motor vehicle involved in the collision was prepared by the Glendale Police Department (GPD) and positioned at the point of impact (POI[3]) on main track two

[1] A 20 mph slow order was in effect on both tracks at CP Currier (just east of Chevy Chase) due to recent track repairs related to the collision and derailment.
[2] Metrolink uses east and west as timetable directions. East is towards Los Angeles. Timetable direction may vary from actual compass direction.
[3] According to GPD measurements, the distance between the POI (measured from the estimated position of the left front jeep fender) to the centerline of Chevy Chase Drive is about 200 feet.

east of the Chevy Chase grade crossing. The replica was painted a similar color green as the actual vehicle involved.

Observation Run One:

The locomotive engineer[4] operating the observation train was instructed to operate east at a slow speed and to stop the train and note the location where he first saw anything out of the ordinary, then to continue eastward to a point where what he saw would cause him to apply emergency brakes if he were operating on his regular assignment and stop again. From MP 7.0, none of the observers, including the engineer, were able to discern the replica vehicle at the POI. On run one, the signal at CP Currier displayed *Diverging Advance Approach* (Red over Flashing Yellow) for the number one main track.

The first observation run commenced at about 5:38 a.m. and the engineer brought the train to a stop using normal service braking at about 5:39 a.m.

The observation train engineer indicated that he first noticed "something" as the cab car moved past the whistle post[5]. At the location where the observation train came to a stop, the engineer indicated that he could now identify the vague outline of a motor vehicle at the POI and that what he saw would cause him to apply emergency brakes if he were operating on his regular assignment. Before the train was moved, several other observers sat in the engineer's seat and validated that the replica vehicle was faintly visible.

GPD personnel made paint marks on the right-of-way identifying the location of the whistle post and the location where the east end of the cab car stopped.

The Metrolink train dispatcher was then asked to change the signal at CP Currier to *Clear*[6] (Green over Red). The observation train engineer noted that the change in signal aspect did not affect his visibility of the replica vehicle "one way or the other".

The observation train was then backed up to MP 7.0 for observation run two.

Observation Run Two:

The observation train engineer was instructed to proceed east at about 25 mph and to apply the train emergency brakes at the point where he identified the replica vehicle on the tracks ahead. On run two, the signal at CP Currier displayed *Clear* (Green over Red) for the track one.

The second observation run commenced at about 6:09 a.m. and the engineer brought the train to a stop using emergency braking at about 6:10 a.m.

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[4] The engineer was familiar with the territory. His regular assignment included operating train 100, although he was not operating on the day of the collision.
[5] Metrolink places a small white sign with a black "X" about ¼ mile in advance of most grade crossings as an indication to engineers to begin sounding the train warning whistle.
[6] This signal was at *clear* for Metrolink Train 100 on the morning of the collision.

GPD personnel made paint marks at the westernmost point that sand[7] was observed on the running rails behind the observation train, at the west end of the stopped locomotive and at the east end of the stopped cab car.

The observation train was then moved at slow speed to the POI where it was stopped just short of the replica vehicle. GPD personnel made a paint mark at the POI. This concluded the sight distance observation runs.

Before the train was moved from the POI, the event recorder on Metrolink cab car 630 was downloaded under the supervision of the NTSB mechanical group chairman who took possession of a diskette with the data. The diskette was sent to the NTSB event recorder laboratory in Washington, D.C.

GPD later measured and recorded the distances of the various paint marks relative to the POI. Approximate distances (in yards) are summarized below:

Run 1:	
Whistle post to POI	531
East end of stopped cab car to POI	274
Run 2:	
West end of sand marks to POI	433
West end of locomotive to POI	346
East end of cab car to POI	247

According to Metrolink mechanical officials, the length of each of the three cars in the observation train was 85 feet and the length of the locomotive was 58 feet, 2 inches (both measured over the coupler faces). The distance between locomotive 853 axle #1[8] to the front end plate was 5 feet.

[7] When emergency brakes are applied, the locomotive drops sand under the locomotive wheels to improve braking and to reduce wheel slide.

[8] Axle #1 is the first axle from the front of the locomotive. This was the last axle of the train given the locomotive position at the rear.

Attachment: Weather and astronomical information

Weather information for Burbank Airport (KBUR) (about 6 mi northwest of the collision site) on January 26, 2005:

0453 PST ... Winds 230 degrees at 3 knots; visibility 4 miles; light rain, mist; overcast skies; temperature 13 degrees C; dew point 12 degrees C; rain ended 0415 PST began 0433 PST.

0553 PST ... Winds calm; visibility 3 miles; light rain, mist; overcast skies; temperature 13 degrees C; dew point 12 degrees C.

0653 PST ... Winds calm; visibility 3 miles; mist; overcast skies; temperature 13 degrees C; dew point 12 degrees C; rain ended 0642 PST.

Astronomical Data (from U.S. Naval Observatory) At KBUR 0600 PST January 26, 2005

Altitude of Moon ... 22.5 degrees
Azimuth of Moon ... 278.3 degrees
Percent Illumination ... 99%
Sunrise January 26, 2005 at KBUR ... 0654 PST
Moonrise 1738 PST on January 25, 2005
Moonset 0800 PST on January 26, 2005

KBUR February 6, 2005

0453 PST ... Winds 150 degrees at 8 knots; visibility 10 miles; overcast skies; temperature 12 degrees C; dew point 8 degrees C.

0553 PST ... Winds 150 degrees at 8 knots; visibility 10 miles; overcast skies; temperature 12 degrees C; dew point 7 degrees C. (Note: on the 0553 PST observation there was the notation that rain began at 0510 PST and ended at 0527 PST

0653 PST ... Winds 150 degrees at 8 knots; visibility 7 miles; overcast skies; temperature 12 degree C; dew point 7 degrees C.

Astronomical Data At KBUR 0600 PST
Altitude of Moon: 6.5 degrees
Azimuth of Moon: 130.7 degrees
Percent Illumination: 8%
Sunrise: 0646 PST
Moonrise: 0514 PST
Moonset: 1454 PST