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Photo: Gary Leonard

Metro Gold Line train approaches Union Station over a dense infrastructure.

How It Works:
Rail Manager Explains How Earthquake Sensor Network Operates

By Michael D. White
Staff Writer

(Jan. 21, 2010) Southern California is no stranger to “seismic incidents.”

In 1769, the first genuinely strong earthquake to strike the region was recorded by the expedition led by the explorer Gaspar de Portola about 30 miles southeast of Los Angeles near the San Andreas Fault.

Since then, every day, hundreds of minor temblors, most of which can’t even be felt, and a few not so minor, have shaken the world under our feet and caused many a resident to seriously consider relocating to Montana.

Quakes can happen any time and it’s that unpredictability and the possible catastrophic impact of a major quake on Southern California’s transportation infrastructure that motivates Metro to employ a sophisticated seismic event sensor network.

The network consists of highly-sensitive motion detectors that are calibrated to send out either a warning or an alarm depending on the movement of the earth caused by a seismic anomaly.

The sensors are sited along the Metro Blue, Green, and Red Lines and on the Eastside extension of Gold Line.

Metro Rail Operations Control monitors the devices 24/7 using remote supervision and control software and Metro Wayside Rail Communications handles routine maintenance and regular testing of the seismic motion detectors.

“The sensors aren’t set off by Richter scale movement, but by spikes on a g-force scale,” says Metro Rail General Manager Mike Cannell.

“A warning would trigger at about .1g, [a seismic event about 5.0 on the Richter scale] while at .2g [roughly equivalent to an earthquake of about 6.0 in magnitude] would result in a full-fledged alarm,” said Cannell.

A .1g warning would not be enough to stop service, but would call for Metro engineers and maintenance staff to conduct a field investigation to determine the effect of the event. “We’d be looking for damage to track, equipment, overpasses, tunnels structure, and facilities,” he said.

A .2g alert would be an entirely different matter.

If an alert sounds, Metro SOP (Standard Operating Procedure) calls for a priority radio alert to be sent to all train operators who would be instructed to stop their trains, conduct a visual inspection of the track in front of them, and if possible to advance their train to the next station at a reduced speed where all passengers would be de-boarded. “Service would be completely shut down with such an alarm until we could determine the full extent of any damage,” said Cannell. “Trains would remain in place and not move until it would be safe to do so.”

The safety of both passengers and train crews “is critical,” he said, alluding to the responsibility of overseeing the operations of 55 Metro passenger trains running during peak hours every day.

“The network we have in place to monitor them and alert our operators are highly sophisticated and specifically laid-out to ensure the safest means of action are immediately taken should a large seismic event occur,” he added.