

# Modern Rail Transportation

—A reality in car-crazy Los Angeles

Greg Davy

The year was 1971. The mass-transit rail vehicles that for decades had crisscrossed Southern California on more than 1,000 miles of routes had been retired from service 8 years earlier, having finally succumbed to the power of the automobile and the open freeway.

The 1990s were years that appeared only in the sketches of the most futuristic planners. One of the agencies that would be merged to create the present Los Angeles County Metropolitan Transportation Authority (MTA) in 1993 hadn't even been created yet.

Transit officials were taking note of some ominous signs: those same freeways that were designed for freedom of movement and ease of transport were steadily becoming headaches. Hundreds of thousands of people were moving to Southern California to take advantage of the robust economy and the great weather -- clogging up the freeways in the process.

Someone dared to ask: "Why don't we build a modern rail system to give our residents a choice?" Others agreed, and they planned their first "starter line," a route that would travel from downtown Los Angeles to downtown Long Beach.

Twenty-two years passed before the first Metro Red Line subway train carried transit and elected officials into the Pershing Square Station to celebrate the arrival of the first modern subway system in Los Angeles. They were years filled with anticipation, careful planning, endless funding requests, some setbacks and plenty of public discussion.

In June 1974, the first public money—a portion of highway gas taxes—was committed for construction of a rail rapid transit system. But Proposition A, which would add a 0.5-cent sales tax in Los Angeles County earmarked just for transit projects, was

defeated at the polls.

Shortly thereafter, the Rapid Transit Advisory Committee was formed in an attempt to gain a local consensus on what a future rail system should look like, and where it should go. In a process that took the best part of 6 years, an environmental impact report for a core rapid transit project was developed, refined, presented to the public for debate, refined again, and finally approved in 1980.

Meanwhile, in November 1980, Proposition A reappeared on the local ballot -- and this time was approved by a 54% margin. The first design contracts were awarded in July 1981.

The geography of the Los Angeles Basin presents subway designers with so many interesting challenges. Many earthquake fault lines cross the basin, so tunnel designers had to ensure that tunnels could withstand an earthquake of a least 7.0 on the Richter scale, or an earthquake that would produce an acceleration of 0.6 G.

Tunnels were designed in an oval shape, and sections were designed in arched concrete quarters that would easily "give" in a major earthquake. The tunnels were to be made with non-combustible concrete, and highly sensitive methane gas detectors would be installed throughout the tunnels and stations.

To guard against groundwater leaks, a 1/8-inch thick plastic liner made of dense polyethylene was to be sandwiched between the double-layered concrete tunnel walls.

Stations were designed to be large, open areas to minimize shadows and dark corners. Construction workers built the stations by carving out a box structure, then supporting the sides with steel beams 75-feet deep, spaced 4 to 6 feet apart. Wooden lagging was installed horizontally between the beams, creating the first layer of the box wall. This method is called "cut

and cover," because the street overhead is decked over with wooden or concrete slabs, allowing traffic to continue passing over the construction site even as work progresses.

Designers decided not to include public rest rooms in the stations, largely as a deterrent to crime. Passengers would usually spend less than five minutes at the stations anyway, they reasoned, diminishing demand for rest rooms.

Transportation officials mulled over 12 different system-design milestones, each receiving public comment and scrutiny before final approval. This process took another 3 years.

Finally, in August 1983, President Ronald Reagan signed a US Department of Transportation funding bill that provided \$117.2 million for the startup of Metro Rail construction -- a major milestone for the eventual return of rail mass transit to Los Angeles.



■ Metro Red Line Subway Train nearing 7th st. Metro Center (MTA)

**Figure 1** Los Angeles County  
**Metropolitan Transportation Authority (MTA)**  
 400-mile Metro Rail System



Metro Blue Line (in operation)	Metro Blue Line (under development)
Metro Red Line (in operation)	Metro Red Line (under development)
Metro Green Line (under development)	LAX/Palmdale
Candidate Corridors*	Possible Candidate Corridors*
Metrolink (Commuter Rail)	

\*Rail or other major transportation improvement



■ LA Metro Station

(MTA)

The first segment would serve downtown Los Angeles with five stations, and would act as the hub of virtually the entire rail network that would branch out from there. The cost of the first segment was estimated to be \$1.25 billion.

Final design was under way, and the project was moving forward quickly, when a methane-gas explosion occurred along the proposed route of the subway system. It would alter the course of the project, and would result in later legislation that banned tunneling of any kind in the Wilshire-Fairfax district, one of the most densely-populated areas in Los Angeles.

Undaunted, subway route planners simply rerouted the line around the problem area. In September 1986, ground was ceremoniously broken for the first of three planned segments of the Metro Red Line subway.

As with any major tunneling effort, tunnel diggers sometimes ran into unexpected obstacles. One contractor tunneling from Union Station toward the Civic Center Station ran into large boulders that required him to slow down. Without boulders, modern tunneling machines can dig as much as 100 feet of tunnel a day.

Another contractor encountered rivers of pungent ground water,

which had to be deodorized and pumped into the usually dry Los Angeles River. A special water treatment plant was built on the construction site just for this purpose.

As time went on, the construction sites began to look less like a jumble of cranes and trailers and more like subway stations. Test trains arrived and rumbled beneath downtown Los Angeles for months, out of sight and out of the public's way.

Finally, the day so many had envisioned came -- 30 January 1993, the opening of the first segment of the Metro Red Line subway system. Los Angeles Mayor Tom Bradley stepped triumphantly from the ceremonial first train, along with a host of other officials, to take public pride in a dream realized. Bradley had worked to bring a subway to Los Angeles for nearly his entire 20 years as mayor.

The first leg of Metro Rail was complete, at a final cost of \$1.45 billion.

The structural integrity of the subway system was tested sooner than most had anticipated. On 17 January 1994, almost 1 year after opening day, a 6.7 Richter earthquake rocked the Los Angeles area, causing widespread destruction in the San Fernando Valley and Westside areas. But a thorough inspection of the subway tunnels revealed no significant damage, and trains were running the following day, helping those still affected by downed freeways to get to work.

The Red Line subway project is only the latest step in a fledgling network of rail lines that will serve the vast Los Angeles County region and beyond. In 1990, modern public rail transit returned to the region in the form of the Metro Blue Line -- a light rail system traveling mostly at street level, carrying riders from downtown Los Angeles south to downtown Long

Beach. The route is 22-miles long and has 22 stations, and already serves 35,000 passengers each weekday.

Extensions to the Red Line are also under construction. Much of the tunneling work is already completed for Segment 2, which will serve some of the most densely populated areas of central Los Angeles and the Hollywood area. The estimated cost for the leg is \$1.4 billion.

Segment 3, expected to cost \$2.4 billion, will continue north from the Hollywood area through the famed Hollywood Hills and into the North Hollywood area of the San Fernando Valley. In mid-1995, MTA will add another color to its rail rainbow -- the Metro Green Line. Most of this light-rail system will run down the median of the Glenn Anderson Freeway, also known as Interstate 105, the area's newest freeway that just opened in mid-1994. The east-west route will stretch almost 22 miles serving the southern portion of Los Angeles County.

While the exact locations of future rail lines in Southern California are still being debated, it is clear that a rail renaissance has begun.

One of the challenges of MTA's new leadership is providing a transportation vision for the next 20 years. Despite a stubborn economic recession that still clings to the region, all indicators are that our population will continue to rise and that our economy will gather steam once again. This will require a well-planned public transportation system that integrates MTA's substantial bus fleet with its burgeoning rail network to accommodate everyone wishing to enjoy the quality of life that Southern Californians have come to expect. ■



## Greg Davy

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