

LIGHT RAIL IN SOUTHERN CALIFORNIA:

PERSPECTIVE AND PROSPECTS

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INTRODUCTION

This paper is intended to put light rail transit in the San Diego and Los Angeles areas into perspective -- a time perspective and a geographic perspective. It shows how the original high speed electric railroad between Long Beach and Los Angeles declined and was abandoned. It shows how West German municipal and transit administrators and equipment manufacturers innovated instead of abandoning the street to automobiles, and how their innovation was recognized and introduced to the United States. Finally, it looks at the prospects for revival of the great electric railroad system of the Los Angeles Basin and suggests that there are still obstacles to be surmounted before this area can gain the advantages of cost-effective light rail transit.

The paper is written from the viewpoint of one who has been an advocate of light rail transit on reserved track since he was a senior in high school. During his 25 years of professional practice as a transportation planner he has seen the mainstream of the planning profession embrace a succession of "answers to the problem", including:

- Prohibiting Parking;
- National System of Interstate and Defense Highways and other Freeways and Tollways in Urban Areas;
- High Speed Rail Transit (like BART);
- Monorails (perennially, since 1887);
- High Speed Ground Transportation;
- Gravity Vacuum Tubes;
- Tracked Air Cushion Vehicles, with Linear Induction Motors;
- "Personal Rapid Transit", including "StaRRcars";
- "Dial-a-ride";
- "Peplemovers";
- "Paratransit", including Jitneys, White Bicycles, and Communal Autos;
- Carpools, Vanpools, Transit Marketing, or "Ridesharing Marketing";
- "Diamond Lanes"; and
- "Telecommuting".

None of the "answers" has ever solved all the problems they were supposed to solve. Those that have proved feasible have found a place in the transportation systems and future plans of many metropolitan areas. For example:

- BART stimulated a vast increase in taxable office floor area in Downtown San Francisco but is still serving the same commuter market as the abandoned interurban electric railroads of 1900-1940;

Vanpools are helping many growing companies to attract and hold workers but they are limited to the small percent of employees that drive over 20 miles;

"Personal Rapid Transit" and "Peplemovers" evolved into "Automatic Guideway Transit" (AGT), which -- though capital-intensive -- may yet have a future beyond Morgantown;

Dial-a-ride transit service has yet to prove more cost-effective than conventional buses or taxicabs;

Monorails have not proved cost-effective on a regional scale when compared to AGT or light rail -- or even conventional rail, for physical design and operational reasons;

Tracked air cushion vehicles have never gone into revenue service;

Gravity vacuum tubes have never gotten onto the design engineer's drawing board from that of the commercial artist.

Throughout most of the time period I am referring to, mainstream planners and transportation engineers habitually coupled the words "light rail transit", "streetcars", and "obsolete". They were frequently excluded from cost-effectiveness analyses because they were thought to be "obsolete", or "unacceptable" (to whom?), "infeasible", "slow", "noisy", "inflexible", or "unsafe". Transit professionals in Boston and Philadelphia and even San Francisco, tried for decades to get the money to replace existing light rail lines with a combination of "heavy" rail and "feeder" buses, before sophisticated studies during the 1970's proved that light rail should be retained and modernized.

In this context, the session today is a welcome contrast. I think that we recognize that light rail transit is not THE ANSWER to all urban transportation problems, but it has proved to be highly cost-effective in carrying people to, from, and within high density areas, and it can facilitate and reinforce land use planning decisions about medium to high density development. In San Diego, Portland and now Southern California, where light rail transit was discarded in the 1950's and 1960's, it is being restored because no other financially feasible means of transportation has been found to play that particular role in a regional transportation system.

THE LONG BEACH LINE OF PACIFIC ELECTRIC

The Long Beach line, now a prospect for reincarnation, was the earliest-built, strongest, and longest-lived of any of the lines of the former Pacific Electric rail system (2)*.

Early Years (1901-1911)

In the beginning, Long Beach was a collection of cottages among the sand dunes and Downtown Los Angeles a village supplying urban services to cattle ranchers. The first line of the Pacific Electric Interurban Railroad was built in 1902 to connect them. In 20 years, Ocean Avenue in Long Beach changed from shacks to skyscrapers, and Downtown Los Angeles became the central focus of a major metropolitan region. The changes resulted from a partnership between public sector providers of infrastructure in the form of water supply and streets and private sector providers of transportation and promoters of real estate (3).

Although Henry Huntington was president of both Pacific Electric and the Los Angeles Street Railway, his impressive personal fortune came mainly from the profits in real estate speculation -- not from the transit properties. Lines were extended rapidly in the boom years between 1901 and 1911, with small suburban towns clustering around the stations. Between the towns, in the early years, was farmland -- orange groves or dairies or strawberries -- producing high value crops in a favorable climate. Huntington would buy land in the townsites, announce a Pacific Electric extension, and resell at five or ten times the original purchase price.

Even though the Pacific Electric lines were only a minor source of income for Huntington, they were in 1911 well patronized and profitable. The Long Beach line was widened to four tracks from Downtown to Watts to provide for express or "limited" service, and the line serving Huntington's home in San Marino also was widened to four tracks. This period of great growth ended after Huntington sold the Pacific Electric system to the Southern Pacific Company, and went off to Europe to buy art work. (His former home is now the Huntington Library and Museum.)

* Numbers refer to the list of references at the end of this paper.

Maturity and Decline (1911-1953)

Once in place, the Pacific Electric system promoted a low-density dispersal of population in the Los Angeles Basin (4). Though most lines focused on Downtown Los Angeles, there were tangential lines along the coast from Newport Beach to Long Beach to San Pedro and from Redondo Beach to Santa Monica. Outlying centers such as Santa Ana, San Bernardino, Riverside, and Pasadena all had their own local trolley lines, most under Huntington ownership, and all were conveyed to Southern Pacific.

The Pacific Electric system grew in a time when only the most innovative and affluent 5 or 10 percent of families owned private autos. The takeover by Southern Pacific occurred when the Model T Ford was just beginning to come off the assembly lines.

Southern Pacific had had good experience with electric interurban railroads in Oregon and in the San Francisco Bay Area before buying Pacific Electric. All the company's electric lines had until then been profitable and had carried a substantial amount of high-revenue short-haul freight as well as passengers. In addition, the electric railroad could collect and distribute freight cars for Southern Pacific's long haul trains less expensively than steam railroad switching crews -- and the passengers paid for most infrastructure costs.

The short-haul freight traffic was first to go, diverting from rail to motor trucks as soon as the latter were generally available. A drop in profits rather than a gain followed completion of the extension to San Bernardino from Covina in 1914, and no new lines were built thereafter. Even so, freight revenues helped to balance the books of the company, although SP had used its control of Pacific Electric to set rate divisions favorable to the parent.

From the time when Frank Norris the novelist characterized the Southern Pacific Company as an "octopus", the company was seen by the public of California as a greedy monster. Hiram Johnson was elected governor of California and U.S. Senator by opposing Southern Pacific. The California Railroad Commission was established to control rates and service. The California Highway Commission was established to give shippers and travelers an alternative to using the monopolistic rail service. People voted for the auto with their money because it was more convenient than transit, taking the continuation of the transit system for granted.

By 1920 auto ownership in Southern California had reached one per nine persons -- roughly 30 or 40 percent of the families having autos (4). Passenger traffic on Pacific Electric peaked in 1924, as family auto ownership grew past 50 percent. By 1930, when there was one auto per three persons -- 80 or 90 percent of the families having at least one car, patronage and revenues were down about 20 or 25 percent from that peak. People were making social, recreational, and shopping and shopping trips by auto even though the peak-hour commuter load continued to be heavy.

Local governments favored auto users and failed to give preference to transit as an efficient user of street space. As local city street systems expanded, grade crossings were opened across the tracks and speed limits were imposed on the interurban trains. On Long Beach Boulevard, what had once been a pure rail right of way was taken over by a street, and then the remaining track reservation in the median was paved over for automobile use. Cars waiting to turn left blocked the tracks.

Running speeds of the interurbans dropped, making them less attractive to commuters than formerly. Even the Long Beach line with its elevated terminal and its four-track right of way, was affected, since it ran in Long Beach Boulevard and in Ninth (Olympic) and San Pedro Streets south of Downtown. The 1913 timetable, for example, scheduled limited-stop cars to take 46 minutes for travel between the Long Beach and Los Angeles terminals of the line. By 1926, with the family auto ownership rate averaging well over 50 percent and growing, 51 minutes were needed; and by 1954, 60 minutes were scheduled and trains often ran as much as half an hour late (3).

Worse from the company's viewpoint was the extra crew time needed to provide a particular frequency of service. Crews who had originally been able to make two revenue round trips during the peak hours could make only one. Productivity shrank while wages had to be increased to keep up with other industries.

Pacific Electric management repented by trying to grade separate the system. To ease Downtown Los Angeles traffic delays, a subway was constructed under Bunker Hill, avoiding congestion on Sunset Boulevard and Hill Street. Grade separations were built at major arterials (many still existing). A private bus line was acquired in 1927 to fill in the gaps between the radial rail lines and to take advantage of arterial highways built with Federal, State, and local gas tax funds during the 1920's.

As Pacific Electric had an operating deficit during the 1930's, Southern Pacific management stopped investing in the property. Low-patronage lines began to be abandoned and replaced with less costly (if slower and less reliable) bus service. Maintenance on track and equipment continued, but under increasing pressure to cut costs. Management came to give priority to profitable freight trains, and peak-hour passenger trains were sometimes tied up for 20 or 30 minutes by local freight switching moves (1).

The rail operating unions were very strong politically in Los Angeles, and they successfully lobbied for a law requiring conductors on all Pacific Electric interurban cars. The craft unions did their best to protect the jobs of track and wire maintenance crews. The union members did a good job of keeping the trains running safely, but their organizational policies discouraged any innovation likely to improve productivity.

Pacific Electric management made one final attempt to improve the quality of rail service immediately after World War II, when record passenger loads had been carried on aging equipment. The management could afford to install the tracks but not to buy right of way. The California Highway Department and Pacific Electric agreed to incorporate two electric railroad tracks in the median of the "Hollywood Parkway". The agreement collapsed when courts ruled that State gas tax funds could not be used to purchase the necessary extra right of way (a situation since corrected by the "Proposition 5" referendum in 1974). Thereafter Southern Pacific's management began seriously to look for a way to keep the freight traffic while getting out from under the passenger service.

End of the Line

Many explanations involving allegations of conspiracy of auto and bus interests have been advanced for the final abandonment of the magnificent Pacific Electric transit system. So far as I can tell, the line was abandoned because Southern Pacific management tired of supporting it financially, without aid or comfort from other quarters. None of the other entities whose help would be needed in preserving the system -- Los Angeles City Council, Los Angeles Traffic Commission, Long Beach City Council, the State Public Utilities Commission, the United Transportation Union, and many others -- was willing to sacrifice short-range objectives in order to save and rehabilitate the system. Highway funding was embedded in the State Constitution and was unavailable, and no elected public official took a leadership role in getting interest groups

to compromise or find politically acceptable sources of funds for subsidies.

In 1953, Pacific Electric passenger operations were separated from the freight business and sold to Metropolitan Coach Lines, a bus operating company which planned to abandon all of the "obsolete streetcar" lines. Even under Metropolitan Coach Lines management, even after it was partially paralleled by the Long Beach Freeway, the Los Angeles - Long Beach Line survived. The last cars running -- known as "blimps" because of their large size -- each could carry more people than two 1953-vintage buses, and they kept on rolling.

A combination of poor profits and public hostility brought an end to Metropolitan Coach Lines's control over Pacific Electric. Within five years, it was succeeded by a public body called the Los Angeles Metropolitan Transit Authority, which although publicly owned had no budgeted public subsidy. LAMTA nevertheless paid Southern Pacific to continue running the Long Beach line.

The Long Beach line finally was abandoned in 1961 because the equipment, for which spare parts could no longer be obtained, became unreliable. The Watts area, which had had excellent frequencies of local and express service on Pacific Electric, lost its good access to service and clerical jobs in Downtown Los Angeles. This loss coupled with other frustrations and disappointments, appears to have played a part in the devastating riots of 1965.

EVOLUTION OF GERMAN LIGHT RAIL TRANSIT 1950 - 1970

While the abandonment petitions for Pacific Electric lines were being processed by the California Public Utilities Commission, public decisions on light rail transit were taking a different path in West Germany.

Nazi Technology Freeze

In the early 1950's most West German cities were operating their transit systems with trains of short two-axle streetcars, little changed since those of 1914. The Nazis has frozen urban transit technology at the World War I level while building autobahns to move troops and party officials. A three-car train was operated by a motorman and three conductors. Even the 10-mile interurban line (Frankfurt Lokalbahn) from Frankfurt north to the foothills of the Taunus Mountains, was operated with "Toonerville Trolley" equipment manufactured during the 1920's.

Growth and the Need for Productivity

As prosperity returned after the "winter years" of the immediate postwar period, public transit management in West Germany was faced with four problems:

1. Their staff members were being attracted away to better-paying jobs in manufacturing;
2. Increasing motor traffic was slowing down the street railways;
3. The equipment, which dated from the mid-thirties, was becoming expensive to maintain; and
4. Passenger traffic was being increased by economic growth and migration from the east.

Although the lines were subsidized by municipal funds, the budget was growing less rapidly than the deficit. An increase in productivity was essential.

West German Transit Finance

Unlike the United States, the West German managements had strong public support and some had cross-subsidies from municipally owned gas and electric utilities (5). Thus deficiencies in fare box revenues did not have the drastic impact on transit budgets and services that they have had in the U.S. Also, West German Unions were moderate rather than militant and labor relations have been less confrontational than here. Measures and equipment to improve staff productivity were welcomed by staff and management as well as the public who rode the system.

Though there was no "well" of Federal Grant funds to be pumped out on capital projects. The properties were expected to be subsidized as a public service, but capital investments had to show a favorable discounted cash flow.

West German Transit Alternatives

Already having a "heavy" rail transit system in being, the Hamburg and Berlin officials elected to phase out streetcars (there were no interurbans) in favor of a combination of buses and "heavy" rail. These cities had extremely strong finances and the rail extensions were small relative to the system already in place. Munich elected to follow their example and build a high-platform, high-capacity grade separated system.

In Frankfurt, Cologne, Duesseldorf, Hanover, and other medium sized metropolitan areas, "heavy" rail did not exist, and grants to fund such systems from scratch were not available. Buses were not cost-effective in handling the peak loads because stop delays (dwell times) were too long and auto traffic interfered with schedules. The transit property managements of these cities followed a policy of evolutionary development of their transit systems, "souping up" their streetcars rather than building a complete new underground system.

The Articulated Car

An early productivity measure was the introduction in the early 1960's of the eight axle articulated car. Passengers boarded at the rear platform and paid their fares to a seated conductor, exiting at any of a number of doors forward of the conductor's desk. The concept was not original, having been used on the so-called Peter Witt cars in the United States and Canada during the 1920's, but the German articulated cars held about twice as many passengers. Two employees were able to carry as many passengers as four employees on the old "Toonerville Trolley" trains.

Evolution of Fare Collection

The next innovation was not so much in equipment as in fare collection and work rules. Instead of cash fares, an effort was made to sell monthly passes to commuting passengers, and to the articulated cars were attached unstaffed four-axle trailers. The trailers were operated only during the peaks and were restricted to pass users. Spot checks by roving inspectors who had the authority to collect very high cash fares -- tantamount to fines -- kept honest commuters from being tempted.

The "honor system" having worked in the unstaffed trailers, transit management and union leaders turned to driver-only operation. The motorman was allowed to sell a few cash fares, but people with passes were allowed to enter and leave by all doors, again with spot checks. The staff productivity increase more than offset any cheating that may have occurred. All this time, the only reductions in staff were for normal retirements and voluntary job changes, because the properties were constantly expanding into the suburbs. Motormen and inspectors received good pay increases.

The final step in fare collection reform was to remove fare collection from the vehicle and transfer it to concessions in small shops and coin-operated vending machines.

Passengers purchased tickets and time-stamped them while waiting to board or when boarding the car. Only one person was then needed to operate cars or trains carrying upwards of 300 passengers during peak hours. Moreover, with no fare collection delays, passengers could board or exit at any of several doors. Dwell times at stops were reduced, average line-haul speeds improved notably, and track capacity was increased.

The Frankfurt Subway and Nordweststadt

In the mid-1960's Frankfurt had the transit demand and auto conflicts which warranted a subway, but the capital investment was not available. Working closely with the city's urban planners and traffic engineers, the transit management developed a combination of a short subway in the congested downtown area (the area of the old medieval city) with rigorous transit-preference traffic controls on one of the major arterials leading into the city center. (The arterial was used by both city streetcars and the interurban or "Lokalbahn".)

Two traffic lanes in each direction plus a pair of fenced-off reserved tracks were "shoehorned" into the arterial right of way (about 25 m or 80 feet wide). There was no stopping and left turns were prohibited at all inter-sections. High platforms were provided in the middle of the street between the tracks, and these were accessed by pedestrian subways (no provision for wheelchair users).

The subway and arterial traffic control scheme was coupled with a "new town" about 15 miles from the center of Frankfurt, called the "Nordweststadt" (literally "Northwest City"). A new branch line terminated in the basement of the town center complex.

New equipment was ordered from the manufacturer of the articulated cars. The new cars were about 22 m (75 feet) long, had six axles, and were articulated (hinged) in the middle. They were designed to be operated in trains of up to four articulated cars. Of significance perhaps for Southern Californians, they were painted red.

The decision to build the Frankfurt northwest line was taken in 1964. Construction was underway in 1965 and the line was opened by 1969. This is less time than it takes to get an EIS signed off by the Urban Mass Transportation Administration in the United States.

REVIVAL IN SAN DIEGO

Like most American cities, San Diego had had an urban streetcar system in the period from 1890 to 1950. The strongest line had run north from the downtown area to University Heights and then east toward San Diego State. There had been a line to National City, but the right of way of the present trolley was used only by infrequent steam trains. The old streetcars were retired and replaced by buses a few years after World War II.

By 1977, 30 years later, the City had a population of over 700,000 in a metropolitan area of over a million. Though the city had a good freeway and controlled-access arterial system, a need for rail transit was seen by metropolitan and State transportation planning officials.

The MTDB and its Charter

The Metropolitan Transit Development Board was set up by the State at the behest of the President pro tem of the Senate, who represented the San Diego area and had an ongoing interest in rail transit. One of the board's responsibilities was development of plan to implement rail transit in San Diego County.

Initial Heavy Rail Concepts

Light rail was initially excluded from the Board's analyses because it was "obsolete", "inefficient", "too slow", and "unworkable" -- the usual reasons for premature rejection. The staff hired a strong team of consultants headed by Bechtel, which had built BART and MARTA (Atlanta). The consultants were to study regional rail and express bus alternatives, with the rail alternatives being modeled after the successful Lindenwold line in the New Jersey suburbs of Philadelphia.

The UMTA staff held out no hope of funding a rail system in San Diego for the foreseeable future. The need for a short but expensive subway into Downtown San Diego limited the line length of each rail alternative to about five miles. Under these constraints, none of the the three financially feasible rail alternatives could attract any more passengers than the existing bus system.

The Board's Trip to Europe

While the consulting engineers were mapping initial rail alternatives and preparing preliminary representative designs for cost estimation, the Board members scheduled a

trip to Europe, which included Frankfurt. The Board members saw what could be done with light rail transit at grade when traffic controls favored the transit vehicles. The terms of reference for the consultants were extended to include light rail alternatives.

Breaking the Rules -- Successfully

In the final analysis, opportunity and intuitive judgement were more important than sophisticated mathematical models in the decision to build the San Diego trolley. The models were calibrated to travel by San Diego regional residents and could not predict any use of the Line by Mexicans boarding in San Ysidro. The line was built as single track, when the models said it would be overloaded. It was fitted into the downtown street system at grade, with strong misgivings, by the City's traffic engineers. The Southern Pacific, anxious to get out from under maintenance costs of a branch line, sold it to the Board at the Board's price.

The line was operated by a local agency separate from San Diego Transit and therefore exempt from its labor contract constraints. The European fare concept was imported successfully, so that one motorman could run a three-car train carrying over 400 people in the peaks. Electronic ticket dispensers, automatic train operation, automatic fare collection, and all the other sophisticated electronics that plagued BART in the beginning were avoided. The cars arrived from Germany and worked as smoothly and reliably as Maerklin trains. Like their Frankfurt prototypes, they were painted red.

LOS ANGELES PROSPECTS

Conventional "heavy" rail rapid transit lines have been proposed in Southern California since 1906 (4). They were not built, according to Professor Wachs, because the threshold investments were much higher than those for the highway system. Every referendum for bonds or additional taxes to build a "heavy" rail line or system in the region was voted down. Monorails and other exotic concepts were proposed but never got beyond preliminary studies. The El Monte Busway, which follows part of the right of way of Pacific Electric's Covina Line, successfully attracted passengers away from autos, but the peak hour buses on the special roadway required a bus driver, often at premium rates, for every 60 to 70 passengers.

Using a federally approved transportation planning process, staff and consultants of the Southern California Rapid Transit District designed a "heavy" rail (Metro Rail)

"starter" line 18 miles in length and projected to cost about \$3,000,000,000. The line successfully negotiated the Federal and State environmental impact procedures, but is presently in limbo because of Federal funding constraints and questions about safely tunneling through natural gas deposits.

Light rail was proposed by the consultants for inclusion in the Metro Rail alternative analysis process but was rejected by the Rapid Transit District for the usual reasons. Public comments about the attractiveness of the old Pacific Electric Red Cars were dismissed as nostalgia. (Even a proposal for direct access from a Metro Rail station to the Subway Terminal Building -- a 1926-vintage example of successful joint development -- was rejected by the Metro Rail station architects.)

The San Diego Trolley was planned, built and opened while Los Angeles area transit planners were working their way through the UMTA-mandated decision making processes. The success of the RED CARS in San Diego led the California Department of Transportation to commission a study of the Long Beach line, which was still in place between Willow Street in Long Beach and Olympic Boulevard in Los Angeles.

Similarities to Pacific Electric

The line which LACTC is about to begin building, duplicates Henry Huntington's original alignment, except that it will serve the newer offices on the west side of Downtown Los Angeles. The Los Angeles Department of Transportation and the City of Long Beach agreed to reserved lanes for light rail in Washington Boulevard and Long Beach Boulevard respectively. (Had they done so in 1946 or even 1956, the line might never have stopped running.)

The electorate of Los Angeles County passed a sales tax measure in 1980 which, confirmed by a 1982 court decision, can ultimately fund restoration of electric railroad service to Pasadena, Inglewood, Manhattan Beach, and perhaps even Glendale and Van Nuys. The new lines will likely use some of the remaining disused Pacific Electric rights of way.

Unresolved Questions

Despite the present good prospects for light rail transit in Southern California, there are a few niggling questions which must be answered favorable if this valuable and cost-effective means of access to major employment centers is to be successfully restored:

1. Present laws require the existing Southern California Rapid Transit District (SCRTD), an organization that has never before shown much interest in light rail transit, to run the Long Beach line. The management of SCRTD have trouble supplying reliable bus services; will they be able to achieve the same quality of schedule-keeping, staff courtesy, and vehicle maintenance that one finds in San Diego?
2. If SCRTD is responsible for running the light rail line, will the same labor contracts that make the El Monte Busway services so expensive to run, be applied to light rail as well?
3. The European "honor" fare system has been successfully used in San Diego but has failed in the Netherlands. If used on the Long Beach line, will it work with the ethnic culture found in South Central Los Angeles?
4. The number of interest groups and municipalities in Southern California staggers the imagination. Will local political interests, unconcerned with transportation, force expensive improvements because of envy for other areas?

To sum up, light rail transit can be an extremely cost-effective means of public transportation, attractive to the user and supportive of both high and low density development plans. To be successful, it requires that transit vehicles be given preferential use of street space, that the related traffic controls be enforced, that labor unions avoid featherbedding in their contracts, that passengers police each other insofar as fare collection is concerned, and that the public and their elected officials support operations with modest subsidies.

It was lack of articulate public support and conflicts among affected interests that killed light rail transit in Southern California 25 years ago this month. Strong public leadership and a sense of community were needed to develop the concept in Frankfurt and in San Diego. They will be needed in Southern California as well for the Red Car Revival to be successful.

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