Light Rail Transit Development in the United States

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Pittsburgh's Port Authority Transit (PAT) is acquiring 55 of these high-performance LRVs from Siemens Duewag for placement into service in 1985.

TRB ANNOUNCES NATIONAL LRT CONFERENCE

The Conference on Light Rail Transit: System Design for Cost Effectiveness will be held May 8-11, 1985, at the William Penn Hotel in Pittsburgh, Pennsylvania. The conference will address issues relating to infrastructure reconstruction, car design, cost-effectiveness, comparisons with other modes, operations, planning, and technology applications. Robert L. Landgraf of the Greater Cleveland Regional Transit Authority is Conference Chairman. Robert P. Sedlock of the Port Authority of Allegheny County is Co-Chairman for local arrangements.

When the Urban Mass Transportation Administration asked TRB to sponsor the first National Conference on Light Rail Transit in 1975, the acronym for light rail transit, LRT, was almost unknown to most transportation profes-

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sionals. The general public had even less awareness, because the development of LRT systems was just beginning in North America. Worldwide, more than 300 cities had operating systems at that time, of which only 4 were in the United States. In three other U.S. cities, there remained a line of old streetcar networks. Thus it was not surprising that the public media reported the excitement displayed at that first conference as a rebirth of the streetcar. One national weekly entitled its article "The Trolley Clangs Back."

Since the early 1970s the light rail concept has gained increasing acceptance in the United States. The decisions made by the cities of Boston and San Francisco to modernize their aging light rail systems and to purchase new light rail vehicles to replace 30- to 40-year-old equipment signaled a crucial change in attitude toward transit in general and light rail systems in particular.

The feature that distinguishes LRT most sharply from other urban transit modes is the diversity of options for right-of-way location and configuration, design of guideway and stations, and operations. This flexibility and diversity translates into great cost advantage, because fixed facilities need not be built to the same standards over the entire length. Costs per mile may be less than $10 million, as the city of San Diego has demonstrated; or in the range of $10 to $20 million (costs of systems in other North American cities), or as high as $70 million (where local conditions have dictated the placement in tunnels).

To yield maximum benefit, light rail systems should operate primarily on exclusive or reserved right-of-way, separated from traffic. However, separation from other traffic is not a rigid requirement. Operational considerations can be tolerated that include short sections of mixed or otherwise nonexclusive operation. If the line is at the surface, traffic-controlled grade crossings are provided along with preferential signalization at intersections. At heavily traveled crossroads, grade separation structures can be constructed, or the guideway can be placed on an aerial viaduct.

LRT stations need not be elaborate; they can be as simple as a loading area on a city street that is delineated by pavement markings. Or they can be constructed as high-level platform stations with full fare-collection controls. For increased operating efficiency, many new and planned LRT systems are adopting a barrier-free fare system in which tickets are dispensed by machines at stations with self-validation by patrons.

Two San Franciso LRVs, trained for high-capacity service, approach St. Francis Circle south of Twin Peaks Tunnel.

LRT IN CALIFORNIA

The West Coast has embraced the light rail concept with surprising fervor, with six urban areas operating, constructing, or planning light rail systems. San Francisco's Municipal Railway (Muni), which operates the oldest service (dating back to 1912), has formulated ambitious plans to expand its Muni Metro LRT system in the mid-1980s. It is expected that Muni Metro will be extended down the 3rd Street corridor into South San Francisco with the first leg of line constructed to the Caltrans commuter rail terminal at 4th and Townsend. Other plans call for two lines to operate along the Waterfront and down Market Street to the Civic Center utilizing vintage trolley cars. In the distant future, it is planned to extend Muni Metro west of the downtown section in the Geary/Post street corridor. For the present, the San Francisco Public Utilities Commission has given permission for a short extension to the "J" line along San Jose Avenue to a BART station, a distance of 2.3 miles.

To the south of San Francisco, Santa Clara County has received final approval to construct a 20-mile LRT system connecting the northern and southern portions of the county with downtown San Jose. The focal point of this line is a vehicular mall in the center of San Jose that will include paired one-way streets limited to LRT and buses (with automobile access at several critical street locations). In addition to the downtown mall, the line will make use of a variety of available rights-of-way including road medians, railroad alignments, and land originally reserved exclusively for a long-planned highway. The single route will require a total of 30 articulated light rail vehicles (LRVs) to be manufactured by UTDC/Hawker Siddeley of Ontario, Canada. The system is scheduled to begin service in 1986 and will cost $320 million (1983 dollars).

Farther to the northwest, California's capital city, Sacramento, has embarked on the construction of an 18.3-mile LRT line. The line forms a U-shape with the bend located in the downtown section. The line is expected to cost $131 million; financing will come from federal, state, and local resources. The line will utilize abandoned highway rights-of-way and will initially feature some single-track operation on the outer segments of the system. A total of 26 articulated LRVs of German design have been ordered from Siemens-Allis, with an option for additional purchases. The unit cost of the LRVs is $785,000. The system, projected to begin operation in 1986, will eventually carry 32,000 passengers per day, or 40 percent of the region's transit trips.

Articulated LRV developed by UTDC/Hawker Siddely at the company's Kingston, Ontario, Canada, research facility. LRVs to be manufactured for Toronto, Canada, and Santa Clara County (San Jose), California, will be based on the design of this car.

In the far south of California, San Diego's highly successful 15-mile light rail line to the Mexican border at San Ysidro enters its third year of operation. Ridership on the line averaged over 12,000 daily passengers in the second year of operation and reached 14,500 by mid-1983. An additional 10 LRVs were delivered by Siemens Duewag to bring the fleet total to 24 vehicles.

San Diego's Metropolitan Transit Development Board (MTDB), which designed and constructed the south line (operated under contract by a private company), hopes to initiate construction in 1984 for a 17.3-mile extension of the system to the city of El Cajon in the eastern suburbs. The extension, which will cost $107 million (by contrast, the south line cost $86 million), will require an additional 15 articulated LRVs. The MTDB has also initiated engineering studies to assess extensions to the San Diego Airport, to the Point Loma/Ocean Beach residential sections, and to La Jolla and Mission Valley north of the city.

In Los Angeles, the Los Angeles County Transportation Commission (LACTC) is well into a comprehensive engineering effort to complete plans for a 22.5-mile LRT line linking the downtown sections of Los Angeles and Long Beach. Latest estimates identify a $290-million level of investment for the line, although the exact routes in downtown Los Angeles and Long Beach have not been completely determined. The Commission's timetable projects the completion of all engineering and design

FUTURE DEVELOPMENT

Other parts of the country currently without rail transit service are actively pursuing LRT options with varying degrees of interest. In Dallas, Texas, a voter-approved referendum provides for a 160-mile rail system to be constructed in increments over a 28-year period. The referendum also contains a dedicated tax for the transit improvements. The approved plan calls for the majority of routes to be located in existing railroad rights-of-way with only about 3 to 4 miles of subway in downtown Dallas. LRT is expected to be chosen as the implementing mode.

The Minneapolis-St. Paul region is seriously studying the LRT option for the heavily traveled University Avenue corridor that links the two cities. The city of Milwaukee, Wisconsin, is currently refining plans for a possible LRT line to the western suburbs, while Orlando, Florida, is examining LRT and other alternatives for a key corridor near Walt Disney World.

In New York City, a longstanding proposal to establish an LRT line along 42nd Street (a major east-west arterial) has resurfaced. The city will study the potential effects of the proposed line on traffic in the corridor. The line is viewed as an integral component in the redevelopment of the 42nd Street corridor. More than $1 billion in redevelopment projects are currently planned for the Times Square section.

For cities where the LRT concept was given new life (including San Francisco as previously mentioned), plans for improvements abound. In addition to ordering 45 new articulated LRVs from a Japanese manufacturer, Boston's Massachusetts Bay Transportation Authority (MBTA) is considering a light rail facility as replacement for the soon-to-be-demolished Washington Street elevated line. The MBTA is also examining a possible extension of the Green line (LRT system) from a present terminal across the Charles River at Lechmere to Somerville along an existing railroad alignment.

In Pittsburgh, Pennsylvania, work is well advanced on the complete reconstruction of an existing system. The 10.5-mile segment involved in the first stage will also include short subway sections in the central business district and in suburban Mount Lebanon. Port Authority Transit (PAT) has ordered 55 new articulated LRVs from Siemens Duewag as part of the renewal effort, and will completely rebuild 45 existing PCC cars for service into the next century.

The city of Philadelphia has recently placed 141 new single unit LRVs (purchased from Kawasaki of Japan) into service on both suburban and city portions of its light rail system. A patronage increase of 50 percent was measured on the city segment and is believed to be the result of the reliability and comfort of the new vehicles.

CONCLUSION

LRT is not a panacea for the transportation problems of all cities, but it can be an attractive alternative to rapid rail transit, railroad commuter service, or busways. Today over two dozen cities in the United States are either building or expanding light rail systems or seriously considering new systems. In many cases, the systems are not extensive networks, but are single or multiple lines in selected corridors that require medium-capacity transit facilities. In these situations LRT can be a practical option, significantly less expensive than conventional rapid transit, yet offering an attractive level of service. These cities have demonstrated that light rail transit is an important element in the family of urban transportation modes, which can be cost-effectively constructed and operated.

Third Edition of *Highway Capacity Manual* To Be Published

Transportation Research Circular 281, *Proposed Chapters for the 1985 Highway Capacity Manual*, just published by TRB, marks the first appearance of what is expected to be final text for portions of the third edition of the *Highway Capacity Manual*. Four of the 15 chapters to be included in the new *Manual* are presented: *Basic Freeway Segments*, *Ramps and Ramp Junctions*, *Multilane Highways*, and *Unsignalized Intersections*. The first two chapters and the last replace material on the same subjects published in Transportation Research Circular 212: *Interim Materials on Highway Capacity*. The chapter entitled Multilane Highways replaces procedures described in TRB Special Report 87: *Highway Capacity Manual*, published in 1965.

The 1985 *Highway Capacity Manual* will be organized into four major parts. Each chapter will include step-by-step analysis procedures, example problems, and sample worksheets. After the *Manual* is published in 1985, future updates will be on a chapter-by-chapter basis.

The 15 chapters in this third edition come from several sources. In some cases, they represent the results of funded research specifically commissioned for the development of new *Manual* material. At the other extreme, some chapters represent the voluntary contributions of members of the TRB Committee on Highway Capacity and Quality of Service. Still others represent mixed sources of input that become nearly impossible to accredit. Nevertheless, all chapters have two features in common: each has been prepared by the research team assembled under Dr. Roger P. Roess of the Polytechnic Institute of New York and Dr. Carroll J. Messer of Texas Transportation Institute; and each has been thoroughly reviewed by members of the NCHRP project panel monitoring the work, by members of the TRB Committee on Highway Capacity and Quality of Service and its subcommittees, and by many individuals not affiliated with either group who have volunteered their time and interest.

It is expected that one or more circulars containing additional chapters will be prepared and distributed before publication in 1985 of the complete *Highway Capacity Manual*. Transportation Research Circular 281 is available at a cost of $12.00 from the Transportation Research Board, 2101 Constitution Avenue, N.W., Washington, D.C. 20418 (telephone: 202-334-3218).

CALL FOR ARTICLES

Professionals in the transportation field are invited to submit to the *TRNews* Editorial Board topical articles on innovative or state of the art aspects of the various modes of transportation. Articles that highlight the role played by research are especially desired. Feature articles should be 1,500 to 3,000 words in length and accompanied by appropriate, high-quality illustrations.

Letters to the Editor are encouraged that offer commentary on feature articles or responses to point-of-view articles, or in general discuss issues related to transportation research or to TRB activities. Comments are also welcome on the changes in format, design, and contents, since the change in editorship of *TRNews* beginning with the January-February 1984 issue.

All articles and letters received will be reviewed by the Editorial Board of *TRNews* for suitability for publication. For further guidelines, see Information for Contributors on the inside back cover.

–Nancy A. Ackerman, Editor