ABSTRACT

In recent years interest in light rail transit has grown substantially in the United States. The concept of LRT is increasingly viewed as a possible answer to the search for a less costly rail transit technology that could reduce America's dependency on the private automobile and put the country on the road to a more secure, self-sufficient energy future. The paper reviews recent LRT developments in four American cities, two of which have undertaken to rehabilitate and upgrade their existing surface street railway systems, and the other two have embarked upon construction of entirely new light rail systems.

Introduction

Light rail transit is hard to define. The difficulty stems from a number of causes. It is not the product of a single invention such as Frank Sprague's trolley. It did not materialize at one moment as did Andrew Hallidie's cable car. Finally, its current physical characteristics are so varied that a convenient definition is practically overwhelmed by exceptions.

In a sense this problem has much to do with the heretofore slow pace of Light Rail Transit (LRT) development in the United States. When America's transportation specialists attempt to describe LRT, the perception is often a confusing kaleidoscope of form and function with a strong coloring of the old fashioned streetcar. The result is that while LRT has flourished in some parts of the world, it seldom progressed beyond the conceptual stage in the U.S.A.

Some Parameters of LRT

In order to chronicle recent LRT developments in the U.S. some characterizations are required. Otherwise the separate events cannot be assembled into a trend. A prime characteristic of LRT is a state of flux. The technology, itself, is constantly changing. Vehicles are growing in size and performance, while innovation in fare collection and traffic control is commonplace. Then, too, the individual systems are evolving. Most came into being as mutations from obsolete street railway systems. Now nearly
everywhere there are upgrading programs with goals of greater speed, capacity, reliability and productivity.

A classic example can be found on the Green Line System of the Massachusetts Bay Transportation Authority. In 1959 a new LRT route was inaugurated on a former steam railroad branch. The conversion cost for the 9.4 miles was $9.2 million - a modest sum even in those days. Since then patronage has nearly doubled, so in 1973, in connection with the acceptance of new vehicles, the Authority launched another modernization program. This produced new roadbed, track, traction power substations and a vehicle maintenance facility. The new cost: $26.1 million. The line is still LRT, but in terms of comfort, capacity and reliability it is strikingly different from its predecessor.

As previously indicated, the other basic feature of LRT is the variety of its physical aspects - notably rights-of-way and vehicles. LRT can be located in streets, highway medians, pedestrian malls, elevated structures and tunnels. At one end of the investment spectrum it resembles its predecessor, the streetcar. At the other, it is hard to distinguish from its more costly relative, high capacity "heavy" rail transit. Vehicle length varies from 40 to 126 ft. Interestingly enough, LRT vehicles are usually heavier, on a linear-foot basis, than heavy rail transit cars.

**LRT as a System**

It is little wonder, then, that the layman is confused when exposed to such disparate aspects. The key to an understanding of LRT, and more importantly to its success, is the development and functioning of the different elements as a system.

LRT can be initially implemented on low cost surface alignments which may necessitate operations in or across general traffic arteries. Such conditions result in lower speed and reliability than is possible with complete segregation. However, the construction cost of such alignments is typically one-twentieth the cost of subways, so much more mileage can be developed for a given budget. Then as environmental and traffic conditions require, specific segments can be upgraded in a logical sequence to provide greater speed and reliability. Meanwhile, the system as a whole is providing a greater transit coverage at an earlier date than would be possible with full scale heavy rail transit.

At the opposite end of the capacity scale LRT offers advantages over the bus. The electrically propelled vehicles are non-polluting, and the remote energy generating units can consume non-petroleum based fuels. Additionally, since LRT is a fixed guideway mode, trains can be lengthened or shortened in direct response to daily fluctuations in patronage, while