LIGHT RAIL TRANSIT AND OTHER MODES

Blurring the Light Rail Transit–Bus Rapid Transit Boundaries
Rapid Light Transit

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During the last 30 years, light rail transit (LRT) has overtaken heavy-rail rapid transit as the high-capacity, high-performance transit mode most often chosen for new urban transit corridors in the United States. Now one may find that bus rapid transit (BRT), typically with lower cost than light rail but similar capabilities, may overtake LRT as the mode of choice for corridors in which capital-intensive transit is justified. What is involved in deciding upon a best course of action? Are these "either–or" technologies, or simply different expressions of the same concept? The author argues in favor of the latter, and suggests a new term encompassing common forms of both modes, rapid light transit (RLT).

LRT and BRT in terms of the functions to be served, the forms fulfilling those functions, similarities between BRT and LRT regarding those forms, and issues of cost, funding, and implementation are explored. It is noted that the BRT form of RLT is almost always the lower-cost alternative; a metropolitan area will be able to deploy a network of high-performance transit more extensively and quickly as BRT rather than as LRT. Also noted are reasons why LRT may be chosen despite its higher cost, but the potential for using BRT as a first step, with later conversion to LRT, is also discussed. An RLT facility might also share BRT and LRT vehicles, or even be converted from LRT to BRT—a simple transition if light rail has been built with tracks embedded in pavement suitable for BRT vehicles.

INTRODUCTION

Consider this description of a public transportation technology:

- Operates in a reserved guideway with at-grade crossings; the guideway sometimes shared with other vehicles;
- Stops only at dedicated stations, more widely spaced than local bus stops;
- Has vehicle floors level with station platforms;
- Has off-vehicle fare collection;
- Has multiple doors, all for combined entry and exit;
- Uses traffic signal priority or preemption and other traffic and operations management methods and technologies to provide on-time, predictable arrival times with minimal delay;
- Provides a smooth, quiet ride at average speeds often competitive with travel by private car; and
- Can provide ample passenger capacity for most corridors in major U.S. cities.

What transit mode or modes fit that description? Light rail transit (LRT) certainly comes to mind immediately, but all these characteristics can be true of bus rapid transit (BRT) as well. The thesis of this paper is that both LRT and a particular definition of BRT conform to the functional definition listed above. If that is true, is it not appropriate to establish a name for this "mode"? The name rapid light transit (RLT) is proposed.

There are advantages in having such a term. One reason is that it will differentiate between this special form of BRT and the wide variety of other valid but different physical and operational characteristics currently encompassed by BRT as it is being applied in the United States. Another reason is that the broader definition of RLT would be less prescriptive of investment and operational characteristics than are the terms LRT and BRT; if a broader technological envelope is specified initially there is less likelihood of studying technology-specific alternatives that may prove to be infeasible.

THE ISSUE

During the last 30 years (1972–2001), light rail has overtaken heavy-rail rapid transit (HRT) as the mode most often chosen for high-capacity, high-performance transit corridors in the United States.

Within that period there have been more miles built as HRT than as light rail, but those miles include three major new systems all under construction by the 1970s—San Francisco, California; Atlanta, Georgia; and Washington, D.C. Three other cities built or expanded HRT during that period, the most recent in 1993 (*1*). All these projects together have added about 40% to HRT route miles in the United States (*2*).

New light rail lines opened during this period in 12 cities (*1*), expanding total light rail route mileage by some 65% (*2*). Opening of these light rail lines occurred between 1981 and 2001 (*1*). Figure 1 illustrates the numbers of HRT and LRT projects carried out during this period.

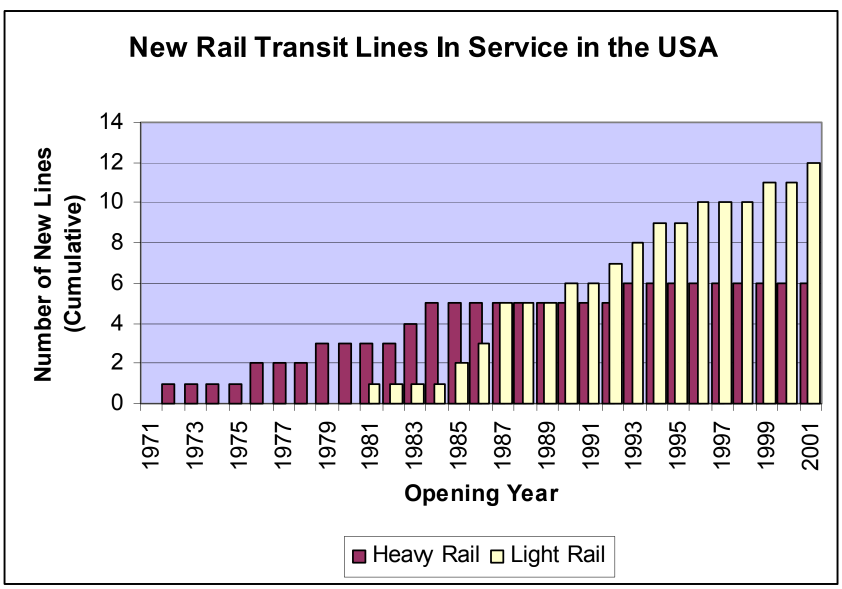

FIGURE 1 Light rail implemented more frequently than heavy rail rapid transit. Source: American Public Transportation Association, 2003.

As of September 2002, there were 21 light rail, or Diesel Multiple Unit, projects in the FTA New Starts pipeline, contrasted with 6 heavy rail or guideway projects (*3*).

This shift from HRT to LRT is logical, considering the fact that in the United States there are progressively fewer corridors in which there is sufficient demand potential to justify fully grade-separated transit, while at the same time, many cities are growing beyond the level at which conventional local and express bus services can provide an adequate public transportation solution.

In recent years, another candidate technology for high capacity, high level-of-service transit corridors is growing in prominence. In transit corridor studies, BRT, by one definition or another, is often an alternative to LRT. One view of this development is that BRT, typically with lower cost than light rail but similar capabilities, may overtake LRT as the mode of choice. What is involved in deciding upon a best course of action? Are these truly "either–or" technologies, or simply different expressions of the same concept?

It is proposed here that LRT and similarly configured BRT are different expressions of the same functional concept, and as such deserve a new term encompassing both modes: "rapid light transit." Why? To help transit professionals avoid the persistent planning problem of dealing with a technology in search of an application, rather than a need met by a best solution. How will RLT be of help? By providing a transit form identifier that is function-oriented rather than technology-specific, avoiding premature focus on technology differences that may not be relevant to the transit problem being addressed. Another advantage of the term is that it can identify a form of BRT that has a more specific definition than is currently found in the United States, where a variety of features and operating modes have been gathered within the umbrella of BRT.

THE CONCEPT—FUNCTIONS TO BE PERFORMED

One must recognize that what is being accomplished in terms of mobility objectives, when choosing light rail or a similar technology, is the introduction of public transportation measures that achieve improved speed, predictability, passenger amenity, and passenger capacity. This is accomplished by means of features such as providing a reserved guideway, limiting the number of stops, collecting fares in stations rather than on vehicles, minimizing traffic conflicts, giving priority or pre-emption at traffic signals, providing stations that offer more comfort and amenity than ordinary bus stops, and using large vehicles or trains with multiple doors. Minimization of air pollutant emissions and noise may also be an objective.

There may also be objectives pertaining to ease of understanding the route (e.g., by means of prominent stations with names related to neighborhood features). This can be beneficial to all passengers, but perhaps is appeals especially to visitors or others who are not familiar with a city's transit system. A sense of physical presence and permanence may also be desired to encourage economic development, transit-oriented development, or sustainable development.

To expand upon these points, an effective LRT or BRT route normally would minimize passenger waiting times, stopped time, in-vehicle time; maximize capacity; provide a smooth and quiet ride along an understandable route; and achieve sense of permanence.

Minimal Passenger Waiting Times

Service is frequent and predictable; ideally, service at least during peak periods is so frequent that passengers feel no need to refer to timetables or to time their arrival at stations. At other times of day, service should be on time and preferably at easily remembered “clock-face” times, for example, on the hour, quarter hour, half hour, and so forth. Both LRT and BRT can fulfill this requirement, especially if operating mainly in reserved right of way, with traffic signal priority, and with advanced-technology operations management. BRT typically uses a smaller-capacity vehicle than LRT’s individual vehicles or trains, so service frequency tends to be higher and waiting times less.

Minimal Stopped Time

As little time as possible is lost due to stopped time at stations, traffic signals, or other traffic conflicts. Stopped time at stations can be minimized by collecting fares on station platforms rather than as passengers enter vehicles, by providing station platforms level with car floors, for rapid entry and exit, by meeting requirements of the Americans with Disabilities Act (ADA) without resort to bridging plates, wheelchair lifts, or other mechanical devices, by use of vehicles with multiple doors, and by avoiding excessive crowding on vehicles. LRT typically meets all these requirements, especially if low-floor vehicles are used. BRT has these capabilities, possibly including the use of automated guidance at stations to position vehicles precisely in relation to station platform edges. Traffic management methods apply equally to LRT and BRT.

Minimal In-Vehicle Time

Vehicles should operate in a reserved right of way, and use traffic management methods including traffic signal priority to minimize delay due to other traffic. Station spacing should be set for optimal passenger travel times, considering passenger trip lengths and the interfaces with access modes, including other transit services, walking, and park-and-ride opportunities. Vehicle performance (acceleration, deceleration, and maximum speed) should be suited to the route and station spacing. This functional requirement is largely based on LRT capabilities. BRT is easily conformed to the same requirement, with the possible exception that currently available articulated buses may have lower acceleration rates, and some have lower maximum speed capability than typical light rail vehicles (LRVs) deployed in the United States.

High Capacity

The system should have ample capacity for anticipated passenger demand within major transit corridors in U.S. cities where it may be deployed. LRT achieves high capacity by operating large vehicles operating singly or in trains. BRT provides conventional or articulated buses, which have lower capacity but can operate at higher frequency, since multiple buses can be stopped at a station simultaneously, depending upon station length.

Understandable Route

The attractiveness of the service to passengers—including visitors to a city—will be enhanced if the route is visible, clearly mapped on information sources (e.g., on vehicles and at stations), and it is understood that the service is constrained to that route. LRT readily satisfies that requirement; BRT can be built in this form.

Smooth, Quiet Ride

The system is attractive to passengers and not an imposition on neighborhoods through which it passes. Ride comfort is ample and both in-vehicle and external noise levels are well within accepted limits. LRT achieves these requirements. Bus technology is addressing these requirements through developments such as automated vehicle guidance by mechanical, optical, or magnetic means, and the introduction of better sound suppression including use of electric drive motors in hybrid or all-electric applications. The running surface is also a key variable in ride quality, and is, for buses, much more manageable in a reserved right of way than with ordinary in-street operation.

"Presence" and Sense of Permanence

This is a key not only to public understanding of and comfort in using the system, but also in attracting transit-oriented sustainable development. Suitably prominent well-designed infrastructure (guideway and especially stations) satisfies this requirement. A natural attribute of LRT, these design characteristics can apply equally to BRT.

FORMS OF AVAILABLE RLT (BRT AND LRT) TECHNOLOGIES

Those functional attributes can be achieved in more than one way, as already noted in the preceding section. Within the range of transit and transportation professions, the attributes of LRT are well known, and understood to satisfy the functional characteristics described above.

Light Rail Transit

Features of LRT as commonly found in the United States include:

- Articulated reversible LRVs around 90 ft in length;
- Capability to operate LRVs individually or in trains two to three or more cars in length;
- Low-floor vehicles with multiple doors and doorway floors at the same level as station platforms;
- Electric propulsion using overhead electrification;
- Reserved right of way operation on ballasted or embedded track; and
- Traffic signal priority and other traffic management techniques to minimize delay and service unpredictability.

Bus Rapid Transit

With the exception (usually) of operation in trains, buses operating on "guideways" of appropriate design can also achieve those requirements. The perfect BRT vehicle for applications in this country may not yet be "off the shelf," but it is not far from being in production. Buses now available or under development, based in part upon European technologies, include features such as:

- Clean-fuel, fuel cell, electric, or various hybrid motive power sources;
- Effective quieting of engine noise;
- Low-floor design for ease of entry and exit from low station platforms;
- Multiple doors, and doors on both sides if needed;
- Articulated and even double-articulated design, for high passenger capacity; and
- Vehicle guidance technologies (e.g., curb, optical, magnetic, or center-track guidance), enabling positioning at stations with the precision necessary to comply fully with ADA requirements without resort to bridging plates or other mechanical devices. Automated guidance may also be appropriate for an entire line rather than just at stations.

Regarding the capacity issue, stations can be built to accommodate several buses simultaneously, allowing operation of buses at closer headways than are advisable for light rail trains, and thus providing capacity not too far below that of light rail trains.

FACTORS IN CONSIDERING RLT APPLICATIONS

It has been shown in the previous sections how both rail and bus fit within a common functional description of high capacity, high performance urban transit routes and services – Rapid Light Transit. To reinforce this concept, it is worthwhile considering some of the factors that have tended to interfere with this view. The discussion in this section also suggests how RLT can be considered without predisposition toward rail or bus, and how, finally, the differences between rail and bus RLT may be brought into the picture and expressed.

Factors that Separate Rail and Bus

Typically, the image of light rail, to the public, is of a "permanent," understandable facility and service, quiet, comfortable vehicles, and a general impression of high quality. The public image of buses, in contrast, tends to be formed by the character of local buses operating in traffic on city streets. Street design typically has included no special provision for bus operation. Both vehicles and streets may be inadequately maintained. Lacking knowledge of BRT examples, the public tends to think of BRT as a mode that will share those same undesirable characteristics. The image is further distorted, even among those with more knowledge of public transportation, by the fact that there is no universally accepted definition of BRT, and by the temptation in BRT applications to exploit the "flexibility" of buses by designing services that are not exclusively within fixed-guideway alignments.

Similarly, to the developer, light rail possesses that image of permanence, with fixed station locations that are readily accepted as nodes of accessibility having the potential to support and reward investment in residences or businesses. This same vision is not necessarily accorded to BRT, not because it cannot have those same attributes, but because the term "bus" invokes images of ordinary bus service and tends to cloud the image actually consistent with the LRT-like concept of BRT described here.

As noted briefly above, because buses can operate anywhere there are streets, there is a tendency to exploit that feature in a BRT application, by designing service that includes operation both on and off the guideway portion of a route. On paper, at least, this appears to optimize the transit solution. In reality, it may remove too much of the understandability, predictability, and exclusivity of the service, with the result that it does not truly meet the service criteria being sought, nor stand to win the acceptance accorded to LRT. In some cases, that type of "compromised" system may be the right answer.

Describing Rail and Bus as RLT

The operational concept proposed here is a limited one, as relevant for rail vehicles as for buses. After all, in public transportation there are many vehicle systems that run on rubber tires but only on fixed guideways. They range from Metros in Paris, Montreal, and Mexico City to numerous automated guideway systems and most monorail systems. Why not also define a form of BRT that is equally exclusive, and a true alternative or companion to LRT?

If this is accepted, then it is appropriate to have a new name for the technology. The name should not contain the word rail or the word bus. It should express the fundamental functions and advantages provided. The term RLT, as introduced earlier in this paper, is proposed. This name should be readily understandable: there is widespread understanding of the term rapid transit, and of the kind of difference expressed by inclusion of the word *light*. At the same time, the unnecessarily restrictive words *rail* and *bus* are omitted.

Use of this functional classification, so named, should give a planning framework that does not require premature selection of all the physical characteristics of the technology. An RLT route would be described generically as a major corridor high capacity route operating primarily or entirely in reserved right of way (with at-grade crossings as required), providing frequent, limited-stop service significantly faster than local bus service, providing stations rather than simple stops, and employing traffic signal priority (or pre-emption, if appropriate) and other traffic management methods to achieve a high level of predictability.

Applicability of Differences between Rail And Bus

Ultimately, a RLT route will be either bus or rail, although at different points in time it may change from one to the other or even have periods when bus and rail share the use of a guideway. This flexibility is a valued characteristic and an integral part of the rationale for use of the term RLT. Nevertheless there will be times in the process of planning and implementing a route, or its later modification, when rail versus bus decisions will be made.

In this section of the paper, factors that may lead toward bus or rail are explored. Every city, and every corridor within a city have unique circumstances that affect decisions, so the information presented here provides only general guidelines. Nevertheless, this material may provide a useful reference.

Comparative Costs

How do rail and bus, as alternate forms of RLT, relate to one another in terms of cost. One reason why this may be important is to demonstrate that BRT may justify as much specialized design and investment as LRT—design and investment necessary if BRT is to emulate the exclusivity found in a well-executed LRT project. To that end, an example is given here in the form of a brief analysis of a typical RLT line, as implemented for various demand levels and using rail and bus technology. The analysis is based on the author's recent experience in transit major investment, alternatives analysis, and preliminary engineering studies, and uses methodologies and cost models derived from those sources.

Capital Cost An understanding of cost differences between LRT and BRT is not easily found, due to the limited number of cases for which there are directly comparable actual cost data. Furthermore, although many studies consider both modes, there is little consistency among them in the definition of each mode, and especially in the design features of the BRT alternative. Even if one adheres to design criteria calling for an identical alignment and stations, there can be differences in assumptions about the extent of construction work associated with features such as the relocation of underground utilities, ways of dealing with drainage, extent of road reconstruction, or other aspects of design. From the author's planning-level experience, it is seen that a BRT system designed to adhere as closely as possible to light rail design, short of the installation of tracks and overhead electrification, and using vehicles of uniquely high quality, can be expected to cost no more than two-thirds to three-fourths the amount required for implementation of the system as light rail.

For purposes of illustration, an aggregate capital cost model based on such assumptions was applied to a hypothetical RLT route having the following characteristics:

- Route length: 10.4 mi (16.7 km);
- Number of stations: 14;
- Right of way:
  - 5.2 mi (8.4 km) in-street,
  - 4.7 mi (7.6 km) in median or separate right of way, at grade, and
  - 0.5 mi (0.8 km) on elevated structures or bridges;
- Park and Ride: 1,200 spaces;
- Vehicle fleet size: variable (see discussion of operating and maintenance cost); and
- Maintenance and storage facility: sized to accommodate vehicle fleet.

The true test of cost is, of course, the life cycle cost, which accounts for the initial capital outlay in terms of the useful lives of the individual components of capital cost including land, infrastructure, systems, and vehicles. In this way the capital cost can be considered on an equal basis along with the annual cost of operating and maintaining the system.

Life-cycle accounting for capital cost can be calculated in various ways, one of the simplest being to apply the FTA procedure for determination of total annual cost, in which each major capital cost category is assigned a percentage to be applied to the total initial capital cost, to provide a discounted equivalent annual cost (*4*). This figure then can be combined with the annual operating and maintenance (O&M) cost to provide a total annual cost. This result can then be compared with the similarly calculated annual cost of any alternative actions being considered.

The results of this approach are shown in the discussion of equivalent annualized cost, addressed below.

Operating and Maintenance Cost Conventional wisdom is that LRT, due to the opportunity to operate an entire train with only a single operator, is less costly to operate and maintain than an equivalent BRT system. This opinion is sometimes based on comparison with typical urban bus system operating costs, not reflecting the effect of higher average travel speed attainable under LRT or BRT service conditions.

Using the hypothetical route described above, and an estimated one-way trip time of 35 minutes, operations statistics were generated for four cases of varying passenger demand. Typical weekday, Saturday, and Sunday/Holiday service patterns were defined for each of the four cases. Each case addressed satisfaction of a specific value for peak-hour, peak-direction passengers at the maximum load point of the route. These assumed demand levels were 970, 1930, 2,900, and 3,870 passengers per hour, which correspond with total weekday ridership of 12,000, 24,000, 36,000, and 48,000, respectively.

Further assumptions were that light rail could be operated as one-, two-, or three-car trains, each car having a capacity of 165 passengers. BRT articulated buses were assumed to have a capacity of 100 passengers. Two alternative service strategies were defined for the LRT case, one based on providing the shortest reasonable headways, and the other based on using longer trains operating less frequently. In both cases, headways were used that would result in patterns that are repeated hourly. For BRT service, headways during each service period were determined by demand except for low-volume cases in which policy headways were observed.

This operations modeling provided estimates in each case of fleet size, vehicle miles, and vehicle or train hours. Applying O&M cost models using these results together with route length and the number of stations as variables, annual O&M costs were estimated for each case. The results are shown in Figure 2. As shown in the figure, BRT would have the lowest operating cost only at the lowest level of passenger demand, or by inference, in cases of hourly demand (maximum vehicle loading) up to around 1,500 passengers per hour in one direction.

Equivalent Annual Cost The annualized capital cost estimates were combined with the annual O&M cost for each of the LRT and BRT cases, with the results shown in Figure 3. This shows that in all the cases examined, despite the shorter lifespan of buses compared to light rail vehicles, and despite having higher operating cost over most of the system capacity range assumed, BRT would be the less expensive approach. For a corridor expected to grow quickly into the realm of high bus operating costs, especially if the need to achieve higher capacity by conversion to LRT is anticipated, economic and financial studies might show the conversion cost to tip the scales toward initial implementation of rail. It should be noted also that funding sources for capital cost may be different from those available for O&M cost, and these differences may affect selection of the most advantageous RLT solution.

Funding and Implementation Issues

Transportation professionals may recognize the capabilities and merits of alternative technologies more readily than the public, but normally the public is closely involved in funding major transportation improvements. For the public to make optimal decisions about any aspects

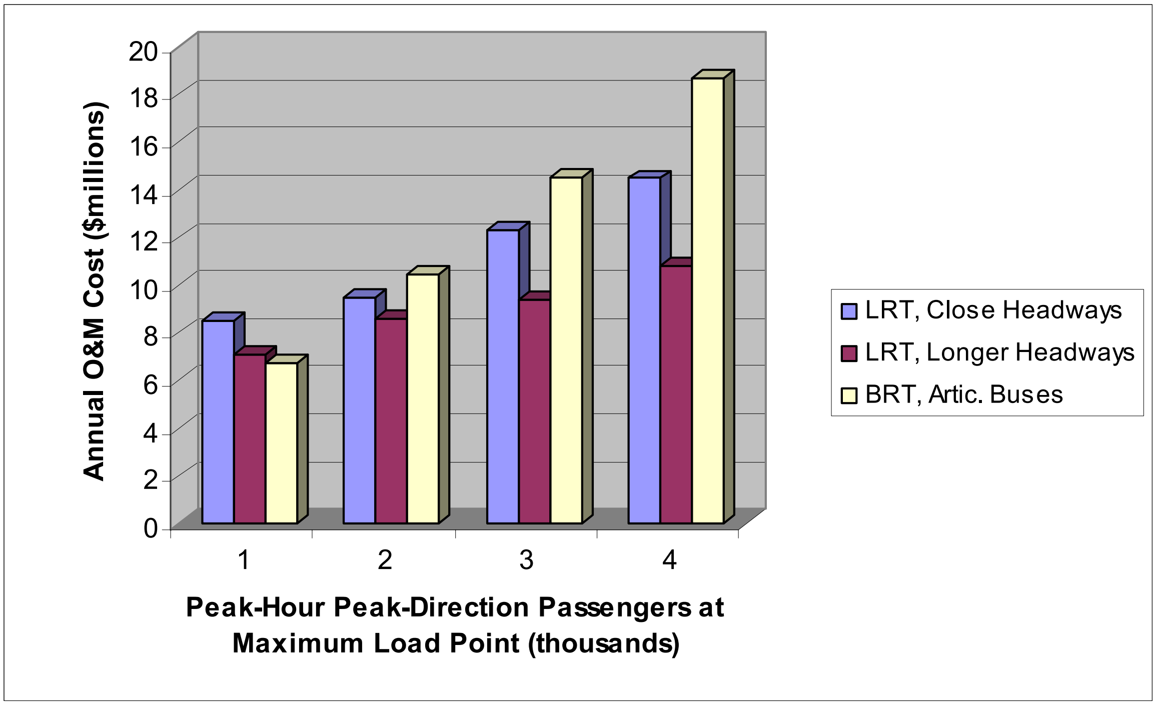

FIGURE 2 Comparative O&M costs of BRT and LRT.
Note: See text for route and service assumptions. BRT headways are better (service more frequent) than LRT headways over the range of passenger volumes shown.

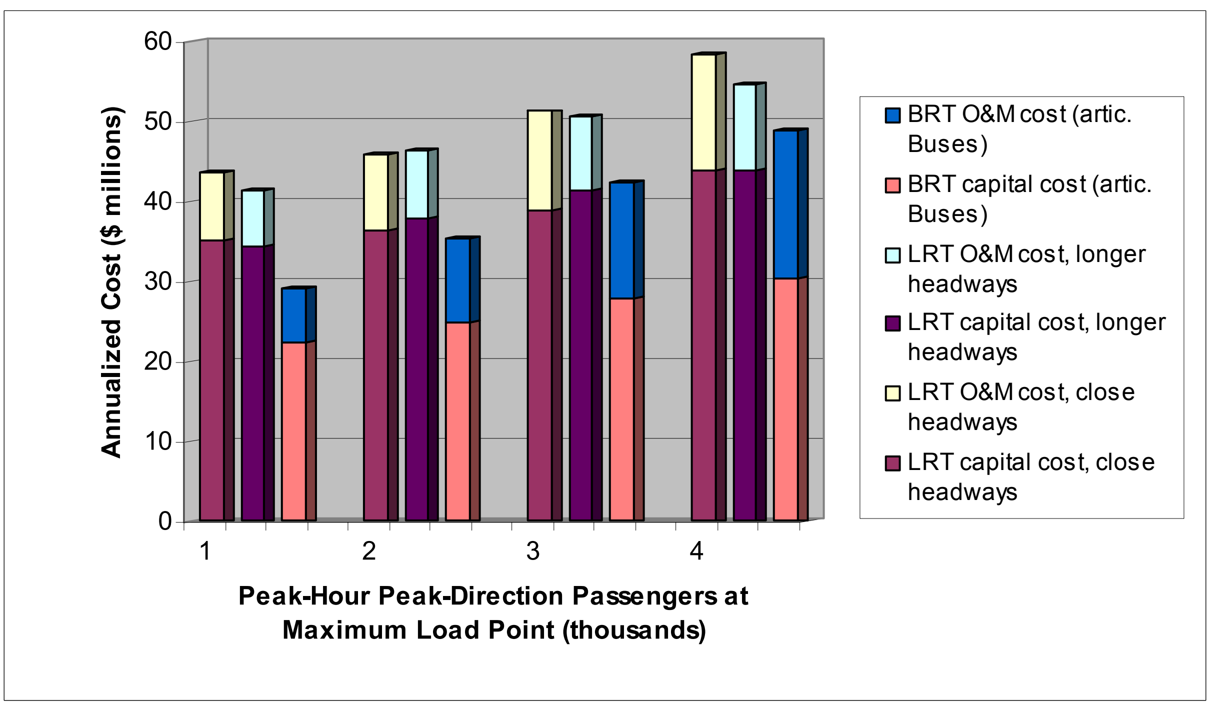

FIGURE 3 Annualized costs of a corridor RLT project.

of transit improvement alternatives, they need a clear understanding of those alternatives. Adoption of a descriptive term such as RLT may provide an envelope that will help professionals to communicate technology choices and their characteristics more clearly by associating the rail and rubber tire options more closely with one another and with the functional characteristics they share in common.

One aspect of RLT that should not be overlooked is the issue of convertibility. As a practical matter, this is unlikely to apply if LRT is the initial choice, but it could, as reiterated later. Certainly it may apply if one plans initial implementation as BRT. In that case, conversion to LRT requires the paved guideway to be replaced with a rail guideway, with or without pavement, and overhead electrification must be installed (unless one of the emerging technologies for in-guideway electrification is implemented). Of course, there are many design issues to be addressed if the design has future conversion from bus to rail in mind. Issues include not only the horizontal and vertical alignment, but also details such as utility relocations, provisions for drainage, design for both bus and rail vehicle clearance envelopes, design at some level to assure that future electrification including the overhead contact system will fit, and possible guideway construction details to facilitate later removal and replacement with rail track, imbedded or otherwise. One of the key points in the possible appropriateness of this approach is that the lower cost of bus RLT gives latitude to include design and construction features that will simplify and streamline later conversion, if this becomes the desired action.

A major obstacle in such a conversion process is the maintenance of service during construction. In most cases, this will be achievable by having buses run around guideway sections during the conversion process, which can be staged as desired. If the LRT guideway includes pavement, then it may be possible to reintroduce BRT service on the completed guideway sections until such time as LRT operation is introduced.

The use of track embedded in pavement also means that it is possible, though perhaps seldom desirable, to convert RLT from light rail to bus, possibly with no disruption in service. It is also possible for LRVs and buses to share the use of the guideway, as found, for example, in Pittsburgh, Pennsylvania.

CONCLUSIONS

During the last 30 years, LRT overtook HRT as the technology most often deployed in new major transit corridors. There are good reasons for this, including the fact that there have been fewer candidate corridors with the passenger demand potential to justify fully grade-separated transit, while at the same time many cities have grown beyond the size at which conventional local and express bus services provide adequate public transportation.

Recently, BRT has attracted increased attention as a high capacity corridor solution. Although BRT has been defined very broadly in recent projects in the United States, the more exclusive forms share most if not all of the functional characteristics of LRT. The need for deployment of major corridor transit solutions having these functional characteristics is substantial, and it is satisfaction of the functional characteristics rather than the choice of a specific technology that is the first and most important decision in selecting each corridor solution.

Accepting the thesis that attainment of the functional solution is of overriding importance, rather than the choice between rail and bus, it is logical to have a name for the "mode" that responds to this set of functional characteristics, and RLT is proposed. This name contains three key transportation descriptors: *rapid*, which in urban transit terminology refers to a service that significantly shortens travel times within a corridor without failing to serve the extent of the corridor (in contrast with express services which only serve points at the ends of a corridor); *light*, which has the connotation of less massive vehicles or trains than are used by HRT, and of surface rather than grade-separated routes; and *transit*, to make clear the fact that it is a public transportation system.

The introduction of a new functional mode, RLT, also can help to avoid ambiguity that may arise when the term BRT is used, by defining a very specific form within the BRT mode. With regard to the bus form of RLT, this name may also help to distance the mode from ordinary bus service, with its characteristic environment of operation over streets maintained (or not maintained) by others, and inevitable conflicts with other vehicular traffic.

The functional definition proposed for RLT is that it provides

- Minimal passenger waiting times,
- Minimal station dwell times,
- Minimal in-vehicle times,
- High capacity,
- A readily understandable route,
- A smooth, quiet ride, and
- "Presence" and sense of permanence.

The forms that satisfy these functions are much like the definition of LRT, and would be the following:

- Reserved right of way, and high quality track or running surface;
- Level entry and exit, full ADA accessibility, off-vehicle fares, and multiple doors;
- Limited-stop operation, ample acceleration, deceleration, and maximum speed;
- High frequency of service;
- Large vehicles or trains that are distinctive and high-quality;
- Quiet, clean for passengers and "neighbors;" and
- Visible, substantial, high quality investment.

This paper includes material that may serve as a general guide in the ultimate definition of RLT corridor projects, which will inevitably be a city-specific, corridor-specific decision. This includes "typical" results of comparative costs, and comments on design and implementation issues. Bus-based RLT is generally less expensive to build than rail, and at low corridor passenger volumes, cheaper to operate. At higher passenger demand levels, buses are more expensive to operate than light rail, although the combined capital and operating costs may remain lower than the rail option. In terms of design and implementation, advantages are seen in setting design criteria that are fully compatible with rail, and possibly including, in initial construction of a bus option, some of the features that will be needed if later conversion to rail should occur—examples are horizontal and vertical alignments, clearance envelopes, station design particulars, and utility relocation performed.

Within the RLT envelope, there will sometimes be reasons to select BRT, and under other circumstances, LRT. Examples of the latter may include extension of a pre-existing LRT system, the use of alignments in which the lower service frequency of LRT is preferable to the frequency of BRT service that would be required, corridors in which passenger demand levels will soon exceed the capabilities of BRT, or clear evidence that achieving certain development goals or public acceptance targets requires adoption of LRT. Different ways in which capital and operating costs are funded may also be a decision factor.

All of these possibilities suggest advantages in adopting and using terminology that does not draw the typical sharp distinctions made between LRT and BRT. RLT may be an important step in achieving more widespread understanding of the technological options available in the urban transportation toolbox.

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