

The Role of the Transit System Operator

In the Design Process of A New Rail System

**By
W. D. Volkmer**

**Project Engineer, Transit Systems Development
Southern California Rapid Transit District
Los Angeles, California**

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**Presented by William D. Volkmer,
Project Engineer, Transit Systems Development Dept.
Southern California Rapid Transit District
Los Angeles, California**

ABSTRACT

Modern rapid transit systems are constructed as the end result of what amounts to years of planning and design. Quite often the results contain flaws which the operators must either rectify at great expense (often without external funding) or they must live and operate the best they can with the less-than-desirable design because there are not enough funds to rectify the situation.

This paper examines the role that the operating group must assume during the design process in order to assure that the needs of their group will be adequately addressed during the planning and design phases of the rail projects.

SCRTD (The Southern California Rapid Transit District) is presently entering the second phase of the rail rapid transit era in Southern California wherein we are now not just "The Bus Company" but are indeed a bona-fide rail system operator. SCRTD is in a position to know from firsthand experience where the weaknesses are in the design process and is now taking steps to assure that its operating experience plays an integral role in future route planning and design.

ABOUT THE AUTHOR

William D. Volkmer has been with the SCRTD as a Project Engineer, System Development, since November, 1991. Prior to that time he worked as a Consultant on the Metro Blue Line design team from its very inception to its opening for revenue service.

Bill worked on the Miami Metrorail project before coming to Los Angeles and has had a long career in the rail transit field involving the manufacture of light rail cars at the Boeing Company, and the manufacture of rail cars and locomotives at the General Electric Company. He served ten years as a Maintenance Officer on the Pennsylvania Railroad and he is a graduate Mechanical Engineer from Georgia Tech.

**The Transit Systems Development Department
of
Southern California Rapid Transit District**

Who We Are And The Role We Play

by

**William D. Volkmer
Project Engineer, TSD**

Background

Rapid Transit in the Los Angeles area is growing at a fast pace. Initial design work for a rapid rail system began in the early 1980's, the first ground was broken on October 31, 1985, the first line went into service on July 16, 1990. At the present time there are two additional rail lines under construction with at least 300 miles of system under consideration for construction in the near future.

All of this design and construction activity requires the interaction of literally thousands of individuals from all walks of life and entails the services of nearly every job occupation or discipline, technical, political, and administrative, imaginable.

The task of coordinating all of these disciplines and task activities is the single largest challenge in a project of this magnitude. The need for effective cooperation and coordination at every level is absolutely crucial to the ultimate success of the project. Once the 300 mile Metro System is in place, along with the 475 miles of Commuter Rail that is planned for the six county region and the various other transit schemes that are being proposed are brought to fruition, Los Angeles will have one of the largest mass transit systems in the world!

To put the scope of the Los Angeles system into perspective, one should compare it with the giant New York City Transit System which is today considered the world's largest and most complex. While the New York City system is large in terms of track mileage and people transported, it is at the same time a very compact system. If a map of the New York subway system were superimposed over a map of the Los Angeles region, almost the entire New York system would lie between downtown LA and Pasadena! That would in effect exclude the entire South Bay Area, West Hollywood, San Fernando Valley and the eastern San Gabriel Valley, not to mention Orange County which alone has a population larger than many Countries in the world.

As portions of this huge system are built and placed into operation, it becomes the responsibility of the Southern California Rapid Transit District (SCRTD) and its currently 9,000 employees to operate, maintain, and market the service. The degree of success that the District will enjoy in operating the system will be directly proportional to how well the system was planned and

designed. This is especially true from the standpoint of being "User Friendly", to use a bit of today's popular computer jargon.

The Evolution of A New Rapid Transit System

The driving force behind a proposed new rapid transit system historically has seldom if ever come from within the operating transit authority in a given city. This is largely because the proposal was originally brought forth in concept long before the transit operating body was formed as a public agency. Los Angeles was no exception to this principle. The idea for a rapid transit system in Los Angeles was first proposed in 1909 when the Pacific Electric Railway Company studied the possibility of digging a subway from downtown Los Angeles to Venice. The estimated cost of \$525,000 was considered prohibitive at the time and the idea was dropped!

Planning for new rapid transit systems and extensions to existing systems usually is the work of city planning agencies who are moved and shaped by the demographics of the region both politically and geographically. Deciding upon a route alignment and getting public agreement on it is usually a long slow process, often lead by persons with little or no real knowledge of the hardware and operating procedures of a rapid transit system. Usually where the public is allowed to participate, a few very vocal people show up and insist that the rapid transit operation be constructed from where they live to where they work. Another group often heard from at the public meetings are the "NIMBYs" or "Not In MY Back Yard".

A lengthy litigation process usually ensues followed by an environmental assessment, then a route is defined and a grant application is prepared. Generally by this time the local bus operating Authority has become involved since after the rapid transit system is built and operating, the responsibility for keeping the system functional will fall to the transit authority.

Because a bus-only Authority tends to be busy tending to the day-to-day problems of operating the buses, the management is forced to hire outside help to take on the problems of planning and designing a new rail rapid transit system. The only logical source of personnel qualified to direct the planning and design of a new rapid transit system is cities where there are already trains in operation.

Unfortunately, all too often the types of people who are in a position to move to the new project are planners and designers who left the old city before their rail system went into operation. Therein lies the root of the many of the problems. Had these designers been forced to stay and live with their preconceived ideas and/or concepts, they would not perpetuate their mistakes at the new city.

Perhaps the foregoing paragraph tends to paint an overly bleak perspective of the situation because in reality, these planners and designers do tend to keep in touch by phone and by visits to their old property and they make an honest attempt to keep informed of problems that have arisen out of their designs. Additionally, the American Public Transit Association meetings serve as a forum to air problems that are currently being experienced by various transit properties so that a mutual exchange of information can be undertaken.

The Preliminary Engineering Phase

Once the concept for the rapid transit system has been approved for funding and funding is secured, the Preliminary Engineering phase is carried out. Preliminary Engineering lays the important foundation work for the system. Many important decisions are made which will shape the destiny and success of the system for many years to come. Decisions need to be made on what level of service will be provided, the gauge of the tracks, the size and locations of the stations, the length of the vehicles, the voltage at the catenary or third rail. Many of these decisions will be irrevocable or difficult to change if the choices are wrong. Seldom if ever are the bus operators asked to participate in this decision making process because the buses have little in common with the train system, or so it would appear.

In reality however, there are many areas where a common ground needs to be found early in the planning phase so that the rail system and the buses can interface with one another. Two major areas which must be addressed by both parties are fare collection, or rather fare structure, and the communications system. A third area of importance is the location and quantities of bus bays at the rapid transit stations.

One of the largest obstacles facing the designers and planners in this area is the art of predicting the changes in riding patterns which the public will adopt after the rail line is running. What the public tells you they are going to do after the rail system is open and what they actually do are usually two different scenarios. There is an element of luck that goes into the success of achieving the ridership projections. Fortunately the fare structure policy has enough elasticity that it can cope with possible errors in judgement on the part of the ridership forecasters.

Another problem in the process is that there are seldom any management personnel at the bus operation during the Preliminary Engineering Phase who have had any experience at all from a rail property. If there happen to be a few, their input to the design effort is valuable but too often these people are too busy doing their own jobs on the bus side to spend the needed time studying design concepts and offering comments and suggestions when they are needed. The new rail system Authority cannot afford to begin to staff up its operations positions until the construction is substantially complete. By this time it is too late to make any substantial changes to the designs, so if the Preliminary Engineering and the Final Design teams made any mistakes, they could last forever, or as a minimum on the first line built.

The Final Design Phase

After the Preliminary Engineering (PE) plans have been approved, the Final Design begins on the new rail line. A set of Design Criteria has been drawn and approved and the final designers merely follow the plans as laid down in PE. Quite often at this juncture, the operating Authority will hire a manager from an existing rail property to head up the rail operation and he will discover what he perceives as fatal flaws in the design. This usually surfaces when the operations manager begins making up his operating budget and finds items in the design which require staff to perform duties where he feels automation should prevail. Examples of this would be in the areas of security surveillance, fare collection, train operators, station attendants, dispatching, vehicle maintenance, yard layouts, cleaning and servicing scenarios and so on.

Sources For Hiring of New Rail Operations Staff

Just as the designers (usually working for Consulting Firms) typically are hired away from existing rail properties and rail equipment manufacturers, these same sources usually serve as a source for the Operations Department personnel. This phenomenon brings with it a good side and a (sometimes) less-than-good side. The good side is that these people generally bring with them years of hard earned first-hand experience. There simply is no educational substitute for hands-on experience. The one negative aspect of this is that sometimes these people come from an older (pre- World War II) transit property where the methods and equipment have been generally outdated by technological advancements. People from these properties are accustomed to operating practices that were appropriate for them because of the nature of the physical plant the rolling stock and maintenance equipment with which they had to work. It is difficult (but by no means impossible) for these people to learn to take an objective approach when designing a new system using today's equipment catalogs. This phenomenon is sort of like "trying to teach an old dog new tricks".

The new operating staff at a new rail system must quickly learn to put together staffing and operating plans for a new rail system. They cannot simply copy the plan from their former employer unless that happens to be a very recently constructed property with substantially similar operating patterns.

As was alluded to at the beginning of this paper, there are a multitude of different disciplines involved in the planning and design of a new system. There are architects, engineers, planners, politicians, public regulatory agencies, public works agencies, salesmen, consultants, financial people, funding agencies, news media people, trade unions, contractors, equipment manufacturers, and a host of other completely independent variables. In the final analysis, it falls to the Operations Managers of the Transit Authority to make the system work and work well. So if these people do not play an integral role in the design process, then there is little chance that the system will be an unqualified success. This being the case, it remains difficult for people operating the system day-to-day to also devote adequate time to the design process.

The SCRTD Situation

As 1992 begins, the SCRTD is in its second year as a revenue operator of rail trains. The Metro Blue Line, a 20 mile light rail operation began operation in July 1990 between downtown Los Angeles and Long Beach. The 54 rail cars serve as augmentation to a fleet of approximately 2700 buses owned by the District and several bus routes operated by the various neighboring Municipal Bus Authorities.

The Blue Line has been quite successful thus far from an operations standpoint largely as a result of cooperation over the design years between the District and the Blue Line designers, even though the Blue Line was being designed by another agency, the Los Angeles County Transportation Commission. The cooperation and team effort was largely aided as a result of the RTD's in-house Transit Systems Development staff assigned to the Metro (Red Line) Rail design and who were in close proximity to the bus operating division.

At the point in time where the design of the proposed 300 mile rapid transit system got into high gear, it was decided to consolidate all the rail design functions under one roof. This was accomplished by placing all of the design work under the direction of the LACTC.

In 1992, a merger is planned wherein the funding agency (LACTC), the rail construction agency (RCC) and the system operator (SCR TD) will be merged into a single new authority to be called the Los Angeles County Metropolitan Transit Authority.

1992 also brings with it a rapid expansion of new rail system planning and design activities. Extensions to the Metro Red Line in three different directions are under active design. A new light rail line to Pasadena is in the Preliminary Engineering Phase. Studies are being made for an extension of the Metro Blue Line to Los Angeles' Exposition Park. In addition to all of this rail activity, planning is now under way for a totally new dimension in transportation in Los Angeles, the electric trolley bus, as a means of transit and air quality improvement.

With this much planning and design activity going on, the results could be disastrous if the operations concerns would be left out of the design loop. For this reason the District is in the process of restaffing its Transit Systems Development Department. TSD's overall goal or mission is to ensure that the operations interests are not overlooked in the design and to assure that a single unified voice from the system operator is heard.

Some Specific Areas Of Concern To TSD

There are several broad areas of concern where TSD people must be involved. They are:

- Commonality of appearance between lines.
- Commonality of vehicles (insofar as practical).
- Commonality of communications equipment between lines as well as the bus operations.
- Interface requirements for rail feeder-bus lines at rail stations.
- Ease of integration of dispatching and central control functions as new lines come on-board.
- Adherence to fire-life-safety principles which have been established for the previous lines.
- Commonality of signage among the lines.
- Commonality of staffing requirements between lines and exploring ways to reduce staffing costs by improvements to the design.
- Methods of taking advantages of technological improvements to equipment which have become available since the first lines were designed.
- Adherence to the requirements of the new Federal Regulations involving the Americans With Disabilities Act of 1990.

How TSD Functions

Some of the activities which TSD people must participate in are listed below:

- Make periodic inspections of the operating line and interview the management personnel involved in both the operations and maintenance of the line. Ask questions as to what is going wrong. What could be done better on the next line. What are the line's strong points and what appears to be working well.
- Review patronage reports. Ask the Marketing Department what they think could be done to make the system more "Rider Friendly". Ride the line under the pretense of being a paying customer and make judgements on improving the design from the user's perspective. Talk to system users and get firsthand feedback.
- Review all design submittal documents and ensure that the appropriate operating people are at least aware of the contents of the specifications. In many cases such as the radio procurement contracts, maintenance facility contracts, and vehicle contracts, it is expedient to have the operating people carefully review those parts of the new design contracts that they are interested in based on their operating experience with the existing facilities and equipment.
- Coordinate any comments that the operations people have back to the designers so that their concerns are addressed before the contract goes out for bid.
- Attend as many design review meetings with the designers as possible when there are areas of grave concern. Areas that would have great consequence, if not corrected are brought to the attention of senior management.

Sources of TSD Staff

Staff persons for the TSD group come from a cross section of both the ranks of former operators and former designers. Expertise in both disciplines are desirable but few people have experience in both fields. For this reason, there is a percentage of people from both backgrounds. With all the staff in place, there is a constant dialogue among members of the group and they operate as a team so that healthy input from both sides will be used to resolve design/operations-related issues.

Conclusion

The Transit Systems Development Department is intended to be the glue that binds the new transit system together as we go forward with the 300 mile transit system design, building, and operation. To do this effectively requires great skill and political astuteness because we are dealing with such a myriad of disciplines. Being effective at this mission is a very real challenge but it must be done if the integrated bus-rail system is to be a success.