Practical Considerations in Vehicle Procurement for San Diego LRT

W. P. QUINTIN, JR., Bechtel Civil and Minerals, Inc.

On the San Diego Light Rail Transit Project, time considerations required procurement of a standard car with project-necessitated modifications. Selection of the standard car and the resultant modifications are discussed.

For the San Diego Light Rail Transit Project, the product of the design criteria and the operating strategies defined the vehicle and sized the fleet. However, as vehicle procurement was on the project critical path, it became urgent to purchase a standard car, and thereby eliminate time for resolving custom design items.

The project, nonetheless, had some features requiring modifications to the standard car. These modifications were project oriented and were practical considerations in procurement of the vehicle.

THE STANDARD CAR

Among the four standard-car offers received, not one was satisfactory to the project without some modification. As standard cars of their respective manufacturers, all essentially conformed to the California Public Utilities Commission General Order 143 (Rules for the Design, Construction, and Operation of Light Rail Transit Systems Including Streetcar Operations), all could make the round trip within 75 minutes, all provided adequate natural ventilation, all could be multipled up to four cars, and all could be equipped with an acoustically damped railroad wheel.

One of the four car types did not have sufficient passenger-carrying capacity and was of a new and unproven design; it would have been difficult to increase the capacity by another 20 standees (full load, not crush) through a straightforward design modification.

Of the remaining three, two required the use of platforms above top-of-rail, and of these two, one was a single-ended, single-sided car. Neither of the two high-platform cars could be certified by an operator as standard cars was the consequence of its larger size and higher performance capability. The car was wider and could carry about 12 more full-load passengers. It was capable of higher speeds and was chopper-controlled, which contributed to its weight and higher performance, especially at low speeds.

Thus, among the finalists, two were near-standard cars that reasonably fitted the project requirements. One exceeded the requirements more than the other, and as that difference had commercial significance, the decision was made to award the contract for the Siemens-Duwag U-2 car.

MODIFICATIONS

Once the car was selected, the actual purchase order was prepared to provide for certain modifications necessitated by the project. Actually, it soon became apparent that there was not a standard U-2. The manufacturer evolved the design from the Frankfurt U-2 via Edmonton and then Calgary so that San Diego would have its own model (MTDB-1). These evolutions were included in the standard car, whereas the project-necessitated modifications were not.

The seven project-necessitated modifications were as follows:

1. A swing-out footboard was ordered to meet the reduced requirement for the maximum step riser. In this modification, the car builder divided the car floor elevation, just over 38 inches above the top-of-rail, into four equal rises. Two of these are in the door well where structural modifications were minimal. The other two are...
Optimizing the Light Rail Vehicle Pre-Procurement Effort

TITUS ANDRISAN, Parsons Brickerhoff-Gibbs & Hill

Over the past 18 years, great technological advancements have been made in the development of rail transit systems. In conjunction with these developments, vehicle systems, related equipment, and operating techniques have become more complex and costly. These factors result primarily from the requirements of accommodating overall system configuration, increased sophistication, Buy-America constraints, vehicle improvements and standardization impacts, initial capital cost versus life-cycle cost considerations, critical vehicle options, and many other factors that tend to complicate the procurement process.

The objective of optimizing the light rail vehicle pre- procurement effort—to satisfy all functional, operational, safety, and site-specific requirements within predictable and reasonably acceptable cost and time constraints—can only be accomplished through a systematic and practical approach. The approach must have sufficient flexibility to permit tailoring the pre-procurement process to the site-specific requirements and must consider the various financial and technical compromises and constraints that may be imposed on the procurement.

Over the past 18 years, great technological advancements have been made in the development of rail transit systems. In conjunction with these developments, vehicle systems, related equipment, and operating techniques have become more complex and costly. These factors result primarily from the requirements of accommodating overall system configuration, increased sophistication, Buy-America constraints, vehicle improvements and standardization impacts, initial capital cost versus life-cycle cost considerations, critical vehicle options, and many other factors that tend to complicate the procurement process. Periodic changes in employment, residential locations, and travel patterns also have a direct bearing on the selection of the most suitable and cost-effective transit system for a particular area.

Whether a new system is developed or an existing system rehabilitated, contractor assistance is frequently required. If government funds are used, the contractor must be selected through a bid process that allows two or more qualified candidates to bid on each system element to be acquired. The only control the transit authority has is to award the contract to the lowest responsible, responsive bidder that is in compliance with the bid documents for the particular system element. For transit authorities who are not dependent on funding from the government agencies bidding requirements are less rigid. If permitted by state or local law, they may negotiate a purchase order and an agreement with the preferred contractor, and thus avoid

that the equipment could be installed after car delivery.

5. The fare collection system had not been resolved at the time of the car purchase order. It was thought then that there might be a requirement for onboard ticket cancellation. To prepare for that possibility, an amendment was prepared requiring the car builder to install wiring (six-line circuit) in stanchions near two doorways on each car and in the trainline. The wiring would provide battery energy and controls from the operator's console. These cars are so equipped, but the feature is not required and will remain unused.

6. Under the provisions of the California Public Utilities Commission General Order 143, light rail vehicles that operate on streets must have front, rear, and side markers and turn signals in accordance with the California Motor Vehicle Code. (It is interesting to note that the code does not itself require these markers.) The purchase order was amended to include the specific requirements of the motor vehicle code.

These seven amendments added about 6 percent to the base fleet price for the cars. In addition to the provisions of these amendments, the purchase order provided for spare parts, a maintenance contract for 1 year, which began in January 1981, and major shop equipment required to perform major maintenance on these cars.

CONCLUSIONS

Although the project criteria called for standard equipment and discouraged custom requirements, the San Diego light rail vehicle is not strictly an off-the-shelf standard nor was it unmodified. It is a standard design as evolved by the manufacturer from past projects and modified according to the particular requirements of this project. However, these modifications can be seen as contributions to the basic design of the car, and in this sense, the San Diego light rail vehicle is a standard car.