CHAPTER 7

What the Future Holds

Improved reliability, good looks, and economy have given the trolley bus a new lease on life, and its future is promising. Although no one in the transportation community expects the trolley bus to replace an existing public transit mode, it is believed that the trolley system can provide a viable alternative in high-density metropolitan areas.

SOME PERSPECTIVES

The relative attractiveness of the trolley bus has been increasing since the early 1970s. This development is due in large measure to the parallel increases in diesel fuel. Operators of existing systems in North America and other parts of the world now find it more cost effective to stay with electric power. Their decisions have been accompanied by the emergence of new trolley coach manufacturing capabilities in North America and Western Europe.

Advances in bus design and related technology also tend to enhance the future prospects of trolley bus application. The conversion potential of diesel buses to electrified trolley vehicles is one aspect that is receiving increased attention from both manufacturers and transit operators. That the trolley bus is just a regular bus with an electric motor instead of a diesel engine is both an advantage to users and a challenge to designers. The design challenge is rooted in the ability to address this subject and the vehicle's relationship to its infrastructure.

There is a kind of continuity and progression in the types of trolley buses ordered in the last 15 to 20 years that bespeak the durability not only of design but also of utility that can be attributed to the trolley bus. These vehicles have ranged from those with a new body and rehabilitated electrical gear, to an all-new bus with a 1940 design propulsion system, to the chopper-controlled vehicles built since 1978. The later buses with chopper controls have less modification to the motor bus body, and the propulsion system in a cradle structure is comparable to that used in the diesel version. This approach separates the task of building a bus from that of building the propulsion system.

Selected technologies can also be used by trolley bus operators to improve the performance and energy efficiency being obtained. Although the trolley bus already operates with low energy costs, further energy efficiencies appear possible. Electric vehicles also have the potential for recovering and reusing the energy involved in braking.

In addition, studies of the flywheel energy storage system for urban transit vehicles indicate that a flywheel can result in a dramatic reduction in the amount of overhead wire needed for trolley bus operation. Such a development could do a great deal to eliminate the unsightliness, maintenance, and capital costs of overhead wires. Furthermore, it would make deployment of new trolley bus systems attractive to many more cities.

Further study of the electrically floating body, i.e., insulation that performs better when wet and coated with dirt, control of static, and detection of a hot body condition without continual nuisance alarms is warranted as is an evaluation of fiberglass trolley poles. To date these have not been successful enough to displace the metal pole in use. The mechanical behavior of the current collection system merits the attention of manufacturers. Better current collectors would dewire less frequently, would be less likely to catch in the overhead, and would break off at a determined place and at a determined stress to minimize damage to the vehicle and the overhead system.

SUMMARY

In those cities that have trolley buses, public perception and support are favorable for improving and expanding the system. Cities such as Seattle and Dayton have experienced this public backing and with the support of community and professional organizations have involved elected officials in supporting system improvement and extension. This is not to say that there has not been opposition from those along the routes or those concerned with the aesthetics of the overhead, but rather that the public discussion resulted in a choice of the trolley bus. If and how this attitude can be transferred to non-trolley bus cities is worthy of consideration.

Few people are likely to claim that trolley buses are a panacea to urban transit ills. But there are applications that appear economically and operationally attractive. Economic, environmental, operational, and technological considerations must be examined for each application.

Economics

There is little disagreement that the operating and maintenance costs of trolley buses are lower than diesels because of the longer life of the equipment, reduced maintenance needs, and lower energy costs. On the other hand, the initial investment for vehicles and electrification can wash out these savings unless careful design is instituted to reduce both cost categories. The electrification of current bus designs appears to be one such cost saving. The economic results appear to be sensitive to local electrical costs and the kind of deal the operating agency can swing with the local utility.

Many people have observed that replacement of diesels with trolley buses appears to increase patronage. Factoring this aspect into the analysis and a close look at the operation strategy, such as timed transfers, which can improve patronage, also

need to be included in an assessment of the economics.

Environment and Energy

All of the data presented at the workshop indicate that the trolley bus is less energy-intensive than diesels on a seat basis. This factor becomes even more attractive if the electricity is generated from non-petroleum sources. Environmentally, the trolley bus is quieter and free of diesel emissions, which increases its attractiveness in high-density areas and especially in restricted areas such as transit malls. The overhead system is a visual problem, although that effect can be reduced by good design and the use of feederless systems. This visual intrusion appears to be more of a concern in cities unfamiliar with trolley buses than in those that have them.

Technology

The most exciting aspect of modern trolley bus systems is that of the technological innovations. Chopper control that can improve performance and reduce power consumption, AC propulsion systems that can be less expensive and lighter, automatic pole raising and lowering, improved methods to reduce dewiring, and off-wire operational capabilities all increase the attractiveness of the mode.

This is not to say that there are not technical problems to be resolved. Vehicle weights appear to be getting out of hand. A better understanding is needed of the various technologies for off-wire operation--batteries, flywheels, and internal combustion engines. Procurement procedures for vehicles and systems need to be improved. Formal knowledge of trolley buses and the overhead system needs to be increased. Adequate means to provide standards, specifications, and product documentation are needed.

Research is needed on insulation, EMI, detection of electrically hot bodies without continual false alarms, fiberglass poles, and the mechanical behavior of the current collection system. These problems are more in the nature of hindrances than obstacles and all are solvable with a modest amount of research support.

CONCLUSION

If there is one single message from the workshop, it is that the trolley bus can provide a useful transit function and that any city considering the improvement of its transit capabilities should look closely at this mode.

Much work and progress have occurred already, contributing to the reemergence and reawakening of interest in the trolley bus since the early 1970s; but it is recognized by operators, manufacturers, and suppliers that more must be accomplished if the current momentum is to be maintained. Herein rest the challenge and the future for the trolley bus.

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