Keynote Papers

MAINTENANCE RESEARCH AND DEVELOPMENT NEEDS IN THE TRANSIT INDUSTRY

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It has often been said that excellence in maintenance is the key to a successful bus operation. In the days before heavy government involvement in the industry, the profitable private operation was usually the one that had best succeeded in putting together the proper combination of good equipment specifications, efficient maintenance procedures, and an experienced maintenance work force. With the advent of federal subsidies for capital equipment, far too often there was a tendency on the part of transit management to use the acquisition of a new bus fleet as an opportunity to reduce maintenance operating costs. Because of the limited availability of capital funds, the purchase of new buses was also often given priority over the construction of new maintenance facilities. Furthermore, as a result of retirements there are fewer and fewer experienced bus maintenance managers and highly skilled mechanics. Far too little has been done in the industry to train replacements, and the industry has offered neither the opportunity nor the salaries necessary to attract enough top-quality. replacements. The result has been a growing reliance on operational subsidies and a declining quality of maintenance performance.

There has been far too much finger pointing as opposed to a constructive, coordinated program of improvement. We have all heard that bus manufacturers do not build the quality into new buses that they used to, or that the new buses are much too sophisticated and impossible to maintain, or that you just do not get workers who are real mechanics any more, or that the union is the real culprit for inhibiting maintenance improvements, or that maintenance managers really do not know what they are doing, or that UMTA is responsible because it dictates bus specifications and procurement practices. Of course, the real truth is that each of these items has had some impact in producing the conditions with which we are now faced. All leaders in the industry must take some responsibility as well.

The challenge that we face and the purpose of the Bus Maintenance Improvement Workshop is to evaluate where we are today and what we need to do to achieve the desired quality of maintenance performance. To do this, we need to concentrate both our management skills and the resources of the industry on producing (a) improved management systems, (b) better-qualified employees, (c) better vehicle maintenance equipment, and (d) better, more reliable vehicles. Separate sessions of this conference will concentrate on each of these areas. My purpose is to identify, from my perspective as an engineer, maintenance manager, and general manager of a bus operating property, several unmet R&D needs that this workshop should consider in its pursuit of improved bus maintenance. We also need to consider how R&D innovations can be most effectively translated into working tools for the industry and what role UMTA should take in the entire process.

I believe that an appropriate R&D program is one that recognizes not only the state of the art but also the state of the industry. It should effectively "work both sides of the street at the same time"; that is, it should be directed toward providing longer-lived, more reliable, more easily maintainable equipment while at the same time establishing systems that, to the greatest extent, remove human judgment from the maintenance process and automatically flag deficiencies and/or breakdowns in either the process or the people. Maintenance processes should be developed to the point where they are self-monitoring in terms of both quality and quantity of production. An example of this type of technological development is recording and monitoring systems for consumables (fuel, oil, and water). The ideal system for this purpose will have built-in thresholds so that the maintenance manager is not required to inspect voluminous records or make a decision as to whether or not the records indicate a deficiency. Along these lines, there is a need to develop a standardized diagnostic system for buses. Such a system should be related to the on-board daily service check and also have the capability, through the use of a chassis dynamometer, to perform a comprehensive periodic inspection. Although considerable work has been done in this area, it has been fragmented and the dissemination of information to the industry has, to a great extent, been neglected.

Much has been done in recent years with maintenance management information systems, which can provide a valuable tool for monitoring the maintenance process and determining a need for improvement in both production quality and employee performance. There is a need, however, for substantially more work in this area toward the development of packages that are easily implemented and that provide the self-monitoring capabilities required to free maintenance managers to attend to the human aspects of their job. The industry has made little use of the output of maintenance management information in establishing the service life of units and identifying the more critical product improvement needs. Practically every maintenance person today will tell you that the V730 transmission needs quality im-

provement because it has a high rate of failure. On the other hand, what about those units that do not show such a dramatic failure rate but nonetheless fail far too soon in their formal life cycle, increasing road failures and maintenance costs? There is a need not only to build this kind of information into maintenance information systems on a local level but also to develop these means for collection and identification problems on an industrywide basis. This type of analysis infers that we should be "working the other side of the street" to achieve improved product design and greater built-in quality. Some of the recent experiences of the industry indicate a decline in product quality instead of this kind of improvement and point to a need for R&D to achieve better-quality assurance programs along with better preproduction testing and qualification of both the bus units and the entire bus system. The introduction into the American marketplace of many new (including some foreign) buses can only tend to accentuate the need for some standard prequalification system. Although UMTA has sponsored tests in specific cases, all too often these studies have been protracted and have failed to result in substantive improvements. The lack of an adequate system for measuring new-product quality can only result in conflicting subjective evaluations by maintenance managers and costly and time-consuming retrofit programs. In this area of bus design and bus equipment, I believe that current problems related to short brake lives and transmissions also call for a new look at both retarder systems and the diesel-electric drive.

But what about the problem of translating R&D improvements into action? As one who has been involved in many of these programs, some sponsored by UMTA and some not, I am convinced that there is a need for much broader industry participation and less direct UMTA participation in R&D projects. The local property, and particularly the maintenance manager, need to feel that they have been a part of the developmental process. They have to want to implement the system and will do so if they feel that it is partly their idea. That is not to say that the R&D process does not need project managers who can give direction and control to each of the projects. It is to say, however, that this direction and control should come out of the industry and not the federal government. UMTA unquestionably needs to provide adequate financial support for R&D projects. On the other hand, care must be taken that federal controls do not impede R&D and inhibit the deployment of new systems in the industry. I believe consideration should be given to incentives that would encourage timely results and early implementation of new developments. Finally, there needs to be a commitment on the part of both the manufacturing industry and operating agencies to share a reasonable part of the financial burden of R&D. As an industry, we have been all too slow to recognize the investment that R&D represents toward future efficiency and economies in maintenance operations. Without the necessary commitment, project reports will end up on an executive's shelf gathering dust and the industry will go on in a fragmented way, complaining about how it is all somebody else's fault and how the real problem is that something was not done about it years ago. The time to take action is now. It is my hope that this workshop can come up with a definitive program for R&D that can lead to real progress, in keeping with the motto of New Jersey Transit: "Start Moving in the Right Direction."

MASS TRANSIT: A PERSPECTIVE FOR THE FUTURE

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History tends to repeat itself, and mass transit appears to be reliving the experiences of the 1950s and 1960s when private transit operators were faced with increasing costs and declining revenues. In the past 15 years, federal funding has created an environment in which transit management may have become too reliant on external financial resources rather than devoting the necessary energies to controlling costs.

Under the present Administration, federal subsidies have been reduced dramatically. The greater part of the burden has been shifted squarely on to the shoulders of the transit properties themselves, which are searching for a way to provide for present and future demands for transit service with decreased operating revenues. What innovative means do transit operators use to cope with labor, material, and equipment costs and budget restraints and at the same time provide efficient and cost-effective transit service to the public?

Alternative funding is a means but not the total solution. The increased efficiency, performance, and productivity of our established maintenance function would appear to allow us greater future control than expectations of additional funding as the cure to our present dilemma.

Transit managers are now faced with an opportunity to rise to the occasion. Many observers may believe that the difficulties now facing mass transit are insurmountable witnout additional sources of revenue, and they may be right. But each of us faces a significant management challenge--to find creative solutions to reduce operating costs without affecting the quantity and quality of transit service to our passengers.

Transit has often been perceived as being quasi-political in nature because it is a public service similar to other municipal functions within city government. We are often perceived as being bureaucratic and accountable to no one other than the political bodies within our service areas. Many transit managers perceive themselves as being accountable to too many groups, including boards of directors, the public, oversight committees, commu-