Second, we must convince policymakers to change the way they measure our success. Too often, the simplest, most convenient statistic at hand is used to determine whether bus transit is doing its job. Measures such as revenue miles and passengers per mile say nothing about the quality of service. It is through improvements in quality that bus transportation will build a wide base of public support, a necessary first step in increasing the quantity of service.

Finally, we must foster a more open dialogue between operations and maintenance managers. Each side must understand the motives behind seemingly unproductive practices and work together in maximizing departmentwide effectiveness. At the Detroit DOT, regular meetings between middle-level managers from these two divisions have done much to improve interdivisional cooperation.

ROLE OF UMTA IN IMPROVING BUS MAINTENANCE

Currently, UMTA affects almost every aspect of a bus property's existence, especially those areas already mentioned in this paper. Because of this influence, UMTA will continue to play an important role in shaping budget, procurement, labor, and maintenance policies in spite of rumors concerning a diminished UMTA profile. There will be an ever-increasing need for a central focus for the numerous bus maintenance improvement programs taking place or about to take place. Initially, the role of UMTA should be one of facilitator--that is, encouraging and guiding activities such as research and program development. Thereafter, UMTA should assume the important function of information dissemination and program support. The requirements for the implementation of many bus maintenance improvement programs may be found to be beyond the means or expertise of some transit properties.

As an example of the facilitator role, UMTA is currently sponsoring a research project at the Detroit DOT in which job performance aids (JPAs) are being tested for impacts on the effectiveness of mechanics while implementation procedures are refined. Through this project, certain standards for repair and inspection actions are being established. These standards will be beneficial in supporting the vehicle reliability objectives mentioned earlier as a fundamental requirement for an effective preventive maintenance program. A possibility for the UMTA support role would be the establishment of regional training and workshop sessions in which maintenance managers could learn how JPAs can be used to improve mechanics' skills, increase bus reliability, and reestablish preventive maintenance practices.

I do not envision an UMTA role that involves the strict enforcement of a uniform set of maintenance standards, as has been suggested by some. Due to differences in operating conditions, political settings, availability of resources, and many other uncontrollable variables, such an approach would inevitably result in unfair treatment. The tremendous staff effort required to monitor compliance with such standards would be well beyond the capacities of the UMTA organization. In addition, transit managers would have to spend time and energy in dealing with statistics that should be spent in taking care of operations and maintenance.

CONCLUSIONS

In review and conclusion, we must make certain that policymakers are aware of our maintenance problems, and they must be enlisted in support of long-term solutions to those problems. Procurement policies must be altered so that maintenance costs of transit vehicles are carefully weighed. Personnel practices must be restructured so that high productivity and high-quality craftsmanship are integral parts of the contract between the transit agency and its maintenance personnel.

The adversarial nature of labor relations in the industry must be replaced by a mutual concern for vehicle reliability and high-quality public service. Operations and maintenance personnel must replace mutual hostility and defensiveness with attitudes that reflect understanding and cooperation.

UMTA's concern with maintenance should focus more tightly on its role as facilitator, information gatherer, and disseminator and supporter of better research and training programs.

The role of maintenance managers is to see that these objectives are their objectives and that a major portion of their energy is devoted to achieving these goals.

Workshop Report

Robert Prangley, Chairman
Al Alaimo, Recorder

Management plays a significant role in the maintenance process. This role is sometimes played unwittingly; i.e., decisions are made that have an impact on maintenance effectiveness without the decisionmaker being aware of the ripple effects of the decision. Workshop 1 looked at some of the conditions that contribute to management problems, defined some of these problems, and then developed potential solutions.

CURRENT CONDITIONS

Some of the current conditions that have deleterious effects on bus maintenance are as follows:

1. Operations and maintenance managers tend to have the board of directors too deeply involved in the details of day-to-day operations.
2. There appears to be insufficient current and reliable information to permit managers to function efficiently.
3. Many maintenance managers are unable to present a meaningful budgeting case. This appears to be caused by an insufficiency of management skills and analytic tools.
4. Many properties do not have an appropriate organizational approach to purchasing and lack adequate communication links between the maintenance function and the finance function and other organizational functions such as planning, scheduling, and marketing.
5. There is a lack of property-level maintenance policies and standards and a somewhat widespread use of failure-based maintenance.

These conditions are creating a whole host of problems in the industry that must be solved before we can get on with the business of improving bus maintenance. As each of the conditions cited is discussed, it will become evident that the industry as a whole must correct the problems.

PROBLEMS AND POTENTIAL SOLUTIONS

Overinvolvement of Boards of Directors

If boards of directors become too involved in the details of operation, it can be assumed that property management and staff are not communicating issues effectively. Presentations to the board must include alternatives and a clear picture of the consequences that may occur if specific actions are not taken. Managers must provide completed staff work and not dodge the issues. From time to time, a board of directors may become too involved because management and staff have not anticipated related issues and problems. Sometimes the board of directors will become involved in developing administrative rules and regulations when it sees signs of incomplete program planning and lack of a maintenance planning process.

Responsibilities and relationships between operations and maintenance management and the board of directors need to be delineated. Second, the board of directors must be made increasingly aware of the maintenance function and its crucial interplay within the organization. Finally, there must be development of a comprehensive organization plan in the areas of management objectives, standards, budgeting, and maintenance programming and planning. Management must develop "completed staff work", and board meetings must be well planned, with an appropriate agenda and a staff summary for each agenda item. Clear courses of action must be laid out by managers to deal with the political aspects of operating a transportation system. Finally, credibility must be established between the board and management.

Need for Current and Reliable Information

Another condition in the bus industry today is a lack of the current and reliable information required for efficient management. This leads to problems in determining what response is needed. For example, there are no peer-group comparisons or trend analyses to help evaluate situations and needs. Data validation is poor, and there is a lack of differentiation between project problems and ongoing operational problems. Another problem that exacerbates the condition is the lack of timeliness of reports. When information is neither current nor reliable, both operations and maintenance managers, as well as the general manager, are functioning at a tremendous disadvantage. Because of this, many managers dismiss information systems as too unwieldy.

We should be providing management education and involving management in information system design. It is the manager who knows what information is needed, but this same manager requires assistance in obtaining the appropriate information. Scheduling of information reporting to management must be timely to make it useful. Some examples are developing board reports on a monthly or quarterly basis, general manager reports daily and/or weekly, and project reports monthly or periodically. In addition, it would be very useful to produce an annual report of accomplishments that could be disseminated to the public. Usually, the reporting requirements indicated would be made available through a management information system. The sophistication of such a system would depend on the size of the transit property. However, whatever the size, there should be some organized system for management reports.

Inability of Maintenance Managers to Make a Budgeting Case

Many maintenance managers lack the ability to put forward a hard-hitting, positive budgeting presentation to make a case for maintenance. There appears to be a lack of analytic tools for the maintenance manager. In addition, there is a depletion of current skills through attrition; i.e., skilled managers are retiring and there are not enough suitably skilled people available as replacements. Recently, we have seen rules and regulations developed outside of the organization that place serious restrictions on maintenance managers' ability to predict budget requirements. Some of these have been developed by organizations such as UMTA. In other cases, local political groups may project requirements that have not previously been planned for.

To overcome the lack of management skills in this area, there should be employee development in the areas of maintenance management and planning. Other means should be considered to involve the maintenance manager in the propertywide decisionmaking process.

Perhaps one of the best tools a maintenance manager requires is a forecast of long-term equipment and facility replacement and rehabilitation needs. This forecast must have a suitable justification, usually an economic evaluation of the problems and solutions. A word of caution: The evaluation process should be prepared to consider significant factors from the perspective of other parts of the organization. To make this program work, a property requires stable funding for at least five years. This would permit appropriate replacement and rehabilitation decisions to be made when the economics become justifiable.

Other tools to assist the maintenance manager might be in the area of disbursement accountability to accompany purchasing responsibilities. The lowest-level maintenance supervision personnel--i.e., foremen--should be competent enough to make disbursements. (Involving foremen in disbursements is viewed as a means of developing their skills, awareness, and responsibility in fiscal areas and thus enabling upper-level management to control costs at their source. It is recognized, however, that such competence does not now exist in many systems.) Finally, rules and regulations should be kept to a minimum to provide maintenance managers with flexibility in performing their function.

Inappropriate Organizational Approach to Purchasing

A perennial situation in many bus properties is the lack of an overall organizational approach between maintenance and finance in the area of purchasing. This situation is created by the differing operational requirements of each of these organizations. One of the principal factors aggravating this condition is a poor organizational design that exacerbates relations between maintenance, purchasing, and finance. Maintenance is saddled with a fleet mix that requires extensive stock levels of parts to maintain fleet availability, whereas finance is attempting to reduce the financial commitment of stockrooms. These seemingly conflicting goals need management's attention and resolution. Sometimes organizational problems are created by low skill levels in both maintenance and finance. This makes it difficult for staffs to compare the economics of in-house versus outside repairing and leads to poor stockroom control and a lack of adequate checks and balances to maintain the credibility between maintenance and finance. When these problems arise, there

is usually an inadequate parts supply that leads to unnecessary bus downtime.

Some of the problems associated with the purchasing and inventory forecasting function might be solved through appropriate review of current inventory forecasting techniques. These techniques are fairly straightforward and should be reasonably easy to learn. One of the major steps that might be taken is to automate the stock control system for automatic reordering based on use. This should then be cross-linked into the maintenance cash management plan. Parts are a significant cost item in the maintenance function. Again, we might be able to make appropriate use of an education process to assist maintenance managers to understand the reasoning and techniques associated with inventory control. It should be possible to help the inventory control process by developing tight controls at each depot, contracting with parts suppliers versus local consolidated parts supply houses, and, finally, attempting to encourage "in-house bids" for maintenance while at the same time attempting to remove restrictions on outside contractors. This would provide maintenance employees with an incentive to increase productivity and improve the quality of their work.

Lack of Property-Level Maintenance Standards

Far too many transit properties have failed to develop maintenance policies or standards. An ongoing condition develops when the maintenance program becomes failure based rather than planned. Many properties may have failed to do this because they lack skills in the understanding of statistical analysis and life-cycle predictions. Again, the reason may be managers who are unable to "manage". The problems that lead to these conditions include a lack of broad-based maintenance systems and/or technology that would permit information feedback so as to diagnose and predict failure. There might be some difficulty in developing universal maintenance systems and policies because of the great variety of property characteristics. But any systems developed should include the ability to audit, an ability not currently found to any large extent.

The host of problems created in this area may be solved by developing and implementing an appropriate maintenance management system. The system must be capable of providing an ability to develop criteria for life-cycle prediction and some justification for the use of failure-based maintenance in the areas of nonoperating or safety components. In addition, maintenance managers should have appropriate diagnostic systems to predict component condition and failure. An example of this might be an in-house oil analyzer. In addition, it is important that information developed by one property be made available to other properties on a regular basis. This will help local property maintenance management to do a better job.

SUGGESTED ACTIONS

Perhaps the major element needed to improve bus maintenance is a reasonably uniform fleet management system. Preferably, this would be computerized and be adjustable for minor deviations to accommodate variations in property size and organization. As a minimum, the system should provide information on (a) mean distance between failures, (b) maintenance man-hours per 1000 miles, (c) spare bus ratio, and (d) bus availability. These indicators of maintenance effectiveness must be available for review by management on a regular basis. Other reports that could be add-ons to the system would indicate ridership, cost, and quality of service as measured by customer complaints.

Once the decision to develop a fleet management system is made, it will be necessary to provide the appropriate capital funding for both software and hardware plus some means of training to use the system. This funding might come from a central source--i.e., UMTA--with local-share participation. A clearinghouse for information exchange, perhaps in UMTA or APTA, could result that would permit transit properties to compare their performance.

Perhaps even more important than a fleet management system might be the establishment of an appropriate, well-run R&D effort in bus maintenance. This might be accomplished by increasing the availability of R&D funding at UMTA and by the appropriate funding involvement of manufacturers and properties. A combined fund could thus be established. This would ensure that the R&D effort was properly used and that the results of research would be developed into hardware. There has been some discussion to the effect that the current state of R&D implementation is poor. By bringing the manufacturers and properties into the mainstream of the R&D process, a greater degree of effectiveness might be developed.

A third course of action is to develop bus maintenance management courses that would be available, at reasonable cost, to local property management. Training grants could probably be used as a means of subsidization, through UMTA or an industry association such as APTA. Another suggestion might be to establish organizations such as AASHTO and the Highway Users Federation for Safety and Mobility to both provide management of training grants and set up the appropriate training courses.

Another process, which could be coupled with the fleet management system, is the development of an automated inventory leveling system. This system would reduce stock outages and prevent the accumulation of excessive stock levels with its associated tying up of capital. This system could be funded in much the same way as previously outlined for the fleet management system.

A handbook on planning and budgeting is a tool that would be useful to maintenance managers. An appropriate document might be developed through the R&D process or a capital grant in a way similar to that suggested previously for the development and implementation of a fleet management system.

Project delays and roadblocks in procurements have manifested themselves in the procedural process at UMTA. We recognize that UMTA requires accountability; however, excessive interference in the procurement process can be very costly. It is hoped that UMTA may streamline its procedures to permit timely project reviews and expedite the procurement process.