

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

Michael M. Smith
Denver Regional Transportation District.

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 without 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-

nity groups, and state legislatures. The accountability is, in fact, there and it will increase significantly as funding decreases. Such an environment will spotlight the efficiencies and inefficiencies of mass transit.

It is time for us to begin viewing ourselves as similar to managers in private industries. Although we do not have a profit-and-loss motivation, we would be wise to adjust our thought process to this type of philosophy. In transit, the operating ratio is the equivalent to profit and loss. Operating ratio can be defined as total operating revenue (farebox revenue) divided by total operating cost (operations and maintenance cost). An increase in operating ratio can be analogous to an increase in profit. Conversely, a decrease in operating ratio can be comparable to a decrease in profit. Due to the current trends in mass transit and because it is just good business sense, our goal should be to increase our "profits" to ensure the long-term financial viability of our organizations.

Our success in meeting the management opportunities that we now face depends on increasing revenues while decreasing costs without affecting our product--quality transportation service to the public. We must greatly improve service in order to keep our heads above water in our competition against the automobile.

This paper assesses a potpourri of alternatives that might be worth considering in addressing these challenges. For the purposes of discussion, I will assess the cost side of the equation.

In any business the major cost factors that influence the delivery of a product could be defined as follows:

1. Labor,
2. Materials and supplies, and
3. Equipment.

Transit has historically been a labor-intensive business. Most transit operators recognize that labor represents as much as 75 percent of their operating cost. The bulk of this cost is for bus operator wages. The maintenance function absorbs most of the remaining operating costs. Maintenance managers have limited control over operating revenue, but they have a primary responsibility for operating costs. It should be noted that maintenance managers do have a dramatic impact on the type of service provided--i.e., the cleanliness of the equipment, service reliability, etc. These factors are clearly relevant to the marketability of the transit service and potential increases in operating revenue.

From my perspective as a director of transit operations, I am concerned with controlling costs within the maintenance function without sacrificing quantity or quality. The question I raise within my organization is, How can we accomplish more with less resources, meaning less manpower, material, supplies, and equipment?

The following issues represent key factors that are worth examining in considering how to manage more effectively while focusing on productivity.

COST CONTROL AND AVOIDANCE

Due to the pressures currently imposed on all transit managers, it becomes imperative for each manager to assess his or her function as it relates to current costs and future cost avoidance. Such an assessment should consider the acceptable standards of performance within the organization and the resultant costs. The assessment should include all major

factors within the maintenance function to determine what steps should be taken to decrease costs while increasing efficiency.

Quality control of in-house functions can have a substantial influence on the reliability of our own product, help to establish acceptable standards, lower costs, and increase productivity and performance. Monitoring outside services, in conjunction with a strong warranty section, can help avoid costs that should not be incurred. A technical services function should be able to supply the necessary assistance, techniques, and information for potential long-term savings in vehicles, equipment, and material design.

Evaluating positions as they become vacant can produce substantial savings over the short and long term. Some functions may be eliminated, or man hours may be shifted to increase efficiency and thus increase potential savings. The potential for savings through the hiring of part-time employees and subcontracting maintenance functions to outside services can be substantial. It allows the normal work schedule to continue without interruption and allows for completion of necessary retrofits without full-time resources.

Labor costs certainly must be monitored and controlled. Effective training, absenteeism policies, and negotiation practices can all keep productivity up and costs down. Even layoffs, although negative (especially to those affected), can have positive results if implemented properly. Eliminating nonproductive positions can lower costs without affecting productivity. It is quite possible that productivity may even be increased due to a heightened awareness among remaining employees of the need for productivity. If improperly handled, layoffs could place more of a burden on those remaining and reduce their effectiveness.

ORGANIZATIONAL STRUCTURE FOR THE MAINTENANCE FUNCTION

Traditionally, the transit industry has segregated its functions into maintenance and transportation. Maintenance can be broken down further into vehicle maintenance, district shops (heavy repair), facilities maintenance, materials handling, etc. The result is that the boundaries get set, the walls get built, and communication decreases.

For an organization to be effective, interaction between managers is essential. It is impossible to achieve organizational goals and objectives if everyone is headed in different directions.

Currently, my own organization, the Denver Regional Transportation District (RTD), is undergoing a change in structure from the traditional approach shown in Figure 1 to the accountability-centered approach shown in Figure 2, shifting the burden of responsibility to the division and facility level. The Boulder/Longmont, Alameda, Platte, and East Metro titles represent the operating facilities of the Denver RTD.

The traditional approach, with the various line functions responsible to a different manager, may prove successful for transit companies that are not multidivisional or might continue to succeed if the current level of public funding were to continue. However, public demand for improved transit services, coupled with decreased federal assistance, increases the necessity to explore management approaches aimed at providing the best possible service in the most cost-efficient manner.

The accountability-centered approach conceptualized in Figure 2 transforms the traditional fragmented line-function management approach into a

Figure 1. Traditional organizational structure.

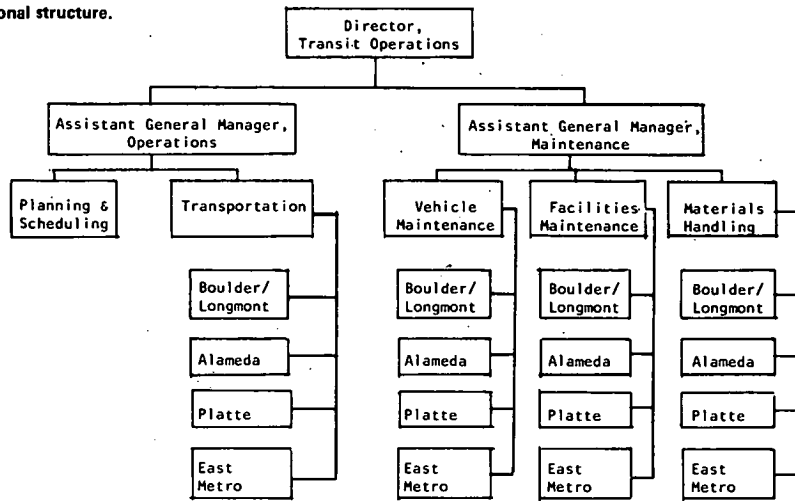
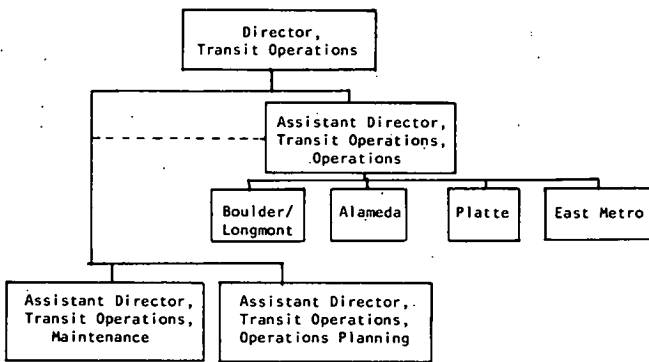


Figure 2. Accountability-centered organizational structure.



management plan that has proved successful in private business promotion. Such a plan includes

1. Budget and cost control,
2. Coordination of all necessary functions for managing an individual operating division,
3. Problem solving at the division level with access to systemwide support staff,
4. Decisionmaking at the lowest possible level within the organization, and
5. Increased accountability, responsibility, and authority.

This approach will transform the management philosophy of the Department of Transit Operations into one that is similar to a private business model and consistent with long-term organizational commitments to achieve greater cost efficiency and improve service to the public.

SUPERVISOR SELECTION AND TRAINING

The managing of any function depends on the quality of supervisory management and staff. This issue is seldom given adequate consideration in developing the strength of an organization. Quite often, organizations have a tendency to select people who are technically competent but who may not necessarily have the required management skills and abilities. Some organizations use a haphazard technique in selecting a supervisor and then spend an inordinate amount of money in attempting to develop that indi-

vidual to meet the demands of the position. In reality, the selection of a supervisor or manager is one of the most critical elements in developing an effective management team.

The most logical approach to proper selection is to first define what we consider a "good supervisor". What qualities do we desire and need? Should he or she possess technical skills, interpersonal skills, or a combination of both? What does the position being filled require? How do we determine management potential? In the selection process, it is worthwhile to consider that it is quite difficult, if not impossible, to motivate people, and advisable instead to provide the atmosphere that allows people to motivate themselves.

Methods of selection are numerous. In-house supervisory trainee programs can be set up to allow individuals to evaluate the positions, and their own potential, in conjunction with management's appraisal of the candidates. Many colleges, trade facilities, and even high schools establish internship programs with various businesses to coordinate classroom learning with actual on-the-job experience. Both of these approaches provide prior exposure to positions at minimal cost. A balance between promoting from within and hiring from without can achieve positive results by demonstrating that advancement occurs through performance and not length of service. The process of choosing the right candidate can be aided through various psychological tests in the interview process, group and individual interviews (for a more balanced perspective), and even assessment centers to identify given qualities in each individual.

Perhaps as crucial as the right selection process is the additional training support that should follow. Follow-up training must continue to isolate the strengths and weaknesses of both the individuals and the training activities and update the needs arising from changing work practices and equipment. Are the personal and monetary incentives to maintain the quality and integrity of the management staff still present? Outside workshops and seminars can keep us aware of the changes around us.

Often we fail in the next step. The "Peter Principle"--i.e., promotion beyond the employee's level of competence--is often discussed and taken for granted. We should pay special attention to providing an avenue for individuals to return to their most productive level of activity. There is no need to live with the selection of an incompetent manager for 20 or 30 years. This only diminishes the pro-

ductivity of the individual and those around him or her.

LABOR CONTRACTS

Nationwide, regardless of industry, it appears that the tendency in collective bargaining is to negotiate a contract--its content and duration--with minimal emphasis on long-range planning. The traditional approach of submitting, eliminating, and trading a host of proposals, with final settlement on a few, is inadequate in today's economy. The 10 minutes in allowances here, the additional 5 cents an hour there, etc., compounded over 10-20 years, in perhaps as many contracts, have created an unworkable operating environment.

The historical pattern of labor unions requesting more with each contract, be it wages or fringes or both, is hard to stop and even more difficult to reverse. The recent Port Authority Transit Corporation decision demonstrates that strikes are perhaps not a viable threat. The latest settlements in the automobile industry have shown more interest in job security and have minimized union-management, employee-employer differences. Now is the time to negotiate in the frame of reference that this is "our" company.

In the past, the labor unions have been allowed to use the transit industry as a standard in establishing wage rates. Rather than using other transit properties for wage and/or fringe comparison, more attention should be focused on the demand and corresponding wage structure of similar occupations in the general surrounding geographic area.

The concept of offering contract wage increases and cost-of-living adjustments (COLAs) seems inappropriate without defining increased productivity. Management's first attempt at controlling costs should be to reduce or eliminate COLAs. Managing on predictions of what might and might not happen is most difficult and offers little, if any, control.

The next need is to institute productivity standards wherever possible. Contract wage increases should parallel increases in productivity. The need to cement the relation between wages and increased productivity is basic.

Third, management should establish contract language that results in wage decreases for the less skilled positions, such as bus cleaners, inventory control clerks, custodians, and clerical support functions. These positions are often included in the percentage increases for the skilled positions of operators and mechanics and as a result receive a much higher wage than similar positions in private business.

Transit contracts have always included clauses that allow management the flexibility to respond to changes in the industry and the economy, clauses defined as the "rights of management". Too often, organizations have inserted language in other areas of the contract that contradict and restrict these rights and tie management's hands in effectively controlling costs.

Because labor costs account for more than 50 percent of the maintenance operations budget, it is most important to relate any wage and/or fringe demands to corresponding increases in productivity in order to at least maintain the present operating ratio and, as a future goal, to increase it.

MANAGEMENT REPORT SYSTEMS

Information management will explode in the 1980s. The more complex the function, or the more variables involved, the greater is the need for thorough information systems. This places an increasing burden

on information management--data capture, processing, reports, etc.--which focuses on key factors such as labor, materials and supplies, and equipment utilization. The major issue is that managers should have adequate data available to them so that they can analyze and develop solutions that result from trends in the reporting process. Some simple rules to follow in the development of an information management system are

1. Keep it simple and easy to understand,
2. Involve the user as much as possible,
3. Make the system modular in design (whole sub-systems),
4. Ensure that data are timely and accurate,
5. Accommodate user involvement,
6. Gear the system to respond to the user's needs and requirements, and
7. Design the system for directing a preventive maintenance program.

Significant progress has been made in the Denver RTD system, due in part to the effort put into the maintenance reporting system. For example, there have been increases of approximately 40 percent in mileage per road call, approximately 10 percent in the average life mileage of engines, 20 percent in inspections completed as scheduled, and increased warranty claims coverage based on the availability of improved coach history. Some of the reports generated include the following:

1. Fuel and oil consumption reports by operating facility, subfleet, coach, and exception basis (designate oil leakers and engines that need rebuild due to high mileage);
2. RTD vehicle inventory and detailed coach history (reference all pertinent coach information for the company);
3. Labor and parts reports (specialized use for maintenance cost data);
4. Maintenance and operating costs per mile (used for cost analysis);
5. Component use (mileage) report, by subfleet (integral part of component change-out and preventive maintenance program);
6. Component repeater report (identifies trouble source and subsystems on specific coaches);
7. Inspection scheduling report (schedules all inspections);
8. Coach history report, which gives activities since the last inspection (reference for the mechanic performing the inspection);
9. Fuel history report (tracks hubodometer and mileage for the entire fleet);
10. Component forecasting report, by subfleet (determines anticipated work-load requirements for all major components for the next 6-12 months); and
11. Road-call reporting, a performance indicator for facility performance and coach reliability (daily, weekly, and monthly reports for specific coach repair and trend analysis).

PREVENTIVE MAINTENANCE

Preventive maintenance is defined as a regularly scheduled program of maintenance by which periodic inspection checks are done to prevent premature failure and provide more reliable service. The initial inspection is only the first ingredient of a sound preventive maintenance program. Even more important is the actual follow-up "hands-on" repair, the essential element before any vehicle is released for service. It is pointless to go through the process of inspecting a bus at 6000-mile intervals and then place it into service with a defective radius rod, power steering pump, or air dryer. Ef-

fective preventive maintenance means both inspection and repair.

Perhaps the most difficult aspect of a preventive maintenance program is to determine at what mileage intervals a maintenance action should be taken and whether a component should be changed out before failure. As a maintenance operation becomes more centralized, more attention is given to scheduling intervals and the repair action to be taken. Scheduling intervals consistent with the skill level of mechanical diagnosis and management's confidence of operation require the most cost-effective approach for an overall maintenance operation based on planning experience and assessment.

The relationship between effective preventive maintenance and an established maintenance reporting system should be apparent. Because planning of scheduling intervals is so critical to effective preventive maintenance, the need for a system to gather and disseminate a variety of data in timely reports for proper analysis is of paramount importance.

Preventive maintenance is most productive due to the fact that it is planned. Unscheduled work assignments will be accomplished in a reactionary mode, but this is disruptive to the planned activities and results in increased inefficiencies in man-hours and parts and materials scheduling.

PERFORMANCE INDICATORS AND OBJECTIVES

A process that is often very helpful in improving the overall operation of a maintenance function is the establishment of clear expectations. One of the most effective applications is the formulation of "maintenance performance indicators". These indicators give a manager a quick overview of how a particular facility is operating and what level of performance it is achieving. They provide the "production" numbers that help gauge the operation.

Specific items can include the number of road calls, tune-ups, preventive maintenance inspections completed, brake and wheelchair lift inspections completed, engines and interiors cleaned, and total work loss. For example, the district shops (major repair) report can be on the number of power plants, transmissions, and brake jobs completed.

One of the most valuable benefits is the actual process of establishing mutual targets as part of the overall setting of objectives. The dialogue between management and supervision is enhanced by specific accountability methods that measure both productivity and performance. The Department of Transit Operations recently performed this valuable exercise in stating its 1982 goals and objectives.

In setting performance objectives for 1982, the Transit Operations staff first reviewed the problems involved in their previous goal-setting process. The staff then worked on a solution that would (a) focus departmental goal-setting activities on priority issues; (b) deal with the "vital signs" of specific sections within the department; (c) require statements with clearly stated, tangible goal commitments for each objective as well as the preparation of appropriate methods to collect data and report the information regularly; and (d) provide a framework for interpreting progress toward and achievement of performance objectives to all staff levels and the Board of Directors.

Toward these ends, each section's management team reviewed and analyzed its unique role in the Department as a whole and identified performance indicators on which to base 1982 objectives. During this process, section directors received input from key members of their staffs concerning the "vital signs" of their respective areas; this information was

reviewed and discussed by the Transit Operations staff in an effort to crystallize issues of greatest concern, coordinate conflicting objectives, and promote departmentwide focus on RTD attempts to cut costs while maintaining safe, reliable, and effective public transit for the citizens of the six-county service area. The results of the process were the 1982 performance objectives for the Department of Transit Operations, including 2 departmentwide objectives dealing with absenteeism and budget adherence and 29 performance objectives set by the seven individual sections.

As an example, the performance objectives set by various sections of the RTD are outlined below.

Vehicle Maintenance

Performance Indicator

Miles between chargeable road calls

Performance Objective

Improve the miles between chargeable road calls by 20 percent from 2475 in 1981 to 2970 in 1982 for a net increase of 495 miles

Miles between road calls is a visible, reasonably accurate indicator of vehicle reliability and maintenance performance. The Vehicle Maintenance Section has monitored this indicator over the past year and has used the data to continually upgrade the preventive maintenance program as well as reduce the number of repeat road calls. The Section's record-keeping system allows for road calls to be reported based on whether the problem was attributable to vehicle maintenance or operator error and whether the occurrence was chargeable or nonchargeable. The information will be reported in this format in order to pinpoint responsibility for correcting problems.

Performance Indicator

Percentage of preventive maintenance program completed

Performance Objective

Complete 100 percent of inspections as scheduled, and clear 80 percent of all defects found in inspection process within 48 hours of date of inspection

Percentage of preventive maintenance program completed relates to the Vehicle Maintenance Section's responsibility for repairing all major defects found during the routine inspection cycle. The most tangible result to be obtained in meeting this objective will be increased vehicle reliability. In 1981, approximately 55 percent of all defects found were cleared. The 1982 objective is set at 80 percent in order to maximize the cost-effectiveness of available vehicle maintenance resources. The focus on preventive maintenance should have a positive impact on the other vehicle maintenance performance objectives for 1982.

Performance Indicator

Repeat road calls

Performance Objective

Reduce the overall road-call repeat percentage from an average of 15.3 percent of total road calls in 1981 to 12 percent of total road calls in 1982 for a net improvement of 22 percent

The repeat road calls indicator addresses those road calls that reappear in the same general category within 10 days. This information should be useful in detecting troublesome subsystems or identifying the need for a mechanic to acquire retraining in some areas.

Materials Handling

Performance Indicator

Bad-order buses due to out-of-stocks

Performance Objective

Bad-order buses awaiting parts not to exceed a daily average of 2 percent of the system fleet, or 14 vehicles, allocated by facility as follows: Alameda - 3; Platte - 5; East Metro - 3; NOG - 3.

The objective excludes bad-order buses awaiting rebuildable components when Materials Handling can provide the repair parts and rebuildable core. To meet this objective, each division storeroom supervisor has made a commitment not to exceed the daily average number of bad-order buses, based on the current fleet.

Performance Indicator

Total monthly inventory valuation

Performance Objective

Reduce the inventory value from \$2.16 million on December 31, 1981, to \$1.93 million by December 31, 1982, for a net 10.6 percent reduction

Meeting the objective would result in an approximate \$230 000 reduction in valuation for 1982.

Technical Services

Performance Indicator

Monitoring and enforcement of all warranty claims related to vehicle and facility equipment for Transit Operations

Performance Objective

Satisfactorily resolve 100 percent of fleet defects and warranty issues on General Motors (GM) buses

Warranty claims, in general, are not submitted to GM until they are discussed and resolved with the GM representative. Negotiations are sometimes necessary before a problem is solved.

Performance Indicator

Verification of quality control on all incoming parts and materials received for the Maintenance Division

Performance Objective

Save the RTD \$52 000 in unacceptable material in 1982, as compared with \$42 000 in 1981, or an increase of 24 percent; and, through the inspection of parts and components and development of specifications, increase the reuse volume of parts and components to save the RTD \$127 000 in 1982, as compared with \$102 000 in 1981, an increase of 24.5 percent

In addition to verifying the quality of incoming goods, Technical Services also monitors parts and components that are rebuilt in-house to ensure their useful life and reliability. In 1982, Technical Services will continue strict adherence to established quality-control standards to reduce waste in high-volume rebuild areas by 30 percent and also continue its efforts to reduce the receipt of unacceptable incoming materials.

Performance Indicator

Project control: electric (brake) retarders

Performance Objective

Complete the retrofit of 259 buses with electric retarders by December 31, 1982, at a cost not to exceed \$2 164 800

In order to meet this commitment, it will be necessary to coordinate and provide support to Grants, Contracts and Procurement and to Vehicle Maintenance in the development of the retarder program by April 15, 1982; beginning May 15, 1982, Technical Services will assist, as necessary, in the installation of the retarders, to be completed by December 31, 1982.

Performance Indicator

Project control: evaporative coolers

Performance Objective

Finalize a decision concerning the type of evaporative cooler to be used in retrofitting 525 buses, cost of installation not to exceed \$3200/coach

In order to meet this commitment, Technical Services will participate in the evaluation of a rooftop evaporative cooler R&D program to be completed by July 31, 1982; specifications for installation are to be written by August 6, 1982, and an invitation for bids is to be completed by August 17, 1982.

MAINTENANCE JOB STANDARDS

Maintenance job standards are the primary source of comparison in determining and monitoring overall maintenance productivity and efficiency. It is management's means of establishing not only what is acceptable but also what is not acceptable. Its value in a production or assembly line operation has been proved. But it can also be used in a maintenance facility for the more common and identifiable tasks. If productivity issues are not addressed thoroughly and if the diagnostic process is failing, management can shift its focus to more "remove and replace" functions, similar to an assembly line practice, replacing the diagnostic trouble-shooting method with defined maintenance procedures in some areas of repair.

As stated earlier, more than 50 percent of the maintenance operating budget is attributable to labor costs. Although there could be considerable difficulty with having a job standard for every repair activity, defining an expectation for all maintenance employees has enormous management value. The standards can be extremely useful in helping managers and supervisors to be more explicit in defining job expectations for their employees.

The methods used in establishing standards can vary from the very simple to the complex. Simple communication between manager and supervisor and between supervisor and employee, although a more subjective and humanistic approach, might be the most positive method in the initial stage because it provides the individual with a sense of achievement and motivation. It also allows for mutual agreement on what the standards should be, based on individual skill levels. Since there is a demonstrated interest in each individual, the barriers associated with fixed standards are overcome.

Time and motion studies have long been used but tend to be negative in nature because they appear to overlook the human element. Industry standards throughout the country can be used for comparison as long as all factors are considered. For example, age and design of facilities, types of tools and equipment, and vehicle and material designs must all be taken into consideration before one attempts to define what might very well become an unrealistic measure of performance.

The development of job standards is closely related to the detailed repair activity codes that are set up within the maintenance system. There should be enough codes to provide sufficient detail and yet

not so many as to confuse the mechanic and complicate the reporting.

The previous discussion is only the first step, however. Once the foundation has been established, it is critical that the standards be stated in concrete, definitive terms. This process will not only be beneficial to the existing work force but will also ensure the level of performance expected of all future employees. Stating in absolute terms that a tune-up will be completed in a prescribed manner in six hours, for example, heightens the level of awareness of the standards for tune-ups and gets the job done. If an employee fails to meet the standard, then positive steps should be taken to provide that individual with the necessary training.

MAINTENANCE TECHNICAL TRAINING

Training, for present and future needs, is an investment in the people side of the business. We spend millions of dollars in equipment improvement and relatively few dollars in people development. The technological advancements occurring in today's transit industry have only increased its complexity. New vehicle designs, sophisticated testing and repair equipment, and corresponding technical procedures have created a substantial burden on today's mechanic. The "old timers" retiring leave behind a relatively young and untrained work force, and an obvious void, in their organizations. The need for a structured training program to meet present and future demands on today's work force is overwhelming. Untrained people increase the cost of running the business. A formal training program consisting of classroom instruction on the latest maintenance techniques, actual hands-on application of those techniques, follow-up observation and assessment, and written and oral reviews is essential in upgrading the skill level of mechanics as well as achieving a level of consistency in determining their qualifications. The purpose is to yield a more productive, qualified mechanic whose increased efficiency and work output will more than compensate for the related training costs. The increased productivity might eventually reduce the number of positions required.

CONTROL OF ABSENTEEISM

A consistent work force is essential to work productivity. In the late 1960s, the U.S. automobile industry had an absenteeism rate on Mondays and Fridays as high as 40 percent, which prompted the expression, "Be sure your car is built on Wednesday!" A comparative study was made of how "coffee breaks" are taken by automobile workers in the United States and Japan. In Japan the assembly line shuts down completely during breaks, whereas the American system substitutes a worker and keeps the line moving. Japan's system was more productive and cost efficient and resulted in a more reliable product.

Controlling absenteeism reduces lost time and increases productivity. Management's emphasis on the urgency of "being present" creates a stable work force and increases morale by instilling job pride. Stability and reliability ensure that effective planning and scheduling techniques do happen.

Wages of union maintenance personnel have climbed so dramatically that some find it quite comfortable to work four days rather than five. Absenteeism then shifts the burden to the remaining work force, decreasing productivity and lowering morale.

Defining and enforcing guidelines on absenteeism

gives all employees direction as to what is and is not acceptable and a sense of purpose in achieving management's goal. Especially in today's marketplace, where jobs are fewer, an unproductive employee must be replaced by those willing to perform efficiently.

The RTD's "Attendance Policy: All Bargaining Unit Employees" states the necessity of such a policy, defines the absenteeism problem, sets absenteeism guidelines, delineates to whom the policy applies, defines a day of absence and absence exclusions, and enumerates the positive disciplinary measures for unacceptable attendance and tardiness. For example, discipline for unacceptable attendance, starting with the date of the first infraction, is administered as follows:

<u>No. of Occurrences in 12-Month Period</u>	<u>Disciplinary Measure</u>
3	Oral reminder
5	First written reminder
7	Second written reminder
8	Decision
9	Possible termination

The RTD maintains a self-help program for the benefit of all employees. The program may be recommended to the employee at the time of a second written reminder. Participation in the program does not preclude additional positive discipline, but it may be a factor in consideration of the discipline to be applied.

The attendance policy also contains a form that is to be signed by the employee acknowledging receipt of the policy.

CONCLUSIONS

This paper has highlighted some issues for consideration in refining and improving transit operations. It is not my intention to represent this as a definite cure to the dilemma we now face. Rather, it is intended as a review of some major issues that can be used as a focal point for what we need to analyze and plan for in the future. Each transit property is confronting these issues with different degrees of success. If we can continue to learn and grow together and effectively confront the management opportunities that we now have, success is just around the corner.

The art of managing, whether it be in transportation or any other industry, depends on maintaining a fine balance between productivity and people. Managing is often described as the ability to maximize and orchestrate the resources of an organization to accomplish the desired results. There is no right way to manage but rather a series of options or alternatives. We need to focus on the relevant issues and be wise enough to select the most appropriate alternatives. If we accomplish this, we will indeed have been successful.

Our concerns should be to control cost while increasing productivity in three areas: labor, materials and supplies, and equipment. Participation in the Bus Maintenance Improvement Workshop is an effective step toward increasing the productivity of our transit systems. The workshop can be viewed as an information-sharing opportunity where invaluable input can be gained toward improving the performance of the maintenance function. The value of such an opportunity can only be determined based on the ideas gathered and the individual's ability and interest in instituting positive change within his or her organization.