

**Management And Self-Evaluation
Manual For Public Transit Systems
In Michigan**

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16. Abstract The objective of the Management and Self-Evaluation is to assist transit managers to achieve their overall responsibility to meet transit service needs in their community efficiently, effectively, and within the constraints of available resources. The manual identifies the critical elements of an internal management and self-evaluation process for mid-size transit systems, describes the relation of these elements to each other and discusses their application and use by a transit system.					
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Executive Summary

EXECUTIVE SUMMARY

This manual is intended to serve as an aid to transit managers in the internal management and self-evaluation of their transit systems. The manual has been prepared in response to a request from the Urban Mass Transit Administration (UMTA) that the efforts of the Michigan State Bureau of Urban and Public Transportation (UPTRAN) to develop an evaluation tool for assessing transit performance be complemented by the development of a manual for transit systems to use in internal management and for communication with local transit boards and public officials. UMTA's request was supported by Michigan transit system managers who indicated that a self-evaluation and management aid for transit systems could be very useful.

BASIC PREMISES OF THE MANUAL

The manual is based on the following principles:

- . First, internal management and self-evaluation practices are important tools for transit managers. These practices facilitate the efficient and effective use of resources and pursuit of organizational objectives. Internal management tools can (1) aid in management control through improved planning and monitoring of operations; (2) improve budgeting activities and enable better financial management; and (3) facilitate external reporting and accountability to the community, public officials, and funding agencies.

- . Second, the specific needs, resources, and circumstances of each transit system are different and the application of general management principles must be tailored to best serve each system and its community. Before developing a structured, internal management and self-evaluation process, each transit manager should ask the following questions:
 - Who will use the results?

 - What resources are available to administer the effort?

 - How will existing management style(s) and perspectives affect the type of internal management and self-evaluation process suited for this transit system?

The combined efforts of senior management with mid-level transit management and the local transit board in answering these questions will influence the characteristics of the resulting program.

OVERVIEW OF THE GENERAL APPROACH TO THE INTERNAL MANAGEMENT AND SELF-EVALUATION PROCESS

Section I of this manual suggests a general approach for the internal management and self-evaluation of transit systems. To develop this general approach, the following activities are suggested.

- Develop Goals and Objectives, to determine what is to be accomplished or improved.
- Define Performance Indicators and Data Needs, to specify quantifiable measures which permit the evaluation of performance.
- Establish Performance Targets, to specify the acceptable or desired level of performance that is to be achieved by a transit system in a targeted area.
- Plan an Improvement Program, to focus on the development of actions to attain the desired level of performance.
- Prepare a Budget, to estimate the cost of labor and (capital) equipment for carrying out the improvement program.
- Collect Data, to monitor the effects of the improvement program on stated objectives and performance targets.
- Compare Actual to Planned Performance, to measure progress against plans and to adjust objectives where necessary.
- Reassess Targets, Program, and Budget, to determine whether the target was unrealistic, the program inappropriate or ineffective, or the resources insufficient.

Clearly, this process is dynamic and interactive. It can be tailored and refined to serve any transit manager. For example, this general approach can be applied to each functional area in a transit system as part of a structured annual planning and budgeting process or used on an ad-hoc basis, for directing and managing change and improvement in a limited number of areas of a transit system.

Section II of the manual presents the framework for internal management and self-evaluation and the sequence and relationship of the basic elements of that framework. Other topics that are covered in it are:

- Why develop goals and objectives;
- How many goals and objectives should a transit system develop; and
- The role of the transit board or oversight authority in the development and use of transit system goals and objectives.

CASE STUDY APPLICATIONS

Section III of the manual demonstrates the application of the internal management and self-evaluation process through three case studies. In the case studies, the subject hypothetical transit system, Mid-Size Michigan Transit Authority (MMTA), faces three serious issues common to many transit systems in Michigan and throughout the United States:

- 1) The need to increase fare revenues through selective fare increases to improve the current operating ratio;
- 2) The need to control absenteeism to reduce operating expenses and improve utilization of existing labor resources; and
- 3) The need to selectively reduce transit service levels to lower operating costs in response to anticipated reductions in federal operating assistance.

The case studies are developed around the application of the internal management and self-evaluation process and the resolution of each of these issues.

Through this case study approach, practical information, illustrations, and analytical techniques are presented to assist transit managers in addressing these issues in their own transit system. In addressing each issue, suggested performance indicators are presented as well as illustrative improvement programs.

Case Study 1: Fare Increases to Improve Operating Ratio

This case study provides some history on transit fare policy in the United States during the past 15 years and discusses the increased importance today of fare box revenues. Drawing on national studies of transit fare policy, information is presented on:

- the alternative types of fare strategies, including flat fares, distance based fares, time differentiated fares, value based fares, fares for special origins and destinations, special fares for limited areas, and special discount fares;
- transit market segments and the importance of determining the response of transit riders to changes in fares based on characteristics of the riders and their trip-making habits; and

- fare elasticity, or the impact of changes in fare on changes in ridership by trip maker, trip type, and time of day--an important consideration in estimating the net effect on revenues of new fare strategies.

Case Study 2: Absenteeism Reduction and Control

In the final case study, an issue which is receiving increasingly more attention in transit and other United States industries--employee absenteeism and its associated costs and impacts on operations--is presented. The case study serves as a vehicle for presenting:

- commonly used definitions for types of absenteeism including injury-on-duty (IOD), sick leave, requested days off, other excused absences and suspensions, and unexcused absence;
- the effects of absence on a transit system including the effects on direct costs, indirect payroll costs, overhead, administrative costs, service impacts, and employee impacts;
- the range of attendance programs that can be used to address absenteeism control as well as those that are historically most prevalent in the United States; and
- the benefits of pursuing a balanced absenteeism control program which includes both disincentives--or punishment for excessive absences--and incentives or rewards for commendable attendance records.

Case Study 3: Selective Service Reductions

Included in the case study which addresses selective service reductions are discussions of:

- three approaches for achieving service cutbacks:
 - reductions in service frequency;
 - changes to service span; and
 - route modification or elimination;
- a route level ridership survey effort to gather and analyze ridership data by route segment and time of day as a basis for recommending reductions in service level; and
- an analytical technique for estimating cost savings which uses a four-factor unit cost approach developed from Section 15 required level data.

APPENDICES

The manual includes two appendices. Appendix A summarizes common transit system responsibilities by functional area. Appendix B defines a set of performance indicators that can be developed from the required level Section 15 data. A review of the current activity by the mid-size transit systems within the state of Michigan to conduct routine performance evaluation and monitoring appears in a separately bound report prepared by Peat Marwick for UPTRAN under this contract (MDOT 79-1829). In it, programs of each transit system are summarized including the use of performance indicators, the process through which goals and objectives are set, the relationship between the transit system general manager and board in performance evaluation, and the impetus for developing a performance measurement and monitoring program. As is demonstrated in this report, there is considerable activity in Michigan in the area of transit performance evaluation. The sharing of information and experience among the transit systems can assist all of the transit managers in their efforts to provide efficient and effective transit service to their community.

I. Introduction

I. INTRODUCTION

The purpose of this manual is to assist transit managers to achieve their overall responsibility to meet transit service needs in their community in an efficient and effective manner, within the constraints of available resources. This manual has been prepared in response to a request of the Urban Mass Transportation Administration that the efforts of the Michigan State Bureau of Urban and Public transportation to develop an evaluation tool for assessing transit performance should be complemented by the development of a manual for transit systems to use in internal management and for communication with local transit boards and public officials. UMTA's request was supported by Michigan transit system managers who indicated that a self-evaluation and management aid for transit systems could be very useful.

This manual identifies the critical elements of an internal management and self-evaluation process for mid-size transit systems, describes the relation of these elements to each other, and discusses their application and use by a transit system. The manual recognizes that all transit systems are unique and that, as a result, the particular management process of each system will be tailored to serve the needs and resources of the community, the transit system and transit management. Consequently, the manual does not prescribe performance targets or standards nor does it recommend specific roles or responsibilities within a transit system or between a transit system and its Board or local elected officials.

The manual is organized in four sections:

. Section I: Introduction

This section discusses the importance of establishing and utilizing structured practices for internal management and self-evaluation; describes the factors that influence the development of these practices, and outlines some of the key features that affect the specific characteristics of the programs of different transit systems.

. Section II: Internal Management and Self-Evaluation Process: A General Approach

This section describes the suggested, general approach for internal management and self-evaluation of a transit system. At first, a general framework is presented; then each element of that framework is defined and discussed.

• Section III: Application of the General Approach Through Case Studies.

This section includes three case studies which apply the internal management and evaluation process introduced in Section II. The intent of this section is twofold: first, to demonstrate how a transit system can use the suggested internal management and evaluation process; and second, to provide practical information and analytical techniques to assist transit managers in resolving three critical issues confronting transit today--the need to (1) increase fare revenue, (2) control absenteeism, and (3) reduce transit service. A hypothetical mid-size transit system is used in the case studies to illustrate these issues.

The manual concludes with two appendices:

- Appendix A: Review of Common Transit Responsibilities by Functional Area; and
- Appendix B: Definitions of Performance Indicators Using Section 15 Data.

IMPORTANCE OF INTERNAL MANAGEMENT AND SELF-EVALUATION PRACTICES

Under any circumstances, an organization should strive to use resources efficiently and effectively to meet organizational objectives, whether in the production of goods, or in the delivery of services.

The application and use of carefully developed internal management and self-evaluation practices has never been more important to the transit industry than it is today. The transit industry is facing escalating costs, declining public support, farebox revenues that have not kept pace with inflation; continued demand for clean, safe, and on-time services; and increasing interest in the accountability of public services to citizens and public officials. This environment pressures transit managers not only to strive individually to perform their jobs in the best possible manner but also to ensure that each employee understands the organizational objectives of the transit system, its existing financial constraints, and the importance of being responsive to the community in the delivery of efficient and effective transit services.

Given these circumstances, management tools that provide structure and direction to the daily and longer-term activities of each transit system are necessary. Up-to-date and accurate information should be available at the appropriate level of detail and frequency to allow management to make timely and effective decisions. Limited resources and public scrutiny will not allow prolonged inefficiency or ineffective decision making.

FACTORS INFLUENCING INTERNAL MANAGEMENT AND SELF-EVALUATION PRACTICES

The internal management and self-evaluation practices of each transit system should be tailored to serve that system and will, therefore, be unique. To determine whether existing management practices are appropriate or to ensure that new practices are properly designed, transit managers should ask general basic questions:

- . Whose needs are to be served and who will receive and use the information produced?
- . What is the purpose or intent of conducting the evaluation? What objectives are to be met or what ends are to be achieved?
- . What resources are available in terms of staff, budget, and technical capability to carry out the internal management and self-evaluation practices?
- . What are management styles and perspectives of the individuals that have prime responsibility for the transit system or are to be centrally involved in the management and self-evaluation activities?

In the answers to these questions lies the basis for tailoring general management principles and practices to meet the specific needs of each transit system.

Who are the Users?

The users of management tools, self-evaluation practices, or the information they produce can include the local transit board, internal transit system management, public officials, the general public, state government personnel, and funding agencies. The needs, concerns, and perspectives of each of these groups may differ. Certainly, the type of information, its level of detail, and how frequently the various groups are involved will differ.

The concerns of transit management (and possibly also the transit board) will be the most comprehensive. Relating to all aspects of the performance of the transit system, they will require the most detailed activities and information. The concerns of the general public or funding agencies are likely to be more limited, possibly focusing on the quality of transit service within specific neighborhoods or the ability of the transit system to continue current service levels within the constraints of available funding.

Why Implement Self-Evaluation Practices?

The reasons for implementing more structured management practices and self-evaluation procedures can include:

- . the production of information to ensure accountability to public officials and outside organizations;

- . the monitoring of performance to assess and improve efficiency and effectiveness;
- . the clarification and prioritization of objectives and expectations;
- . the development and improvement of services;
- . the diagnosis and early resolution of problems; and
- . the internal allocation of resources as part of planning, budgeting, and internal control of operations.

While many purposes can be articulated and targeted for accomplishment through application of management practices, priorities should be set so that the most important result is achieved.

Exhibit I-1 summarizes the range of audiences, purposes, levels of detail and evaluation frequency that influence the design and implementation of a self-evaluation process. The levels of detail by audience shown in this exhibit represent typical experiences of transit agencies and are not necessarily those that should be adopted by the agencies involved.

What Resources are Available?

Resource availability, including financing, skilled personnel and technology, affect the characteristics of the management and self-evaluation practices of a transit system.

Self-evaluation practices must be included in the budgeting and planning of the system, not added as an afterthought or considered as responsibilities outside the routine requirements; the complexity, sophistication, and the frequency with which they are conducted will be determined by resource availability. Transit management must determine what management and self-evaluation practices are essential for their system and then insure that resources are available to successfully implement these practices.

Management Style and Perspective

The final factor that influences the characteristics of internal management and self-evaluation practices of a transit system is the style and perspective of the individuals with prime responsibility for the system. This factor may, more than the others identified above, distinguish the activities

EXHIBIT I-1

SCOPE DEFINITION OF A TRANSIT EVALUATION
METHODOLOGY

AUDIENCE	PURPOSE	LEVEL OF DETAIL				FREQUENCY OF EVALUATION					
		System Wide	Route	Function	Activity	Annual	Biannual	Quarterly	Monthly	Weekly	Daily
General Public	<ul style="list-style-type: none"> Accountability/Information Clarify performance expectations in relation to objectives 	●	●			<p>Frequency of evaluation will be determined by policy decisions which consider:</p> <ul style="list-style-type: none"> the needs of the audience the purpose for the evaluation and use of evaluation results; and the resources available to finance the evaluations. <p>Evaluations should be conducted more frequently for internal management than for external reporting purposes.</p> <p>LEGEND:</p> <p>● Typical levels of detail of interest to the audiences of the evaluation. These will vary by transit agency.</p>					
Public Officials	<ul style="list-style-type: none"> Accountability/Information Assess management and diagnose problems Clarify performance expectations in relation to objectives Resource allocation 	●	●	●							
Funding Agencies	<ul style="list-style-type: none"> Accountability/Information Transit development and improvement Resource allocation 	●		●							
Administrative Agencies	<ul style="list-style-type: none"> Accountability/Information Transit development and improvement Assess management and diagnose problems Resource allocation Management control and monitoring 	●	●	●	●						
Transit Management	<ul style="list-style-type: none"> Transit development and improvement Assess management and diagnose problems Management control and monitoring 	●	●	●	●						

I.1

at each transit system. The manner in which general management practices are carried out is determined in part by the personality of the people in charge. Management style and perspective can affect:

- Organizational Approach. Certain individuals are highly structured and organized. They develop systematic approaches to their day-to-day responsibilities and plan future activities. Other individuals address situations as they arise, tending less to plan and monitor events.
- Delegation Practices. An important difference among managers is the extent to which they delegate responsibility and decision-making to subordinates. Some managers insist on having authority highly centralized. These individuals are personally involved in a wide range of activities and directly participate in decision-making at various levels of the organization. Other managers limit their involvement. For example, they may participate more actively in the budget process and strategic planning and less in the day-to-day operation of each department or functional area of the transit system.
- Attitude toward Participatory Decision-Making. Closely related to the extent that a manager will delegate is the extent to which he believes in participatory decision-making, or group involvement. Although decision-making can take more time when a number of people are involved, many managers look for the input and interaction of their employees while others feel that decisions are more effectively made by the individual having ultimate responsibility.

The extent to which each of these personal attributes characterizes the individual in charge of the transit system will influence the manner in which internal management and self-evaluation practices are carried out. The process for self-evaluation outlined in Section II, however, is a generalized process and is independent of management style.

FEATURES OF THE MANAGEMENT AND SELF-EVALUATION PRACTICES

As shown in Exhibit I-1, the features of the management and self-evaluation practices of a specific transit system will be influenced by the factors discussed above. These features include:

- Level of Detail. How extensive will the information gathering, analysis, and evaluation activities be? Will they address overall system performance, route specific performance? Will they analyze each function and activity performed by the transit system?
- Frequency of Monitoring and Evaluation. How often will selected data be gathered, analyzed, and reported? Yearly? Quarterly? Monthly? Weekly? Daily? Hourly?

- . Responsibility for Self-Evaluation Activities. Who will carry out the specific activities that are essential for self-evaluation (e.g., goal setting, data collection, monitoring, and evaluation, etc.). Who will be held responsible and accountable for the information produced?
- . Use of Results or Output. Who will use the results, i.e., the findings or output of the activities, and how will they be used by each recipient of the information?

Each of these issues should be raised in the process of establishing or refining the internal management and self-evaluation practices of a transit system. When these issues are addressed in the design stage, the practices that are implemented are more likely to serve the needs of the transit system. Over time, the needs served by the management and self-evaluation practices may change, and with them, the features of the practices. Such changes are a natural and inevitable part of organizational change.

SUMMARY

The intent of this manual is to provide an aid for transit managers for internal management and self-evaluation of their systems. The manual was designed to recognize that the specific needs, resources, and circumstances of each system are different and that the application of the general principles discussed in this manual will be unique to each transit system. In short, it is not possible to provide simple, cookbook guidelines that can be applied with the same results in each transit system. Rather, having identified the user's needs and resources of the system, transit managers must tailor their own internal management and self-evaluation practices.

II. Evaluation Procedure

II. INTERNAL MANAGEMENT AND SELF-EVALUATION PROCESS: A GENERAL APPROACH

This section presents a suggested general approach for internal management and self-evaluation for transit systems. The objective of this section is to introduce the evaluation framework and to define and discuss each of its basic elements in sequence.

The internal management and self-evaluation process described in this manual can be applied to each functional area of a transit system. Included in the manual are illustrations which reference the application of the suggested management practices to various areas of a system. The illustrations are provided to demonstrate the usefulness of the practices throughout the system.

To establish a common basis of understanding, an overview of the functional responsibilities common to most transit systems is provided in Appendix A. Functions specific to systems that provide rapid transit, light rail, or trolley service are not included since the mid-size transit system in Michigan do not operate these modes. The appendix provides a description of transit functions and discusses important management concerns relevant to each functional area.

INTERNAL MANAGEMENT AND SELF-EVALUATION PROCESS: OVERVIEW

Exhibit II-1 is a diagram which identifies each of the elements in the internal management and self-evaluation process and their relation to each other. In each of the following subsections, an element of the evaluation process and the progression of the activities are described.

DEVELOP GOALS AND OBJECTIVES

The establishment and prioritization of goals and objectives is the first critical step to be accomplished by transit management.

- Goals are broad statements of intended results. A goal describes the basic purpose of providing a service or performing a functional activity. For example, a goal describing the basic purpose of providing transit service might be:

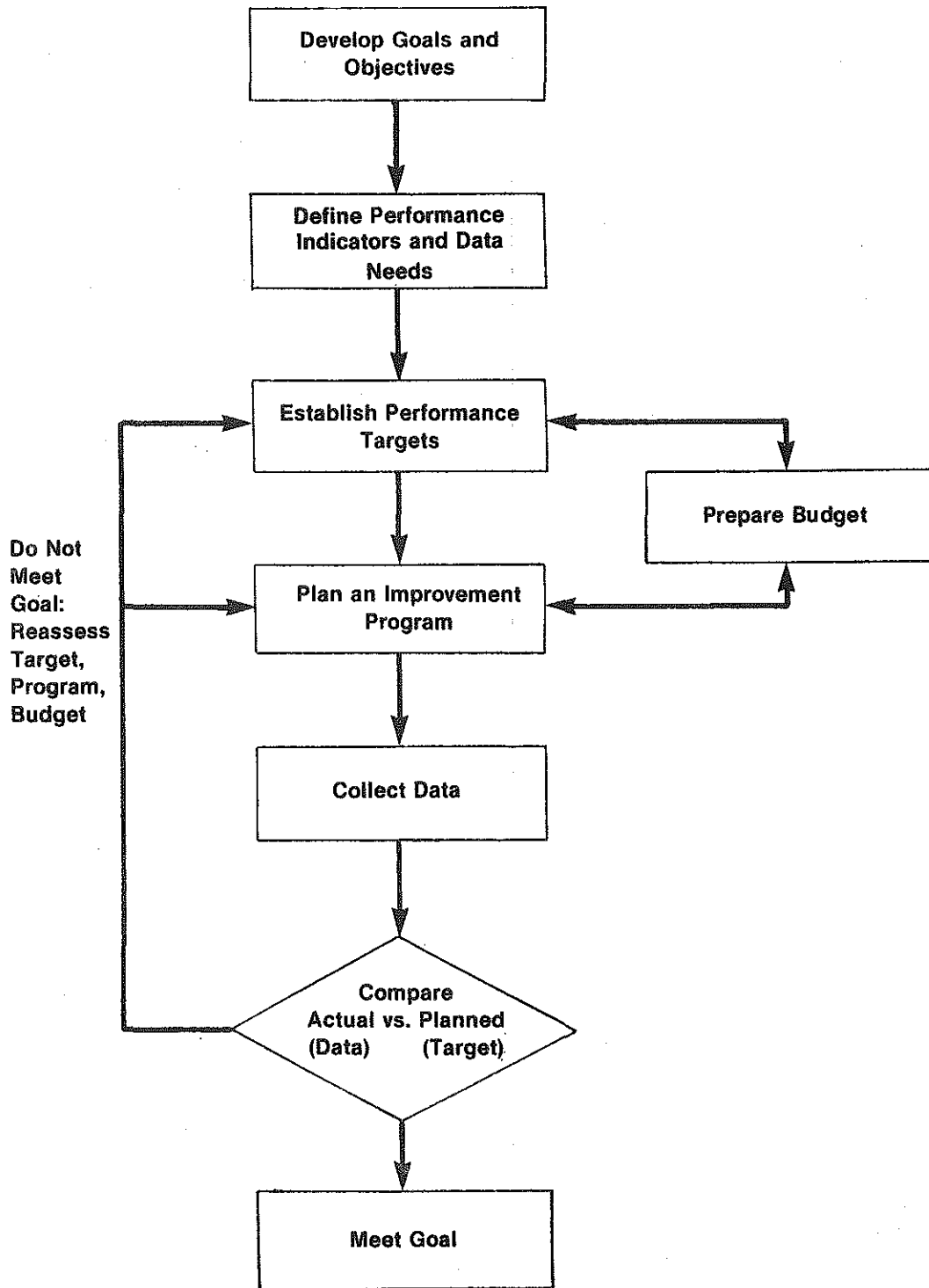
"to provide an effective alternative to the use of the private automobile."

Alternatively, an example of a goal for performing the subfunctional activity of revenue vehicle maintenance might be:

"to assure that the active vehicle fleet is routinely maintained."

EXHIBIT II-1

OVERVIEW OF A TRANSIT MANAGEMENT AND SELF-EVALUATION PROCESS



Objectives describe the manner in which a transit operator intends to fulfill a stated goal. Objectives are more specific; they describe accomplishments required to achieve goals. In keeping with the two examples provided above, objectives of transit service delivery and revenue vehicle maintenance might be:

"to increase transit ridership" and "to maintain a schedule for vehicle maintenance based on vehicle use."

Objectives should be measurable; being measurable, they provide a means to monitor and evaluate performance. A number of objectives can be developed for any one goal. In developing objectives, the key factors which bear on achieving a goal must be identified.

Why Develop Goals and Objectives?

The process of developing goals and objectives requires transit managers to define and communicate their mission, direction, and priorities. It encourages careful consideration of what should and must be accomplished by the transit system. In a time when costs are increasing and resource availability is highly restricted and probably decreasing, organizational goals and objectives must be carefully considered and defined, trade-offs must be made and expectations aligned with available financing.

How Many Goals and Objectives Should be Developed?

The establishment of goals and objectives can be used by a transit system as a means of stating the responsibility and expectations of each department, division, or function in the system. Alternatively, they can be an important first step in initiating change in a few selected areas.

The development of goals and objectives for each functional and subfunctional area requires a comprehensive review of the transit system to formalize numerous goals and objectives. This review can be accomplished by having the person(s) responsible for each area assess and recommend what should be achieved in their area in the upcoming year or through direction from the general manager.

If goals and objectives are defined each year for each functional and subfunctional area, priorities should be set to rank the importance of each goal and objective. Trade-offs will likely be necessary.

Some transit systems develop goals and objectives in a very limited number of areas as a means of focusing attention and initiating change or directing selected activities. This approach can be taken as a means of problem solving or responding to new areas of concern previously not addressed by the transit system. It implies that current performance in most functional areas is adequate.

Whether goals and objectives are pursued in every functional and sub-functional area of the transit system or only in selected areas, it is important to recognize that some goals and objectives may conflict with each other and that there will not be sufficient resources to accomplish all of the desirable objectives.

What is the Role of the Transit Board or Oversight Authority in the Development and Use of Transit System Goals and Objectives?

The development of goals and objectives for a transit system may be accomplished by:

- . an action of the transit board (or other local public policy or oversight authority);
- . a cooperative effort of the transit system general manager working with the transit system board;
- . the transit system general manager, without board involvement or the involvement of other transit system employees; or
- . a cooperative effort of the transit system general manager, assistant general managers, and other transit system employees in managerial or supervisory positions with little or no board involvement.

The first two scenarios imply higher levels of involvement by the transit system board in the oversight and direction of the transit system. The second two scenarios imply that the transit board has a limited role and relies on transit management to address the detailed aspects of system performance.

DEFINE PERFORMANCE INDICATORS AND DATA NEEDS

Performance indicators are quantifiable measures which permit the evaluation of performance. Indicators can be developed that will allow the measurement, monitoring, and evaluation of each of the objectives developed for a transit system. Pertinent performance measures for the examples presented above might be:

"Passengers per capita;"

"Passengers per vehicle mile;

"Vehicle washings per number of days operated;" and

"Percent of vehicle inspections conducted at correct mileage intervals."

While a number of performance measures might be needed to provide the necessary degree of management control over performance, being selective in their development is important since the number of these indicators affects the amount of data that must be gathered. Even though the information gathered may be useful, the cost of gathering and analyzing data provides a natural incentive toward selectivity in establishing performance indicators. Consequently, every effort should be made to identify a limited set of performance indicators, one that provides the most useful and meaningful measure of performance in relation to each objective.

In order to monitor and evaluate transit performance, data must be gathered in support of the performance indicators. A consistent data base (1) maintains a constant set of definitions; (2) is the result of routine data gathering; and (3) reflects systematic reporting. Without a consistent data base, transit system performance evaluation is not possible and management effectiveness will be limited.

In general, to allow monitoring and evaluation of overall transit system performance, data must be gathered on the cost of providing transit, the revenue available to operate service, the operating characteristics, including level of service and fleet description, and vehicle utilization (ridership). Most transit systems have data available to develop performance indicators to monitor and evaluate transit performance. While some indicators are more precise than others in measuring the achievement of specific objectives, the costs of gathering the more precise data may outweigh its usefulness.

Two important sources of data for monitoring and evaluating transit performance are the Section 15 reports, annually required by UMTA and the annual operating assistance report required by UPTRAN. Appendix B of this report includes a brief summary of key strengths and limitations of Section 15 data for use by transit managers in self evaluation followed by definitions for a set of performance indicators that can be developed using data contained in the UMTA Section 15 (required level) and UPTRAN annual operating assistance reports.

The last part of this appendix includes definitions for a set of performance indicators developed from data required by Section 15 that can be used to monitor and evaluate transit system efficiency and effectiveness. The defined indicators are only illustrative of the types of indicators that can be developed using Section 15 required level data. Additional indicators can be developed using this data base that may better meet the specific needs of an individual transit system.

ESTABLISH PERFORMANCE TARGETS

Performance targets represent the acceptable or desired level of performance that is to be achieved by the transit system. The target that is established should be relevant for the transit system, and it should be achievable. Establishing performance targets should be based on information available to the transit system. Some suggested sources of information for performance targets include:

- . the current and past performance of the transit system including historic trends:
- . the current and historic performance of other transit systems similar in size in Michigan or throughout the United States; and
- . performance information from other local or national industries (public and private sector) that is comparable to the transit system circumstances, (i.e. maintenance labor productivity), materials and cost increases.

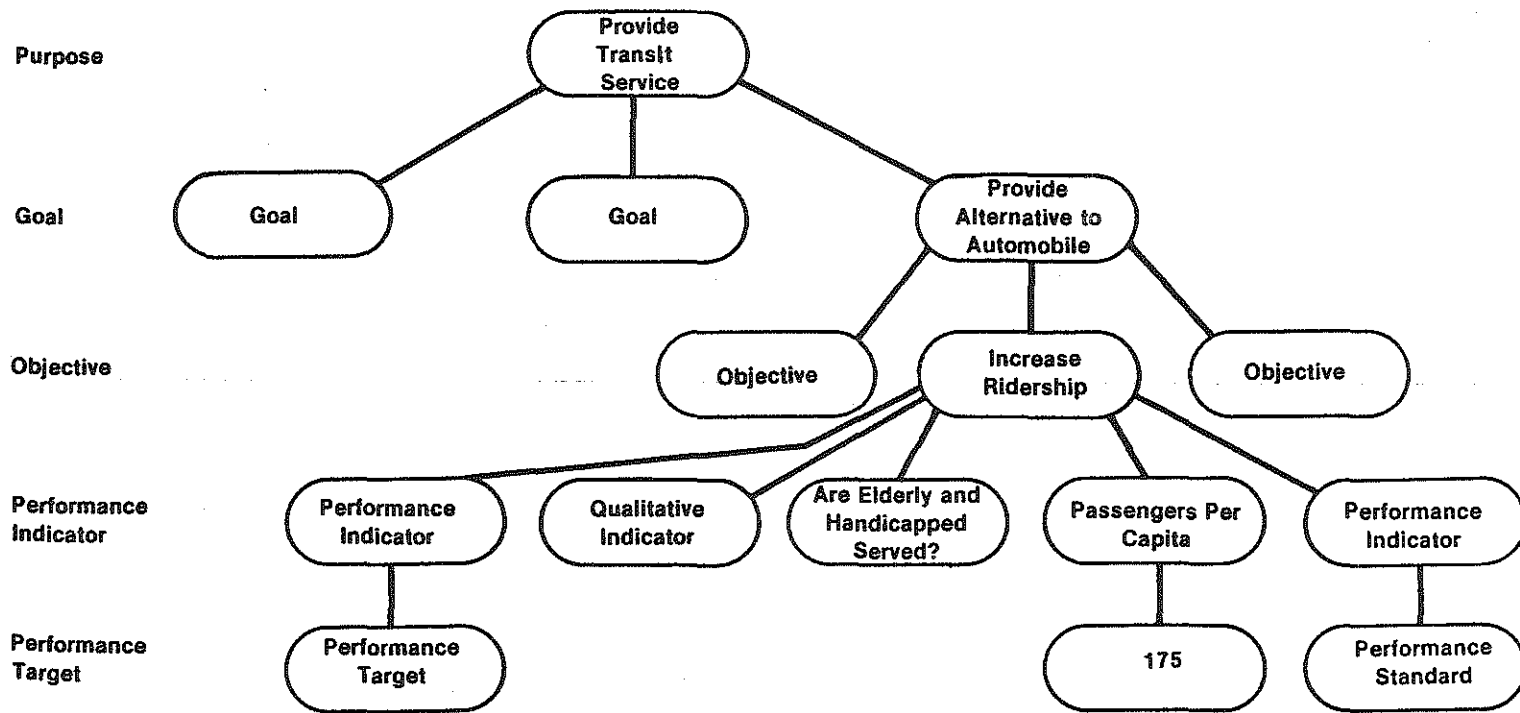
In keeping with the illustrations presented above, the performance target for "passengers per capita" might be set at "10 percent;" for "passengers per vehicle mile," at "3;" for "vehicle washing," at "every four days of operation;" and for "vehicle inspections at appropriate mileage intervals" at "95 percent." Alternatively, performance targets can be defined in relation to a transit system's past performance. For example, a transit system might establish a performance target such as a "10 percent reduction in unexcused transit operator absence," a "five percent increase in off-peak ridership," or "maintaining the current level of professional staff training hours as achieved last year."

Exhibit II-2 displays the hierarchical relation among goals, objectives, performance indicators, and performance targets. As shown in this exhibit, performance indicators and targets are developed based on established goals and objectives. As conditions change or circumstances warrant, revisions may be necessary at any level of the hierarchy. The values assigned to performance targets must be based on factors relevant to each transit system. Performance targets will not be the same for all systems in the state or for a given transit system over time.

The development of performance targets must be accompanied by two activities which are interrelated and will, to some extent, determine the values for the targets. These two activities are (1) developing an improvement plan or program to meet the targets and (2) preparing a budget which includes the necessary resources to carry out the plan. These activities are discussed below.

EXHIBIT II-2

STRUCTURE FOR PERFORMANCE PLANNING AND ANALYSIS



II.7

PLAN AN IMPROVEMENT PROGRAM(S)

An improvement program should be planned that enables the transit system to achieve the established performance targets. For example, a transit system might establish an objective of reducing vehicle breakdowns and set a target of 10 percent fewer breakdowns per 30,000 miles. The following types of programs might be considered to achieve the desired target:

- . increase the frequency of routine maintenance per vehicle, i.e., reduce the number of miles between inspections and preventive maintenance;
- . increase the level of maintenance supervision to ensure maintenance is more carefully performed and inspections are thorough;
- . purchase new maintenance equipment, such as lifts and tools, to improve the effectiveness of mechanics; and
- . improve the mechanic training program to achieve a more skilled maintenance employee work force.

The program should be tailored to meet the transit system needs. Two transit systems could establish the same objective and similar performance targets, however, the differences between the transit systems will result in the development of different programs to meet the objective. One transit system may have outdated equipment while another may find it difficult to hire skilled mechanics. Consequently, the appropriate programs for the respective transit systems might be purchasing new equipment or improving the training program.

The program for achieving objectives and performance targets should define the activities, equipment, and staffing requirements in sufficient detail to allow implementation of the program and subsequent monitoring. The development of the program should state as explicitly as possible how the program will be carried out.

Programs for achieving performance objectives and targets may be developed by (1) top transit management; (2) the manager or the employee responsible for carrying out the program (i.e., the maintenance manager); or (3) as a cooperative effort, perhaps including line employees such as supervisors. The person who will have most immediate responsibility for carrying out the program and achieving the established performance target should have a role in the development, review, or revision of the program. Their concern is that the program is appropriate for meeting targets.

PREPARE A BUDGET

A budget which estimates the cost of labor and (capital) equipment to implement a program should be developed. Simply stated, the intent is to estimate the total cost of achieving the established objective and performance target(s). Having determined the costs, it is possible to assess whether sufficient resources are available to follow through and implement the planned improvement program.

If a transit system determines that the cost of a particular program exceeds the available resources, the following management decisions should be considered:

- . developing a less costly alternative program that may enable achievement of the established target;
- . reducing the performance target to a level that can be achieved within the existing resources;
- . reducing or eliminating the performance targets in another area that will make available resources that are currently budgeted elsewhere in the transit system; or
- . identifying additional resources that may enable the system to implement the program as planned.

The links between the performance target, the improvement program, and the budget are critical. Too often targets are set that cannot be achieved within the limited available resources, or the total cost of achieving a target is not fully appreciated since the improvement program has not been carefully planned and budgeted. As a result, holding people accountable for achieving the targets becomes truly unrealistic. Without the development of a carefully budgeted improvement program, the usefulness of the objectives and performance targets will diminish.

Some transit systems view the achievement of performance targets as a type of "contract" between the responsible division head, or supervisor, and top management or between the transit system general manager and the transit system board or city council. When viewed in this manner, greater importance is often attributed to the development of an appropriate program to achieve a target and the availability of required resources for carrying out the program.

COLLECT DATA

The data for program monitoring should be carefully defined and collected, and recorded systematically and routinely. This will include the data required for the development of the performance indicators which measure the achievement of objectives, as well as any other data needed by transit management or for external reporting requirements. The frequency of data collection and level of detail of the data must be carefully determined. Important considerations are the ease of gathering the data, its usefulness, and the cost of gathering and maintaining accessible information.

Many transit systems have recently given considerable attention to data collection for their transit systems. The use of automated information systems, the need to meet federal and state reporting requirements, and the increased concern for accountability have encouraged transit systems to address data collection practices in greater detail.

COMPARE ACTUAL TO PLANNED PERFORMANCE

Periodically throughout the year and at year-end, actual performance should be compared to the level that was planned. The intent is to assess whether performance is at or moving towards the level intended by the performance objective and target. If, for example, a transit system:

- . established an objective to improve vehicle operator courtesy;
- . set a target of reducing passenger complaints by 50 percent, or to no more than two complaints per operator per month;
- . developed and implemented an operator training refresher course on passenger courtesy and developed a recognition program for vehicle operators who receive no complaints each quarter; and
- . collected data on complaints per operator per day.

The data on complaints per operator should periodically be compared to the performance target. For example, each month the average number of complaints per operator could be compared to the target of two complaints per month.

If it appears that the performance is at the target or moving in the direction of the target, no action is required. The program appears to be successful and the objective is being met or should be met in the foreseeable future.

If, however, the comparison of actual to planned performance indicates that the objective will not be met (i.e., complaints per operator are increasing or are not decreasing) transit management should consider reassessing its targets, program, and budget.

REASSESS TARGETS, PROGRAM, AND BUDGET

If the comparison of actual and planned performance indicates that the performance target will not be met, transit management should:

- . Reassess the Target: determine whether the target may be unrealistic: possibly it is too high or not achievable in the desired time frame;
- . Reasses the Program: determine whether the program is appropriate for meeting the objective; (i.e., Is the training program effective? Is the recognition program sufficient motivation to improve courtesy?); and
- . Reassess the Budget: determine whether the funds available are sufficient to fully implement the program and properly carry it out.

Transit management should base its decisions on these reassessments, whether they involve modifying the target, changing the program, or increasing the budgeted resources to achieve the performance objective and target.

Clearly this process is dynamic, interactive, and ongoing. It cannot be a process that is fixed at the beginning of the fiscal year and ignored until year-end. This could result in cost overruns as well as targets that are not met.

* * * * *

It is important, in summary, to state that a basic assumption of this process is that transit management is seeking to improve the efficiency and effectiveness of transit performance. The process is carried out as an aid or tool to assist management in achieving such improvements. The fact that all performance targets are not always met and that redefinition of performance targets, programs, and budgets may be required should not be viewed as a failing of management. In particular, during the first several years such a management process is applied, considerable learning will take place before realistic performance expectations, the effectiveness of programs designed to achieve specific results and the cost of performance improvement programs are fully appreciated.

III. Case Studies

III. APPLICATION OF THE GENERAL APPROACH TO SPECIFIC ISSUES

This section includes three case studies which apply the internal management and evaluation process introduced in Section II. The intent of this section is twofold:

- first, to demonstrate how a transit system can use the suggested internal management and evaluation process; and
- second, to provide practical information and analytical technique to assist transit managers in resolving three critical issues confronting many transit systems today.

Briefly, the issues presented in the case studies are:

- the need to increase fare revenues through selective fare increases to improve the current operating ratio;
- the need to control absenteeism to reduce operating expenses and improve utilization of existing labor resources; and
- the need to selectively reduce transit service levels to lower operating costs in response to anticipated reductions in federal operating assistance and increased operating expenses;

The case studies are presented through the decisions and actions of a hypothetical transit system. While characteristics of the hypothetical transit system may be similar to those of the mid-size transit systems in Michigan, the intent of the illustration is not to represent any single transit system.

HYPOTHETICAL TRANSIT SYSTEM: ORGANIZATION AND OPERATION

The hypothetical transit system is named Mid-Size Michigan Transit Authority (MMTA). It is located in the central-southern portion of Michigan in a largely urbanized county having approximately 300,000 residents.

The transit system operates as an authority with its own board rather than as a department of the city. The seven board members are appointed for rotating three-year terms by the mayor and are approved by the city council. The board has traditionally been responsible for approving major changes in service level and fares as well as the annual budget but has not become routinely involved in transit management and decision making. The general manager of MMTA reports monthly to the board on transit system status and activities.

In FY80 MMTA had 155 full-time equivalent employees, two-thirds of whom are vehicle operators. Although the new labor contract allows the use of part time labor, currently there are no part-time employees. Exhibit III-1 summarizes the number of employees by classification and mode.

Transit Service Level and Use

The MMTA provides both fixed route and demand responsive transit services six days a week, largely within the urbanized portion of the county.

Fixed Route Service

The fixed route service operates 52 revenue vehicles on an average weekday. The system includes 18 routes operating Monday through Friday from 6:00 a.m. to 10:00 p.m. with 20-minute headways in the morning and evening peak hours and one-hour headways in the off peak. On Saturdays, service operates from 7:00 a.m. to 8:00 p.m. at one-hour headways.

Transit routes provide access between residential areas, work places, schools, shopping, recreational, and community centers. The routes generally correspond to major traffic corridors and radiate from the central business district, for the most part. During the past three years, transit service has been initiated from the downtown through the suburban residential areas to the two outlying shopping centers and to three large plants which are major shopping and work trip generators.

Fares on the fixed route service were raised in January 1979 from 30¢ to 35¢ for the general public and from free fare in the off peak hours to 15¢ at all times for the elderly, the handicapped, and youth (under 18). This was the first fare increase in more than four years.

Demand Response Service

The demand responsive service operates Monday through Friday from 8:00 a.m. to 7:00 p.m. and Sunday from 8:00 a.m. to 2:00 p.m. It is available to all handicapped residents in the county and residents in the nonurbanized portion of the county. The service must be requested 24 hours in advance and is free for the handicapped and \$1.00 per one-way trip for out-county patrons.

Exhibit III-2 provides summary operating statistics for both the motor bus and demand responsive modes in FY 80.

EXHIBIT III-1

MMTA EMPLOYEE EQUIVALENTS : FY80

	Motorbus	Demand Responsive	Total System
<u>Transportation</u>			
Executive/Professional/Supervisory	7.0	1.0	8
Support	3.0	1.0	4
Vehicle Operators	97.0	7.0	104
<u>Maintenance</u>			
Executive/Professional/Supervisory	1.5	0.5	2
Support	2.0	0.0	2
Revenue Vehicle Mechanics	15.0	1.0	16
Other Mechanics	1.0	0.0	1
Servicing Personnel	8.5	0.5	9
<u>General Administration</u>			
Executive/Professional/Supervisory	3.5	.5	4
Support	<u>4.5</u>	<u>.5</u>	<u>5</u>
TOTAL	143.0	12.0	155

EXHIBIT III-2

MMTA PERFORMANCE OPERATING STATISTICS: FY80

<u>Service Supplied</u>	<u>Motorbus</u>	<u>Demand Response</u>
Total Revenue Vehicles	62	8
Number of Vehicles on Average Weekday	52	6
Total Annual Vehicle Miles	1,944,193	141,200
Average Weekday Vehicle Miles	6,230	452
Annual Vehicle Hours	148,000	10,000
Annual Vehicle Revenue Miles	1,826,700	128,100
Annual Vehicle Revenue Hours	141,100	10,300
Revenue Capacity Miles	116,660,900	1,605,300
Charter Miles	68,000	
 <u>Service Consumed</u>		
Annual Passenger Trips	2,973,200	35,700
Annual Passenger Miles	10,373,000	135,700
Average Time Per Unlinked Trip (Minutes)	13	14
 <u>Fuel Consumption</u>		
Gallons of Diesel Fuel	530,200	0
Gallons of Gasoline	13,900	19,355
 <u>Road Calls</u>		
Mechanical Failure	659	28
Other Reasons	195	9
 <u>Number of Accidents</u>		
Collision	120	8
Non-collision	45	4
Station	5	0
 <u>Performance Indicators</u>		
Average Vehicle Speed (MPH)	13.1	14.1
Average Vehicle Capacity	60.0	11.4
Average Annual Miles Per Vehicle	31,358.0	17,650.0
Revenue Miles Per Vehicle Mile	.94	.90
Average Miles Per Gallon	3.7	7.3
Average Passengers Per Mile	1.5	.25
Average Passengers Per Hour	20.1	3.6
Road Calls Per 10,000 Miles	4.4	2.6
Accidents Per 10,000 Miles	.88	.85
Vehicle Hours Per Operator	1,526.0	1,428.0
Mechanics Per Vehicle	3.8	.125

Revenue and Expenses

Exhibit III-3 presents data from MMTA's Section 15 report which summarizes the motor bus operating expenses and sources of funds for FY 80. During this year the system had a break-even operation. As is typical of transit systems of similar size in Michigan, MMTA financing is largely dependent on public assistance from state and federal sources. In FY 80, 80 percent of the system revenues were provided through a mix of public support. The large majority of transit funding was operating assistance from the Federal UMTA Section 5 and MDOT formula operating assistance programs. Local public support contributed about 5 percent to offset system expenses. Fare box revenues represented less than 20 percent of transit system revenues.

The current dependence on state and federal support is a major concern to the transit system management and its board. The state's current fiscal situation and the likelihood of reductions in federal operating assistance pose a serious threat to the future operations of the system. The potential loss of operating assistance represents a substantial portion of current transit system revenues. The impact of funding reductions is even more serious considering that transit system operating costs have increased at an annual rate of between 10 and 15 percent during the past five years.

Current Issues

In response to their concern for the impacts that the potential loss of funding would have on transit system operations, the transit system general manager and board defined three areas for transit system modification and improvement in the upcoming year. These areas include:

- fare increases to improve the operating ratio;
- absenteeism reduction and control; and
- selective service reductions.

The board has decided to exercise its authority and take a more active role in the development and monitoring of improvement programs for the MMTA in the upcoming fiscal year.

EXHIBIT III-3

MMTA MOTOR BUS EXPENSES AND REVENUES: FY80

OPERATING EXPENSES

Labor

Operating Salary/Wages	\$ 1,196,736
Other Salaries & Wages	512,160
Fringe Benefits	514,080

Services

148,160

Materials and Supplies

Fuel And Lubricants	240,704
Tires and Tubes	37,696
Other	220,000

Utilities

41,376

Casualty and Liability

181,696

Taxes

26,880

Purchased Transportation

23,392

Miscellaneous

56,032

Expense Transfers

1,088

TOTAL

\$ 3,200,000

SOURCES OF FUNDS

Fares	18%	\$ 576,000
Other Transit System Revenues	2	64,000
Local Public	5	160,000
State Public	39	1,248,000
Federal Public	<u>36</u>	<u>1,152,000</u>
	100%	\$ <u>3,200,000</u>

Case Study 1

CASE STUDY 1: FARE INCREASES TO IMPROVE THE OPERATING RATIO

During the latter half of the 1970's fares were increased by many transit systems in the United States after a long period of fare stabilization. The most recent Transit Fare Summary, distributed by the American Public Transit Association (APTA), reported that nearly 80 percent of the 180 systems reporting had implemented new, higher fares between 1978 and 1979. The conditions that prompted this wave of fare escalation include: rapid increases in operating expenses; demands for improved and expanded transit services; and stable or only marginally increasing public support for transit operations. These conditions are considered probable features of the operating environment for transit systems in the 1980's. As a result, transit service pricing is considered one of the more pressing arenas for management decision-making in the 1980's.

Passenger fare revenue financed 18 percent of total operating expenses for MMTA in FY80, and the operating ratio has not exceeded 20 percent during the past five years. The current fare structure includes:

- . a 35¢ one way fare for the general public; and
- . a 15¢ fare for the elderly, handicapped and youth.

There is no charge for transfers, nor do fares vary by distance traveled or time of day.

Between January 1, 1976 and January 1, 1979, the fares were unchanged, remaining stable at 30¢ per one way trip for the general public with no fare charged to the elderly, handicapped, and youth in the off peak. During the peak hours, a reduced fare of 15¢ was charged the elderly, handicapped, and youth. The full fare was increased 5¢ per trip in January of 1979 when MMTA's board agreed to pass the increase proposed by the MMTA general manager.

DEVELOP GOALS AND OBJECTIVES

The MMTA general manager and board agreed at a recent board meeting that fares should be increased to improve the existing fare box ratio. Because a reduction in service is to be instituted late in the year as a means of reducing operating expenses, the board and general manager agreed that any fare increases should be implemented during the next three months, i.e., at least six months in advance of the service reductions. They agreed that reducing service and increasing fares simultaneously or introducing a fare increase after a service reduction would be perceived negatively and impact transit's position in the community.

An important concern of the MMTA board and general manager was that the fare increases not impose an undue burden on transit patrons with low or fixed incomes, such as youth and the elderly. Transit service to these riders provides, in many cases, the only alternative for independent travel.

The following goal was established by the board and general manager:

"Improve the transit operating ratio without seriously impacting patrons with low and fixed incomes."

This goal is to be pursued through achievement of the following objective:

"Develop a fare strategy that will improve the operating ratio through rational fare increases that focus on the cost of service provided and willingness and ability to pay."

DEFINE PERFORMANCE INDICATORS AND DATA NEEDS

The MMTA decided that the critical performance indicator to monitor the success of the fare increase effort would be the operating ratio, that is, fare box revenues as a proportion of total operating expense. The data needed to develop this indicator is readily available to MMTA. Each day the fare boxes are pulled from the vehicles and revenues are counted. These fare counts provide the needed revenue information. An indication of the distribution of fares throughout the day can also be obtained through route level ridership counts that are made periodically to estimate patronage for service planning. MMTA operating expense data are also routinely reported and readily available. Expense estimates available for the budget year and budgeted and actual expenses on a month-to-month basis are monitored by MMTA.

In selecting performance indicators the MMTA considered obtaining before and after ridership and revenue data to assess the impacts of fare increases on different types of transit users. Indicators by ridership group or market segment were considered. A decision was made, however, that this type of analysis would be too costly and probably not necessary to meet the MMTA objective. Instead, the MMTA decided to research the experience of other similar-sized transit systems that recently instituted fare increases; and drawing from the experience of other systems, the MMTA proposed to develop an effective approach for increasing the operating ratio without seriously impacting patrons with low and fixed incomes.

ESTABLISH PERFORMANCE TARGETS

The performance target established by the MMTA was to increase the operating ratio to between 22 and 23 percent. This implied a 22 to 38 percent increase over the FY 80 18 percent recovery ratio. A 22 to 23 percent target was intended to demonstrate a meaningful commitment to increasing the passenger's support of the transit system without overreacting in this direction.

After setting its target, the MMTA developed an estimate of what the fares would have been in 1980 if MMTA had raised fares a year earlier to achieve 22.5 percent operating ratio. To prepare a simplified estimate, MMTA assumed that the number and mix of ridership would have remained stable at current levels after the fare change. As shown in Exhibit III-4, based on this assumption, a one-way full fare of 50.4¢ would have been necessary if the elderly and youth fares remained at 15¢ or a 41.5¢ one-way full fare would have been necessary with youth and elderly fares increasing to 20¢. These fares would have implied increases of between 18 and 44 percent for the current one-way full fare and up to a 33 percent increase in the elderly and youth reduced fares.

The MMTA recognized that the assumption that no ridership would be lost with across-the-board increases of this type was probably incorrect. While the majority of peak-hour riders would probably continue to ride transit if such an increase were imposed, it was generally acknowledged that there would be a decline in both the peak and the off-peak ridership. These issues were considered further in planning the fare strategy.

PLAN AN IMPROVEMENT PROGRAM

In planning its fare strategy to improve the operating ratio the MMTA decided to:

- . first, research alternative types of fares strategies;
- . second, identify MMTA's types of riders or current market segments and consider the effect of fare increases on each segment; and
- . third, refresh MMTA's familiarity with fare elasticity.

The combined results of this initial research would assist MMTA in developing a fare strategy to meet its objective and performance target. The research results are summarized below.

**EXHIBIT III-4
BACK OF THE ENVELOPE FARE ESTIMATES**

III.10

	% of Total (Fare) Passengers	Number Passengers	Current Fare		Increase Full Fare Only		Increase Full and Reduced Fares	
			One-way Fare	Fare Revenue	One-way Fare	Fare Revenue		
Full Fare	36 %	936,558	35¢	\$327,795	50.4¢	\$471,795	41.5¢	\$389,060
Elderly	34 %	894,247	15¢	\$134,137	15¢	\$134,137	20¢	\$178,849
Youth	30 %	760,453	15¢	\$114,068		\$114,068	20¢	\$152,091
Transfer		381,942	0	0		0		
	100%	2,973,200		\$576,000		\$720,000		\$720,000
Fare Box Ratio				18%		22.5%		22.5%

*Total Operating Expenses \$3,200,000

Types of Fares

Based on its research the MMTA found that fares can be categorized into the different types of fare structures discussed below.

Flat Fare: The flat fare charges one price for all trips. The major advantage of flat fares are that they are simple and convenient to understand and use. A major disadvantage is that the flat fare offers the same price for trips with different costs and with different values to the transit user. Under a flat fare system, the same price is charged for a long trip from an affluent suburb during a heavily congested rush-hour as is charged for a short trip from a lower-income area when there is no congestion and the transit system has excess capacity.

Distance-Based Fares: Fares which vary with distance traveled may have either a cost or a value rationale. A long trip is both more costly to the transit supplier and more valuable to the transit user than is a shorter trip.

Fares which vary with distance typically include a basic charge for boarding the vehicle and an incremental charge which depends on the distance traveled. Distance-based fares are handled by either stage- or zone-collection systems. In a stage-collection system, each route is divided into stages, or route segments, with a fare increment being charged for each stage or combination of stages traversed by the user. The stage fare is most appropriate on routes with a few designated stops, or where an automatic fare collection system eases the collection of differential fares.

The more common approach to the distance-based fares is the zone-collection system, in which the area served by the transit system is subdivided into zones, with the fare increased each time a zone boundary is crossed. Operationally, the zone-fare system involves charging a passenger a base fare, plus an incremental fare for each zone boundary crossed. There are several ways to design a zone-fare system, some of which are shown in Exhibit III-5.

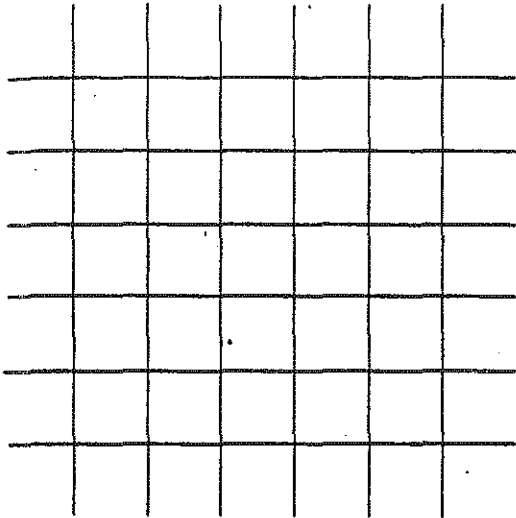
The primary disadvantage of the zone system is that, because it is only an approximation of distance, it can charge a passenger making a short trip which crosses a zone line a higher fare than a passenger making a long trip within a zone. Overlapping zonal boundaries can partially rectify this problem, but will complicate the fare-collection system.

Time Differentiated Fares: There are several reasons for charging fares differentiated by time of day, although some of the arguments supporting this differentiation are conflicting. The basic economic argument for time differentiated fares rests on cost differences. Transit systems acquire most of their capital (i.e., buses) to accommodate peak loads that occur during the morning and evening rush hours. The cost of this equipment has been incurred to provide services to the peak period users, and should be charged to those users. Moreover, since the incremental cost of serving a non-peak period user is very small compared to the cost of providing service for peak period demand, the price of an off-peak trip should be less than the price for a peak period trip.

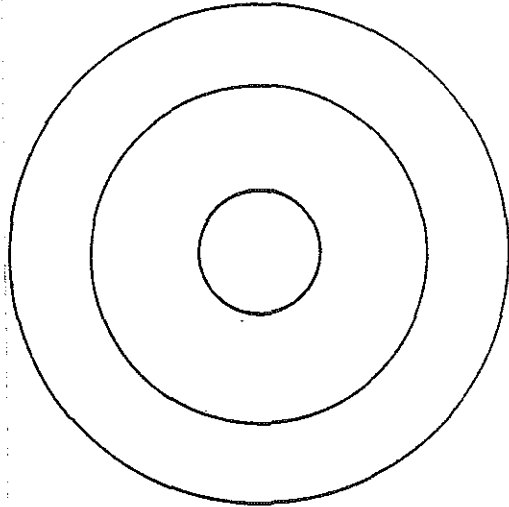
EXHIBIT III-5

ZONE STRUCTURE ALTERNATIVES

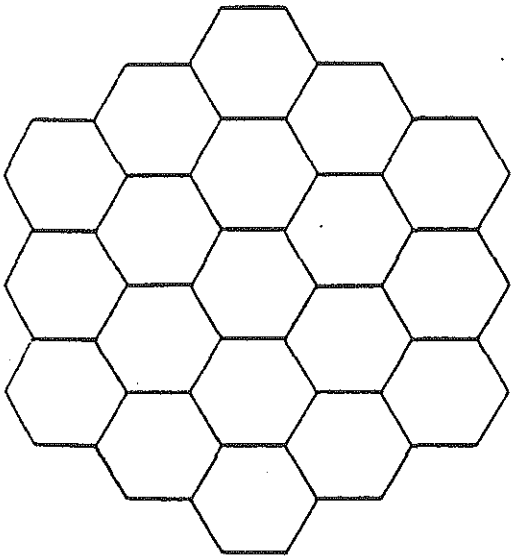
GRID



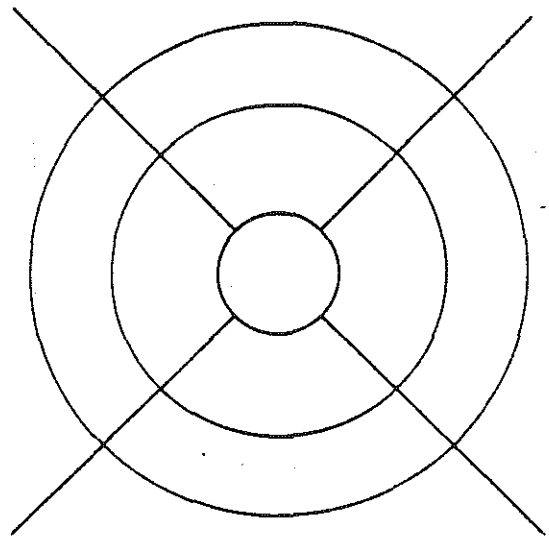
CONCENTRIC CIRCLES



HEXAGONAL SYSTEMS



SEGMENTED CIRCLE



A peak/off-peak pricing differential can also be justified by differences in the value of the service. Persons who ride transit during peak periods typically have different transit requirements than do off-peak riders and are generally less responsive to changes in transit fares. The peak period transit rider is typically making a trip to or from work. The rider may be expected to continue using transit even at a higher fare because he cannot forego the trip, and the available alternative, principally an auto trip, may be relatively unattractive.

Value-Based Fares: A value-based fare is set at or close to the maximum an individual would be willing to pay for a service, rather than at the cost of supplying the service. A value-based fare has two distinctly different kinds of applications: (1) In cases in which special services are being considered, the service should be supplied only if the revenue generated at that fare exceeds the incremental cost of supplying the service; and (2) in cases in which a decision has been made to supply a fixed amount of service, the appropriate fare is the highest fare that can be charged without discouraging ridership below the full capacity supplied.

Fares for Special Origins and Destinations: Examples of transit services for special origins or destinations include services to special sports events, recreational areas, and other special destinations. These services are typically provided from one or several points in an urban area to a single destination. Subscription bus service and bus pools offer further examples of specific origin/destination combinations especially designed and priced to meet specific patronage needs. The subscription service and bus pools provide some indication of the successes possible with special services and fares.

Special Fares for Services within Limited Areas: Service within limited, and usually high density, areas can be specially priced to reflect the difference in costs or value of the service. An example of this service is central business district loop service which offers circulation throughout the central business district at reduced fares. The low fares reflect both the low cost due to the limited route length and high density of use as well as the relatively low incremental value of a trip to the individual passenger. The service may also yield some public benefits by reducing downtown congestion and pollution and by increasing downtown accessibility.

Special Discounted Fare: Several transit firms have reduced fares for certain groups--the elderly, handicapped, poor, school children, and college students. The reductions have come primarily in response to pressures from the public, who believe that reduced fares for these groups provide public benefits through an increased opportunity for them to travel.

Identify Current Market Segments

The MMTA review of the characteristics of riders regularly using the transit service identified five types or market segments. Each of the market segments identified through the MMTA research effort are described below. The market segments were defined in terms of:

- trip purpose;

- . time of day;
- . trip location (origin and destination);
- . age of traveler;
- . income;
- . transit usage ability; and
- . auto availability.

The market segments were defined to allow careful consideration of the effects of different fare strategies on ridership and revenue. The five market segments identified included:

- . market segment (1): middle-aged, lower-income travelers with typical ability to use transit and with no automobile available for the trip, taking a work trip during the peak period from within the CBD;
- . market segment (2): middle-aged, middle-income traveler with typical ability to use transit and with an automobile available for the trip, taking a work trip during the peak period from the suburbs;
- . market segment (3): youth from middle-income households with typical ability to use transit and with no automobile available for the trip, taking a school trip in the off-peak period from the suburbs;
- . market segment (4): middle-aged persons from a middle-income household with typical ability to use transit and with no automobile available for the trip, taking a shopping trip in the off-peak period from a suburban location;
- . market segment (5): elderly, or low-income travelers who may be handicapped and have no automobile available for the trip, taking any other trips in the off-peak period.

The five market segments are identified in Exhibit III-6.

MMTA's review of ridership by market segment indicated that about 36 percent of the average daily ridership is made up of full-fare patrons in market segments (1), (2) and (4) with the large majority of these being the peak hour, middle-income, middle-aged travelers. Market segment (4) off-peak travelers are about 20 percent of these patrons. Youth comprise about 30 percent of the total ridership and the elderly and handicapped

EXHIBIT III-6

ILLUSTRATIVE MARKET SEGMENTS

CHARACTERISTICS OF MARKET SEGMENTS	MARKET SEGMENTS				
	1	2	3	4	5
TRIP PURPOSE Work School Shopping Other	●	●	●	●	●
TIME OF DAY Peak Off-Peak	●	●	●	●	●
GEOGRAPHICAL LOCATION Inner city Outer ring Suburban	●	●	●	●	●
AGE OF TRAVELER Youth Middle Elderly	●	●	●	●	●
INCOME TIME High Middle Low	●	●	●	●	●
TRANSIT USAGE ABILITY Typical Handicapped	●	●	●	●	●
AUTO AVAILABILITY Available Not available	●	●	●	●	●

about 34 percent. Because of their travel needs, the trips by market segments (3) and (5) are predominantly in the off-peak hours. It is evident that important first steps in developing a transit fare policy are to define the relevant market segments and their principal characteristics and understand the effect of fare increase on each market segment.

Fare Elasticity Refresher

Elasticity is the proportional change in the amount of a good purchased resulting from the proportional change in some causal variable. The amount purchased at a specific price is defined as the demand and, in the case of public transportation, is usually expressed as the number of passengers carried over a certain period. Often, the name of the causal variable is included in the term for the elasticity. Thus, fare elasticity or price elasticity is used when describing the effect of changes in the fare.

If, for example, the fare of a local bus service is lowered from a flat 35 cents to 25 cents (a decrease of 28.6 percent) and this reduction in the fare causes the average daily ridership to change from 1,000 passengers to 1,150 (an increase of 15 percent), the elasticity of the demand to the change in price is -0.52 . This is computed by dividing the proportional decrease in the fare, 28.6 percent. The minus sign simply indicates that the direction of the change in the fare is opposite to the direction of the change in the ridership.

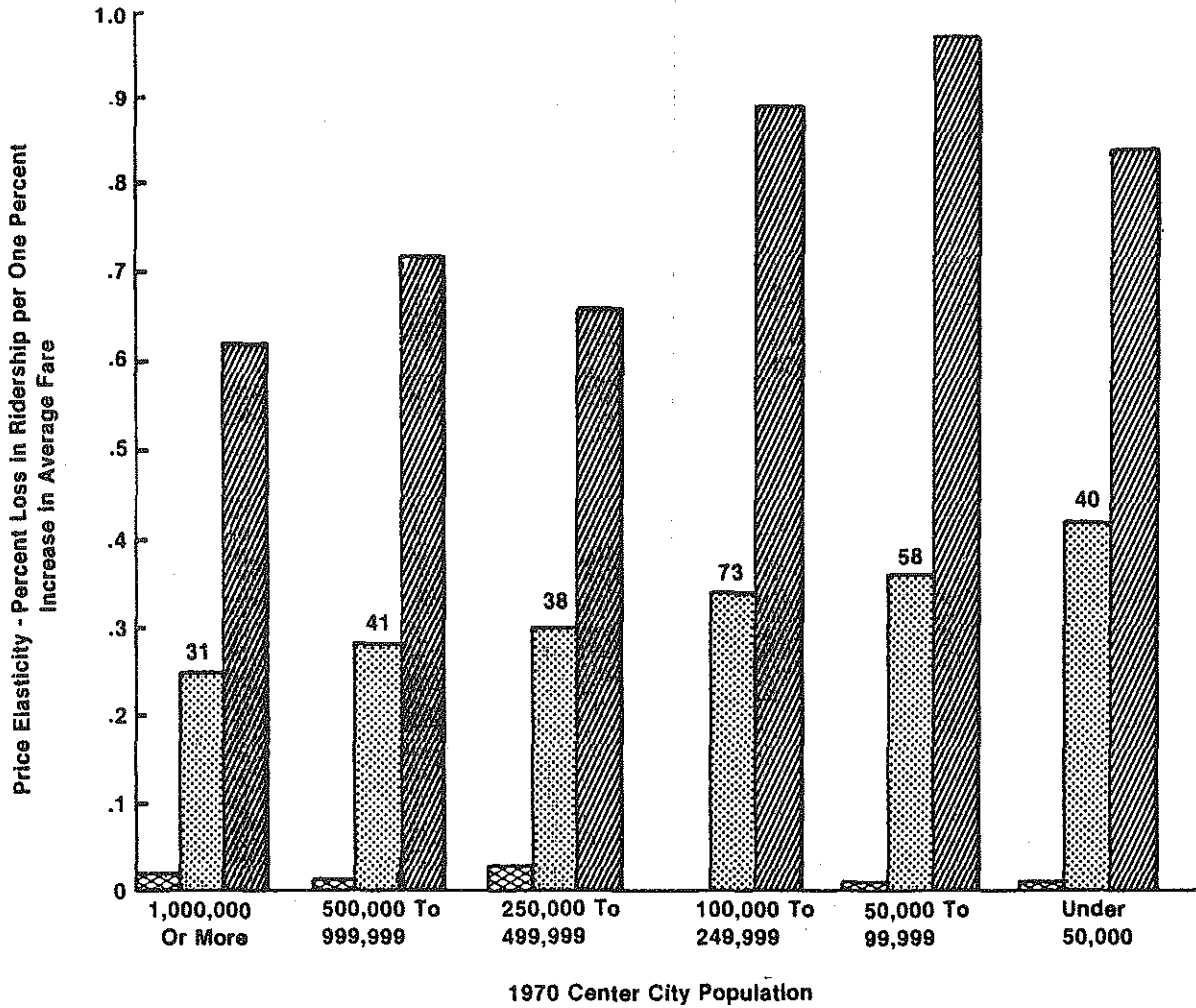
As shown in Exhibit III-7, a wide variation in elasticities between minimum and maximum values can be noted by size of urban area. While previous studies on fare elasticity have suggested an average value of -0.33 (Curtin Rule), indiscriminant use of the -0.33 value can lead to inaccurate estimates of the loss of ridership accompanying a fare increase. Available evidence on fare elasticities indicates that demand for public transit is more responsive to fare changes in the off-peak than during the peak hours. Travel habits of transit riders appear to be influenced by the purpose of their trip (i.e., work trips in peak versus non-work trips in the off-peak). The evidence on fare elasticities, furthermore, suggests that, in most instances, increasing the fare will normally generate more revenue, at the expense of some loss in ridership, while fare reductions increase ridership at the expense of losing revenue.




MMTA collected data from the American Public Transit Association (APTA) on recent fare changes and determined that the following elasticity rates could be used to approximate the effects on ridership of a proposed fare change for systems similar in size and character to the MMTA:

peak period price elasticity of demand	-0.20
off-peak period price elasticity of demand	-0.35

EXHIBIT III-7

VARIATION IN THE ARC PRICE ELASTICITIES BY
POPULATION OF CENTRAL CITY FROM AN
ANALYSIS OF 281 CASES INVOLVING A FARE INCREASE



 MINIMUM
 AVERAGE
 MAXIMUM

Numbers Above the Bars Indicate Number of Observations

SOURCES: American Public Transit Association, Estimated Loss in Passenger Traffic Incident to Increases in Urban Transit Fares (Washington, D.C.: American Public Transit Association, 1961)

American Public Transit Association, Estimated Loss in Passenger Traffic Due to Increases in Fares (1961-1967) (Washington, D.C.: American Public Transit Association, 1968).

Proposed Fare Strategy Improvement Plan

Based on its investigation of types of fares, market segments, and fare elasticity, the MMTA developed a proposed fare strategy improvement plan for review by its board. The following conclusions were influential in developing the fare strategy:

- . The current flat fare, while simple to administer, was causing an unnecessary loss of revenue and should, therefore, be replaced with a fare that better reflects the cost of the trip and ability of the passengers to pay.
- . A distance based or zone fare would be cumbersome to administer because of the fare boxes currently in use and added responsibilities for the driver to enforce or oversee the more complicated fare structure.
- . The review of current ridership segments indicated that the large majority of peak hour trips tend to be made by people enroute to or from work and that they are generally longer than average in length. The large majority of off-peak trips are made by the elderly, handicapped, and youth.
- . The finding that peak hour trips are less impacted by fare increases and that most of the trips by the elderly, handicapped, and youth are in the off-peak argued in favor of peak hour pricing as a fare strategy which better reflects the cost of the trip and the ability of the passengers to pay.

Based on these findings the following fare structure was proposed:

- . 55 cents per one-way full fare peak period trip;
- . 40 cents per one-way full fare off-peak trip; and
- . 20 cents fare for elderly handicapped and youth at all times.

Based on the assumptions that: (1) 80 percent of the full fare trips are in the peak hour, (2) the price elasticity of demand for peak period trips is $-.20$, and (3) the price elasticity demand for non-peak period trips and trips made by elderly and young users is $-.35$, the impact of this fare structure on ridership and revenues summarized in Exhibit III-8. The elasticity estimates were based on the experience of similar-sized transit systems that recently implemented fare increases and reported their effects to APTA. As shown in this exhibit, this fare structure will meet the target of a greater than 20 percent operating ratio.

EXHIBIT III-8

IMPACT OF PROPOSED FARE STRUCTURE

Market Segment	Number of Trips Before Fare Change	Existing Fare	Proposed Fare	Percent Fare Increase (decrease)	Estimated % Increase (decrease) in ridership	Estimated Ridership After Fare Increase	Estimated Revenue After Fare Increase	Estimated % Increase (Decrease) in Revenue
Full Fare								
Peak	749,246	35¢	55¢	+57.14%	-11.43%	663,622	\$364,992	33%
Off-Peak	187,312	35¢	40¢	+14.29%	-5.00%	177,946	71,179	
Elderly	894,247	15¢	20¢	+33%	-11.55%	790,961	158,192	18%
Youth	760,453	15¢	20¢	+33%	-11.55%	672,621	134,524	18%
Transfers	381,942	0	0	-	-	-	0	
TOTAL	2,973,200					Estimated revised operating ratio²	\$728,887 22.78%	26%

¹ The increase or decrease in ridership is estimated by multiplying the percent increases or decreases in fares by the price elasticity of specific markets. For example, the percent decrease in full fare peak period riders is:

$$(50\%) (-.20) = -10\%$$

² Based on an estimated expense of \$3,200,000 (before service reductions)

The final elements of the fare strategy improvement program are its implementation and monitoring. Preparation for implementation planned by MMTA included: (1) a meeting with the board to present the fare strategy proposal and obtain board approval; (2) releases for the newspaper and radio to inform the public about a public hearing to discuss the proposed fare changes; (3) releases to the newspaper and radio to announce the increases; (4) in-house training of the bus operators and phone information personnel regarding the new fare structure and its administration; and (5) preparation of signs for inside the bus and on the fare boxes stating the new fares. Monitoring activities would involve tracking fare revenue and ridership in the peak and off-peak hours following implementation of the new fares.

PREPARE A BUDGET

The MMTA prepared a budget for the development, implementation and monitoring of its fare strategy improvement plan. The cost of this effort would not be considerable and would not involve capital acquisition or contracting for technical assistance. The program could be developed and implemented in-house by MMTA staff. The budget presented in Exhibit III-9 summarizes the hours by MMTA staff person by activity to be conducted.

COLLECT DATA

Following the implementation of the new fares the MMTA collected and monitored data on fare revenue. The revenues received each day by route were recorded and summarized on a weekly and monthly basis. Operating costs were also summarized on a monthly basis which allowed monitoring of the monthly operating ratio. Periodic ridership count data were also used to monitor the impact of the fare increases by type of patron and time of day.

COMPARE ACTUAL TO PLANNED PERFORMANCE

The comparison of actual performance to the planned target revealed that the fare increase program was successful. Revenues did increase and ridership did not fall off more than had been estimated as a result of the new fares. During the first six months after the fares were increased, the operating ratio increased from 18 to 23 percent.

EXHIBIT III-9

**BUDGET FOR DEVELOPING, IMPLEMENTING,
AND MONITORING NEW FARE STRATEGY**

MMTA STAFF HOURS

	General Manager	Assistant General Manager of Operations	Planning Analyst(2)	Total
Research Alternative Types of Fares			24	24
Identify MMTA Ridership Market Segments and Impacts of Fare Increases		16	24	40
Fare Elasticity Refresher			24	24
Develop Fare Strategy	16	16	16	48
Board Meeting to Present and Discuss Fare Strategy	4	4		8
News Releases			4	4
Public Hearing Preparation	4	4	4	12
Public Hearing	4	4	4	12
News Releases to Announce Fares			4	4
Training for Operators and Information Operators (preparation and execution)		4		4
Signs Announcing New Fares			4	4
Monitoring Revenue and Ridership after Fare Increase	12 ¹	12 ¹	100 ²	100
Total	40	60	208	284

¹ Review of fare strategy monitoring at one hour per month during the year following implementation.

² Data gathering and recording of approximately 2 hours per week for a year after new fares are implemented.

Case Study 2

CASE STUDY 2: ABSENTEEISM REDUCTION AND CONTROL

MMTA management and representatives of organized labor have, over the past several years, become concerned about the increasing occurrence and cost of absenteeism in the transit industry. A recent national study on absence among transit operators in the United States reported that these costs were consuming about 27 percent of the federal operating subsidy and that, on the average, workdays lost per operator for reasons other than vacations and holidays had reached 28.57 days. As summarized in Exhibit III-10, transit operator absence nationwide and its related costs increased significantly during the period between 1974 and 1978.

In 1979 MMTA conducted an assessment to estimate the extent of absenteeism it was experiencing. Data available on absence for all employees were analyzed including absence due to: 1) illness, 2) on-the-job injury, and 3) leaves. Vacation days and paid holidays were not included. The results of the assessment revealed that the incidence of absence at MMTA exceeded national average statistics. As reported on Exhibit III-11, MMTA employees were absent an average of 34 days per year, or 14 percent of the scheduled workdays. This exceeded the national average level of absence in the transit industry by almost 20 percent.

MMTA's general manager decided that an absenteeism control program should be developed and implemented. The general manager was convinced that the transit system's poor attendance performance would be sufficient to persuade the board that immediate action was needed.

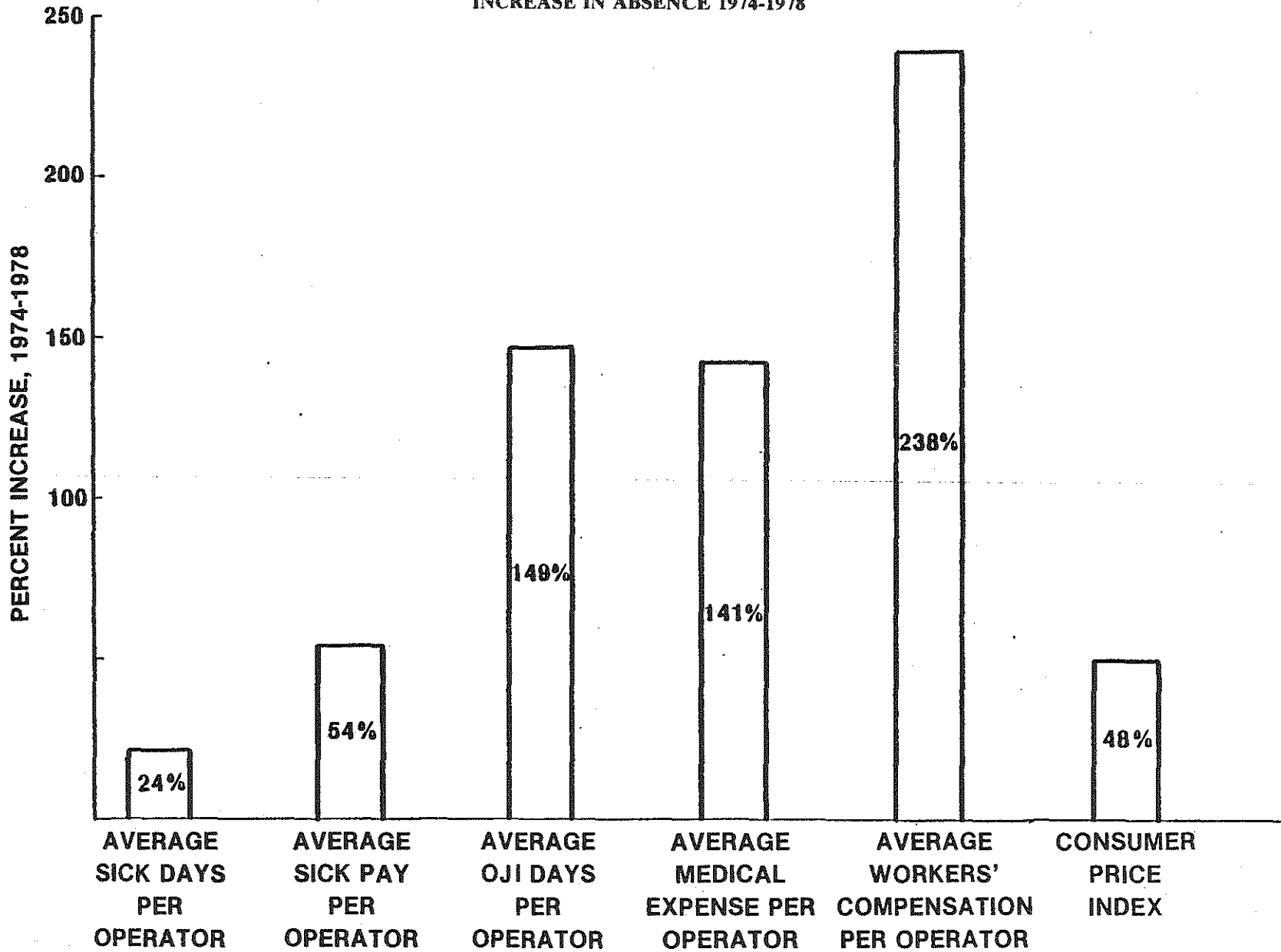
Before meeting with the board to discuss the initiation of an attendance control program, MMTA's general manager prepared a summary presentation of the types of absence, its effect on transit systems, and the range of attendance programs used by the transit industry. The intent of the presentation was to make the board more familiar with the concerns of attendance programs in the transit industry as a first step toward the development of an attendance control program for MMTA. Exhibits III-12 through III-15 summarize the general manager's presentation to the board.

Exhibit III-12 identifies and defines the types of absence. Employee absence includes all days on which an employee could be expected to work but does not. That includes all days except weekly scheduled days off, vacation, and holidays. The absence categories used by many transit systems include: 1) sick leave, 2) injury-on-duty, 3) requested days off, 4) other excused absences and suspensions, and 5) unexcused absence.

Exhibit III-13 summarizes the major effects of absence on a transit system. The primary effects of absence are on cost and service reliability. The unpredictability of absence causes significant costs that cannot be estimated. Bearing this in mind, the five effects of absence that were presented to the board included:

EXHIBIT III-10

INCREASE IN ABSENCE 1974-1978



III.23

EXHIBIT III-11

ASSESSMENT OF MMTA ABSENCE FY79

Number of Full Time Equivalent Employees 162

ILLNESS

Days Lost to Illness	
Total Days Lost to Illness	3029.4
Days Lost to Illness/Employee	18.7
Incidents of Illness	
Total Incidents of Illness	2163.8
Average Days Lost/Incident	1.4
Incidents of Illness/Employee	13.4

ON THE JOB INJURY (OJI)

Days Lost to OJI	
Total Days Lost to OJI	1668.6
Days Lost to OJI/Employee	10.3
Incidents of OJI	
Total Incidents of OJI	73.8
Average Days Lost/Incident	22.6

LEAVES OF ABSENCE (LOA's)

Total Days For Funeral LOA's	65.0
Total Days For Union Granted LOA	220.5
Total Days for Personal LOS	346.0
Total Days for Maternity/Paternity LOA	<u>178.5</u>
Total Days Lost for LOA's	810.0
Average Days Lost for LOA/Employee	5

SUMMARY AND ESTIMATED COSTS

Total Days Lost to Illness/Employee	18.7
Total Days Lost to OJI/Employee	10.3
Total Days Lost for LOA's/Employee	<u>5</u>
Total Days Lost/Employee	34.0
Total Annual Scheduled Workdays	240
Percent of Workdays Absent	14%
Number of Employee Equivalents Absent	22

EXHIBIT III-12

TYPES OF ABSENCE: OVERVIEW AND DEFINITION

Injury on Duty (IOD)

IOD absence includes all absence during which the employee claims protection or benefits for a work-related illness or injury under the applicable workers' compensation statute. It is by far the most rapidly growing category of absence in the transit industry. Under workers' compensation statutes, society holds the employer responsible for compensating the employee. Although statutes vary, employees must typically wait seven days before compensation is initiated. Although lump sum settlements are not unusual, most claimants are paid either two-thirds of their regular earnings or a specified maximum, whichever amount is less.

Sick Leave

Illness or injury which is not work-related is also a generally increasing category of absence. While IOD triggers compensation under state statutes, often supplemented by contract provisions for an initial period, sick leave introduces only the compensation called for by the contract, which is usually limited to the number of days in a sick bank. Like workers' compensation, sick leave benefits, which are tax exempt, often require a waiting period. After an employee's sick bank is exhausted, he may normally continue on unpaid sick leave.

Requested Days Off

Requested days off, within the discretion of the employee's supervisor, are an apparently controllable category of absenteeism. Yet records show that this category is also increasing, and its costs are great. While it can be argued that requested days off need only be granted when the cost is low (e.g., with a "loose board"), the generally increasing level of absence in this category leads properties to hire additional personnel and incur the associated fringe benefit costs. Therefore, this category is also a proper subject of the study.

Other Excused Absence and Suspensions

Absence in this category is largely determined by contract and discipline administered at the discretion of managers. In other words, by including this category, ambiguity concerning its role will be avoided.

Unexcused Absence

Unexcused absence has traditionally been the object of stringent controls in the transit industry. While there is no direct payment for unexcused absence as there is for IOD and sickness, the costs in terms of replacement drivers and service reliability are high. Furthermore, as part of the general increase in absenteeism, unexcused absence has also been increasing slowly. Although the effect of tardiness in the transportation department may be close to the effect of absence, the recent increases in absenteeism and the causes are fundamentally different from those involved in tardiness. Therefore, unexcused absence will refer generally to AWOL incidents, when the employee does not report to work at all.

EXHIBIT III-13

EFFECTS OF ABSENCE ON A TRANSIT SYSTEM

DIRECT COSTS

Three types of absence incur direct payroll costs:

- paid sick leave;
- injury on duty; and
- other excused absence, such as jury duty or funeral leave.

INDIRECT PAYROLL COSTS

Other than direct payments to absent employees, the most significant cost of transit absenteeism is the cost of hiring additional operators and performing the work at overtime rates. These costs have three primary elements:

- the "per employee" costs associated with larger numbers of employees such as vacation, training, holidays, pensions, and other fringe benefits;
- the overtime premium paid to vehicle operators and maintenance employees when absence is high so that there are not enough extra employees to provide service or maintain the vehicles;
- overtime premium is paid to operators to cover absence in two situations: 1) an operator may be asked to work a second run or a portion of a run after his regularly scheduled run; or 2) an operator may be asked to work a run on his scheduled day off; and
- other premiums and allowances paid largely to the vehicle operators arising from the unpredictability of operator absence. Among the various disruption costs that may occur are:
 - spread premium for work in addition to a regular run;
 - spread premium paid to an extra list operator between his show up or report time and pull out;
 - special premiums for intervening time;
 - piece minimums activated when an absentee's run is broken up so that it can be worked into replacement drivers' schedules;

EXHIBIT III-13 (Continued)

- travel time (often at overtime) when runs are broken up;
- intervening time paid to hold an operator for additional work; and
- daily minimums paid on low absence days to extra operators who were hired to cover absence.

ADMINISTRATIVE COSTS

In addition to the payroll costs of absence, immeasurable administrative costs result. These costs include all administrative functions that directly or indirectly are involved in supervision or support of the work force. Among the more apparent functions are:

- recruiting and hiring;
- training;
- accounting;
- dispatching; and
- dispatching facilities and maintenance.

Furthermore, the medical department or payments for medical services and claims department are directly affected by absenteeism.

SERVICE IMPACTS

Failure to fill the schedule is the strongest adverse effect of absence on transit service. Although the true impact in terms of alienated riders and lost revenue is difficult to estimate, the amount of lost service is quantifiable. Although the lost service is only a small fraction of the service scheduled, the confidence of the systems' ridership is shaken in those cases where service is repeatedly cancelled. Furthermore, service cancellation has a ripple effect in the form of schedule delay.

Loads on a trip following a cancelled trip are abnormally heavy. Boarding and dwell times increase and the vehicle falls behind schedule. As the vehicle falls further behind, it carries not only the load of the cancelled trip before it, but also begin to pick up riders that would otherwise board the following bus. This phenomenon, schedule delay, is fostered by cancelled trips and is a major cause of bunching.

Finally, operator absence and the resulting increase in the amounts of extra-list work result in fewer operators who are familiar with their routes. This may have not only the immediate impact of poor schedule adherence and route deviations, but it also makes the service more impersonal.

EXHIBIT III-14

ATTENDANCE PROGRAMS

**METHODS INVOLVING
JOB AND EMPLOYER CHARACTERISTICS**

In-House Newspapers
Social Events
Suggestion Program
Education Assistance
Employee Counseling
Police Protection
Labor/Management Cooperation

**METHODS INVOLVING
PERSONAL CHARACTERISTICS**

Applicant Testing
Applicant Record Screening
Probation and Discharge

**METHODS INVOLVING
ABILITY TO ATTEND**

Safety Programs
Day-Care Centers
Transportation to Work

**METHODS INVOLVING
INFORMATION SYSTEM**

Surveillance
Physician Certification
Management Information System

**METHODS INVOLVING
COST CONTROL**

Planning for Patterns of Absence
Planning for Levels of Absence
Workers' Compensation Insurance

**METHODS INVOLVING
EFFECTS OF ATTENDANCE**

Requested Days Off
Overtime Assignment
Limiting Overtime
Attendance Recognition
Reverse Discipline
Garage Size
Team Activities

**METHODS INVOLVING
EFFECTS OF ABSENCE**

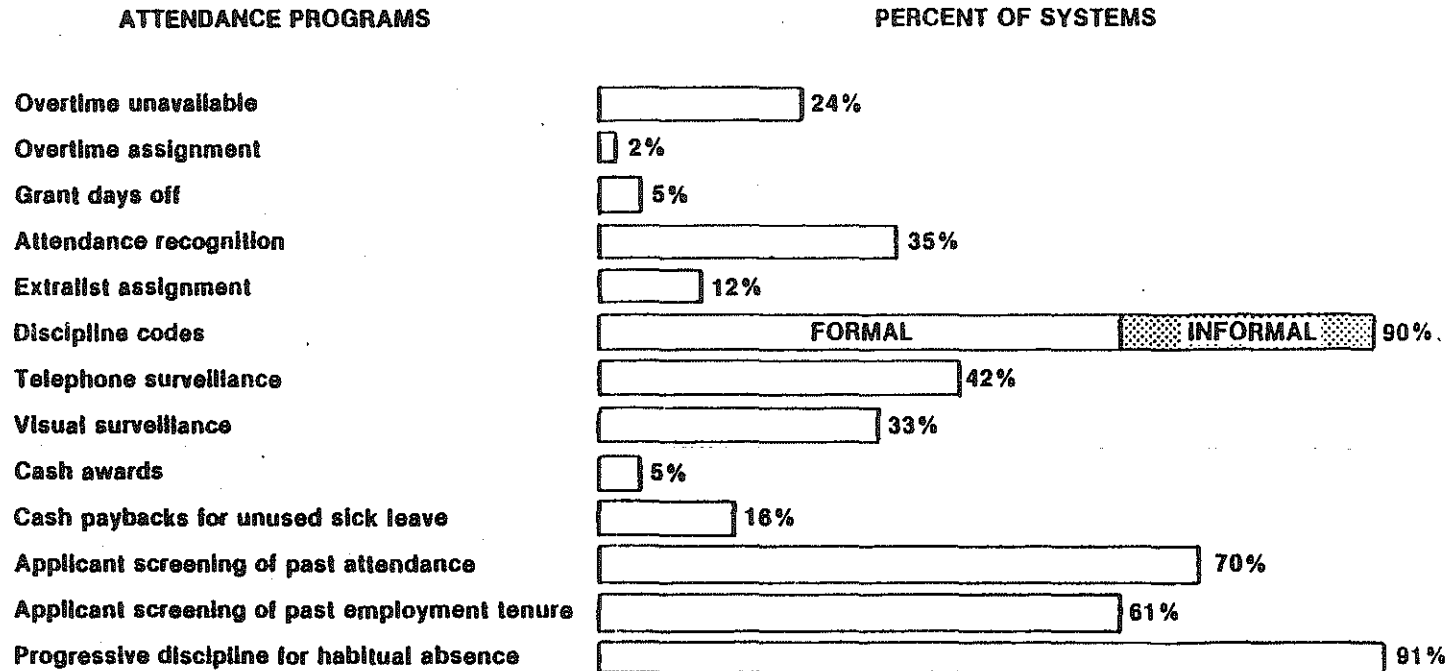
Extra List Assignment
Performance Codes
Friday Pay Day
Limit Workers' Compensation Availability
Limit Sick Pay Availability

**METHODS INVOLVING
SUPERVISION CHARACTERISTICS**

Training
Employee Interviews
Employee Performance Appraisals
Supervisory Ratio

EXHIBIT III-15

PREVALENCE OF ATTENDANCE PROGRAMS



- . direct costs that are specifically associated with absence such as sick pay and workers' compensation;
- . identifiable indirect costs that can be estimated to result from absence, such as overtime and additional fringe benefits;
- . overhead, such as personnel administration and support facilities;
- . service reliability; and
- . employee impacts.

Exhibit III-14 lists a full range of attendance programs used to control absence and Exhibit III-15 identifies the more frequently used attendance programs within the transit industry. As Exhibit III-15 shows, disincentives or punishment rather than incentives or rewards have been more widely adopted to date.

DEVELOP GOALS AND OBJECTIVES

Following the presentation by MMTA's general manager, which included the information in Exhibits III-12 through III-15 as well as a summary of absenteeism experienced by MMTA in 1979, goals and objectives for attendance control were developed. The goal agreed upon unanimously was that "employee attendance should be improved." The objective of the improvement was to "reduce the number of employee days lost to absenteeism." Through better control of absenteeism, real savings could be achieved by reducing the need for overtime hours and work force requirements to meet scheduled operations.

DEFINE PERFORMANCE INDICATORS AND DATA NEEDS

In defining performance indicators and data needs, MMTA decided that it was important to gather and monitor attendance in the same areas that had been used in the 1979 review of attendance. This would allow a time series comparison of change, and hopefully improvement, over time. Consequently for each employee the following data would be gathered:

- . days loss to illness;
- . incidence of illness;
- . days loss to OJI;
- . incidence of OJI;
- . days for funeral LOA's;
- . days for union-granted LOA's;

- . days for personal LOA's; and
- . days for maternity and paternity LOA.

By reporting these data for each employee, the same performance indicators developed in the 1979 attendance report could be developed in 1980. These include total days or incidence of absence by type and average days and incidence per employee.

To enhance the data and potentially better understand MMTA absenteeism, MMTA also decided to more consistently monitor:

- . the incidence of illness and personal leave days in relation to pay day, weekends, and holidays;
- . the types of injuries on duty; and
- . the incidence and duration of all types of absence by position of employee, seniority, and salary level.

This type of information had not been systematically and consistently monitored in the past.

ESTABLISH PERFORMANCE TARGETS

Although an ambitious target, MMTA's general manager decided that a 20 to 25 percent reduction in total days of absence by category (i.e., illness, OJI, and LOA) was the target to be achieved in the upcoming year. This would imply a reduction in total days lost from 5,507.6, or 34 days per employee, to between 4,131 and 4,407 total days lost, or between 25 and 27 days per employee. While this level of absence is still higher than desirable, it is less than the national average (in 1978) and could be improved on over time with further improvements in employee attendance.

Within each of the defined categories of absence, the following targets were defined:

- . 14.4 to 14.0 days lost to illness per employee, or 2,333 to 2,268 total days;
- . 8.2 to 7.7 days lost to OJI per employee, or 1,328 to 1,247 total days; and
- . 4 to 3.7 days lost to LOA per employee, or 648 to 599 total days.

The general manager realized that the attendance habits of employees are established over time and must therefore be given time to change and improve.

Although no specific targets were set, the general manager decided to track over time the days lost per incidence of illness and OJI to assess whether there was a change in minor/short(er)-term incidents or in the more major/long(er)-term incidents.

PLAN AN IMPROVEMENT PROGRAM

In developing an attendance control program, the possible actions were first divided into two groups: 1) attendance programs that can be implemented outside the context of the collective bargaining agreement, i.e., those actions that represent more effectively exercising existing management authority and prerogative, and 2) attendance programs that can be implemented only as part of contract renegotiation since they are currently set by contract agreement.

Because the labor contract was not being renegotiated, the first group was emphasized for near-term consideration. Some thought was given, however, to those actions requiring a change to the existing MMTA labor contract including:

- . reducing the number of sick days per year;
- . requiring an employer-sponsored examination upon (employer) request;
- . increasing the time increment in which sick leave can be taken (i.e., from one to four hours);
- . reducing or eliminating employer payment for insurance premiums during extended leaves of absence;
- . reducing the number of days for unpaid and/or paid leaves of absence;
- . extending the waiting period before payment of worker's compensation; and
- . redefining the progression of disciplinary action for excessive absenteeism.

Focusing on attendance control programs that could be implemented outside the bargaining agreement, the possible elements were identified in two categories: incentives and disincentives. MMTA felt that it was important to have a balanced program that would encourage good attendance records as well as discourage excessive absence or poor attendance.

The improvement plan developed by MMTA affected all employees except the general manager and included:

- more careful monitoring of attendance and absence by employee and type of absence;
- stricter enforcement of the existing excessive absenteeism policy;
- a year-end cash incentive program of bonuses for good attendance; and
- posting of a weekly attendance record for all employees including some summary statistics such as year-to-date and group/function statistics.

The first element of the program was summarized under the heading, "Define Performance Indicators and Data Needs." The last element is straightforward and requires little explanation. Both of these program elements were carried out largely by the payroll office with participation. The excessive absenteeism policy and case incentive program are summarized below.

Excessive Absenteeism Policy

The excessive absenteeism policy defined an incidence of absence as a non-scheduled absence from work, whether part of a shift, a full shift, several work days, or weeks. The following types of absence were not counted:

1. vacation approved in advance;
2. contract holidays;
3. court proceedings;¹
4. paid personal days;
5. approved leaves of absence that are not medically related;
6. workman's compensation injuries which are reported within 24 hours of the injury; and
7. sick leave that includes hospital confinement.¹

To allow some flexibility in the policy, in instances when absence was unavoidable for personal, family, or other reasons it could be excused and not counted for imposing discipline at management's discretion. All other absences were considered eligible for imposing discipline.

¹ Proof of court proceedings and hospitalization may be requested.

Discipline under the Excessive Absenteeism Policy was administered in the following manner:

1. Whenever it was determined that an employee had four (4) absence incidents in a twelve-(12) month period, the employee received a non-disciplinary written notification of the occurrence.
2. Whenever it was determined that an employee had a fifth (5th) absence incident in a twelve-(12) month period, the employee received a written warning.
3. Whenever it was determined that an employee had a sixth (6th) absence incident in a twelve-(12) month period, the employee received a three-(3) day suspension; and
4. Whenever it was determined that an employee had a seventh (7th) absence incident in a twelve (12) month period, the employee was subject to discharge.

Year-End Cash Incentive Program

An important part of the attendance control program was the provision for cash incentives for employees with excellent attendance. Attendance bonuses were for calendar years beginning January 1, 1980. To qualify for an excellent attendance cash award and certificate for a calendar year, an employee had to meet the following criteria:

1. Have had no more than one (1) absence incident (as described below); and
2. Have had no occurrences of being absent without leave (AWOL).

The cash incentives for employees with excellent attendance for a calendar year are as follows:

- | | |
|--|----------|
| 1. First (1st) year. | \$200.00 |
| 2. Second (2nd) Consecutive Year | \$400.00 |
| 3. Third (3rd) and Subsequent Consecutive Years. | \$600.00 |

The cash awards were presented at an annual Christmas party which included spouses or guests and were written up in the transit system newsletter.

PREPARE A BUDGET

The budget requirements for implementing all but the year-end cash bonus program were not substantial. Up to an additional hour per day of operation would be required by the payroll office to tabulate and track attendance

data. This meant an additional 310 hours per year or 15.6 percent of a person year. These activities required no additional cost. Stricter enforcement of the excessive absenteeism policy also required no additional cost since it was part of the defined position responsibility of supervisory and management personnel.

It was not possible to accurately estimate the cost of the cash incentive program since it was not possible to know in advance how many people would qualify. A possible range was developed for budgeting purposes which assumed that at a minimum the same number of the people that had only one absence incident in the past year would again qualify. This represented about 25 percent of the employee force at the start of 1980, or about 40 people. That assumption would imply \$8,000 in cash bonuses. The upper level of the range assumed that 100 percent of the employees would qualify for the bonus. This assumption implied about \$32,000 in bonus payments. This optimistic level of response was not expected but would have more than paid for itself in reduced operating costs had it been achieved.

COLLECT DATA

The data specified under data needs was collected throughout the year through the payroll process. The specified performance indicators were routinely developed to track change in attendance and attendance records were regularly posted. The data collection effort was not complicated and easily fit into payroll office responsibilities.

COMPARE ACTUAL TO PLANNED PERFORMANCE

Within weeks of implementing its attendance control program, MMTA observed improvement in employee attendance. Use of overtime began to decrease in both vehicle operations and maintenance. Scheduled runs were easily filled and full shifts began reporting to the maintenance shop. Normal attrition occurred during the year, and it was not necessary to fill all positions. By the end of 1980, the work force was reduced from 162 to 155 full-time equivalent employees.

A second attendance report was prepared after one full year's experience with the control program. This report compared attendance in 1979 to 1980. The report results revealed that the target of 20 to 25 percent reduction in absenteeism in each category of absence had been met or exceeded. Exhibit III-16 summarizes the improved attendance performance. Total days lost for illness, OJI, and LOA decreased by 28 percent, 27 percent, and 39 percent, respectively. Average days lost per employee in these categories improved by 25 percent, 24 percent, and 36 percent. The average number of days lost per employee for all categories of absenteeism decreased from 34 to 25 days or by 26 percent.

EXHIBIT III-16

SUMMARY COMPARISON OF ABSENTEEISM 1979 AND 1980

	1979	1980	Percent Charge
Number of Full Time Equivalent Employees (year end)	162	155	- 4%
<u>ILLNESS</u>			
Days Lost to Illness			
Total Days Lost to Illness	3029.4	2170.0	-28%
Days Lost to Illness/Employee	18.7	14.0	-25%
Incidents of Illness			
Total Incidents of Illness	2163.8	1142.1	-89%
Average Days Lost/Incident	1.4	1.9	+26%
Incidents of Illness/Employee	13.4	7.4	-45%
<u>ON THE JOB INJURY (OJI)</u>			
Days Lost to OJI			
Total Days Lost to OJI	1668.6	1209	-27%
Days Lost to OJI/Employee	10.3	7.8	-24%
Incidents of OJI			
Total Incidents of OJI	73.8	45.8	-38%
Average Days Lost/Incident	22.6	26.4	+18%
<u>LEAVES OF ABSENCE (LOA's)</u>			
Total Days for Funeral LOA's	65.0	46.5	-28
Total Days for Union Granted LOA	220.5	108.5	-51%
Total Days for Personal LOA	346.0	186.0	-45%
Total Days for Maternity/Paternity LOA	178.5	155.0	-13%
Total Days Lost for LOA's	810.0	496.5	-39%
Average Days Lost for LOA/Employee	5	3.2	-36%
<u>SUMMARY AND ESTIMATED COSTS</u>			
Total Days Lost to Illness/Employee	18.7	14.0	-25%
Total Days Lost to OJI/Employee	10.3	7.8	-24%
Total Days Lost for LOA's/Employee	5	3.2	-36%
Total Days Lost/Employee	34.0	25.0	-26%
Total Annual Scheduled Workdays	240	240	--
Percent of Workdays Absent	14%	10%	28%
Number of Employee Equivalents Absent	22	16	27%

III.36

Pleased with this progress, the MMTA was committed to continuing this program and to seeking further improvements in the future. Additional incentives for good attendance records would be considered as well as disincentives to excessive absence including modifications to the existing labor agreement.

Case Study 3

CASE STUDY 3: SELECTIVE SERVICE REDUCTIONS

Reductions in transit operating expenses can be achieved through reduction in the level of transit service, renegotiation of the labor contract to reduce labor related costs, and improved management practices. The most significant reductions in operating cost result from reductions in the cost of labor and from service cutbacks. Savings from improved management practices alone are generally less significant and often occur over a prolonged period of time. The MMTA transit board and its general manager have agreed that bus service should be selectively reduced to cut back operating expenses.

DEVELOP GOALS AND OBJECTIVES

The transit board, the mayor, city council, and community recognize that the transit system offers an important service to the county residents. The system provides mobility to the transit dependent, and an important alternative to the automobile. Consequently, the board realizes that the necessary reductions in operating expense be pursued without disrupting the overall integrity of the transit system resulting in significant loss of transit ridership.

Together, the general manager and the board established the following goal at a recent board meeting:

"Reduce operating expenses by service level reductions without serious ridership loss."

This goal is to be pursued through the achievement of the following objective:

"Identify and implement selective reductions in transit service level to reduce operating expenses in anticipation of reductions in federal support for the MMTA. Service reductions should maximize cost reductions and minimize ridership loss."

The transit system general manager presented this objective as an effective response to the conflicting requirements of maintaining service quality while reducing the cost of operations.

DEFINE PERFORMANCE INDICATORS AND DATA NEEDS

So that progress toward the achievement of the stated objective could be measured, performance indicators and data needs were defined by transit management. The indicators were defined to allow the measurement (and therefore monitoring) of (1) reduction in operating costs; and (2) impact of selected service cutbacks on ridership.

In developing performance indicators, the MMTA wanted to select relevant measures that would draw on currently available data. Because data collection is costly and often cumbersome, a decision was made that additional data gathering would be initiated only if necessary. To the extent possible, performance indicators would be based on currently available data.

The MMTA has prepared its Section 15 report at the required level of reporting for the past three years. This information serves as a base of consistent information, particularly in the areas of revenue and expense. While the operating statistics reported in the initial Section 15 report were considered suspect in some areas, the data has been reliable in the past year and is therefore useful for this analysis.

The Section 15 data that MMTA identified as potentially useful for the development of performance indicators for analyzing operating cost savings and ridership included:

- . operating expenses systemwide by function and object class;
- . vehicle miles of service;
- . vehicle hours of service;
- . vehicle (fleet) requirements;
- . passenger trips (systemwide);
- . passenger miles per trip; and
- . number of employees.

In addition to Section 15 data the MMTA also gathers information on transit ridership by route. These data were also important for the development of performance indicators.

Certain data useful for identifying opportunities for service cutbacks and monitoring their impacts have not been routinely gathered by MMTA. In particular, current data on transit ridership by route segment and by route by time of day were not available. These data are very important since they assist in making the difficult decisions of where service can be reduced with minimal impact on ridership. Consequently, the MMTA made a commitment to gather more detailed ridership counts during the year.

After careful consideration and discussion, the MMTA's general manager and director of transit operations decided to use the following performance indicators to measure the achievement of their stated objective:

- . total operating cost per passenger trip - Achievement of the stated objective would require the value of this indicator to decrease. This would be achieved ideally by reducing the cost of operations while maintaining ridership or at least by reducing cost without serious loss of ridership; and

- passengers per vehicle mile (for the system as a whole, by route and route segment by time of day: for the morning and evening peak hours, midday and evening service) - Achievement of the stated objective would result in an increase in the value of these indicators in that the intent is to reduce service which is underutilized. This will imply cost savings without significant ridership loss. The indicator is relevant on a systemwide basis to obtain an overall measure of performance. The route, route segment, and time of day level measurement are required to facilitate informed decision-making in the selection of service reduction.

ESTABLISH PERFORMANCE TARGETS

Performance targets represent the desired or acceptable level of performance that is to be achieved by the transit system. The values for the performance indicators reflect the direction and magnitude of change that the transit system intends to pursue.

The MMTA decided that it would establish performance targets for service reductions based on its past year performance. The targets set by the MMTA were:

- a minimum 10 percent reduction in total operating expense from \$3,200,000 to \$2,880,000; and
- a maximum 3 percent reduction in transit ridership from 2,973,000 to no less than 2,884,000.

Last year MMTA's systemwide average cost per passenger served was \$1.076. Achievement of the above performance targets would result in an average cost per passenger of \$0.999 or a 7.7 percent reduction.

PLAN PROGRAM

To achieve the performance targets, MMTA had to identify underutilized transit service by route, route segment, and time of day so that service could be cut back and savings achieved with minimal ridership loss.

The MMTA decided to consider three approaches for achieving the service cutbacks:

- reductions in service frequency - Poor performance routes, i.e., those routes that experience low ridership or poor revenue contribution would be candidates for consideration of headway adjustments. Headways would be increased on the entire route or through the use of turnbacks.

- service span - The types of changes considered by the MMTA to achieve service reductions were largely modification of the hours that service is provided. For routes that have low patronage in the early morning or later evening hours, service would start later in the morning and end earlier in the evening.
- route modifications - Rerouting of transit service includes service cutback and elimination -- the most drastic type of reduction in the level of transit service. While it has the greatest potential for cost savings, it also has the most significant impact on transit riders; therefore, transit systems generally consider changes in service frequency and scheduling prior to considering route cutbacks or elimination.

The plan developed by the MMTA involved surveying the ridership on each route and conducting an analysis of each route to determine patronage by route segment and time of day. Using the survey data, evaluators compared routes selecting those with the lowest patronage overall or by route segment and time of day as candidates for service changes.

An iterative analysis process was used. The first pass at reviewing the routes considered changes in service frequency by lengthening headways including the use of turnbacks. The second pass considered the reduction in service span generally by shortening the hours service was provided by one hour in the morning and up to three hours in the evening. The third pass considered routing changes first by the shortening of route length and then finally the elimination or restructuring of route(s).

In conjunction with the ridership analysis, the following questions were considered about each route:

- Could route segments be cut or service frequency reduced without significant ridership loss?
- Do route segments duplicate other routes, allowing for restructuring without serious service disruption or inconvenience?
- Is it possible to introduce turnbacks mid-route to allow for greater frequency on the initial route segments and lower frequency on the latter segments?
- Is patronage sufficiently low in the early morning, late evening, or weekend to consider eliminating these services?
- Is there significant transferring among routes such that reductions in service on certain routes, which may have low ridership, will impact the patronage on other routes?
- Are there particular trip generators along low patronage routes like hospitals or senior citizen centers that would result in serious impacts on transit dependent patrons if service is reduced or eliminated?

The overall objective of the program was to identify and prioritize service level reductions in terms of savings potential and ridership loss. Having completed this effort, cutbacks were selected until the cumulative result achieved the stated objectives and performance targets.

PREPARE A BUDGET

A budget was prepared by the MMTA transportation department to carry out the planned program for identifying service reductions. It was a relatively simple effort since carrying out the program involved only nominal additional expenses outside of the regular transit system budget.

The budget was prepared as a two-step process. First, an estimate was made of the additional labor expense that would be incurred to gather ridership data by route. To support changes in service frequency, span, and routing, MMTA decided to hire four part-time surveyors to gather data on ridership on each route.

To conduct the survey of each run of the 18 routes operated by MMTA, the surveyors would work an estimated eight hours a day Monday through Friday for two weeks and either three or four Saturdays for 12 hours. The surveyors were each paid \$3.50 per hour. The cost of this effort was:

$$4 \text{ surveyors} \times 134 \text{ hours} \times \$3.50 = \$1,876$$

A budget was also prepared to estimate the time required of current MMTA staff to complete the planned program. While no new staff would be hired, the time required to identify service cutbacks and cut a new schedule was estimated. Exhibit III-17 presents the estimate of the MMTA staffing budget by staff hours.

COLLECT DATA

Data collection was largely limited to the ridership survey required to analyze each route and route segment. The other data needed for the analysis were already being routinely gathered to meet Section 15 reporting requirements.

Recent data on average passengers per mile was the only route specific data available when the effort began. Exhibit III-18 summarizes last year's data. Clearly these data provide some insight regarding the overall performance of each route, but a more detailed route profile was determined to be required to reduce service with minimal ridership impacts, during the program planning.

EXHIBIT III-17
BUDGET OF MMTA STAFF HOURS

Activity	General Manager	MMTA Staff Hours			Total
		Director Operations	Planning Analyst	Scheduler	
1. Prepare and Oversee Survey Effort		8	24	120	32
2. Analyze Survey Results		8	24		32
3. Identify Low Ridership Route/Segments		8	16		24
4. Estimate Cost Savings of Service Reductions			24		24
5. Estimate Ridership/Revenue Loss			16		16
6. Develop Proposal of Recommended Cutbacks	8		40		48
7. Review Proposal with Transit Board and Obtain Approval	16	16			32
8. Prepare Informational Material for General Public and Conduct Public Meeting	8		24		32
9. Cut a New Schedule				120	120
10. Inform Drivers of Service Changes	8	32			8
11. Evaluate Impacts of Cutbacks on Ridership Cost and Community Response		8	40		48
	32	80	208	120	416

* In addition to these personnel hours, operator time would be included since a pick would be required once all of the route schedules are recut.

EXHIBIT III-18

DAILY PASSENGERS PER VEHICLE MILE

Rank	Route	Daily VMT ^{1/}	Average ^{1/} Daily Riders	Daily ^{1/} Passengers Per Mile
1	A	346	1,246	3.6
2	B	387	1,238	3.2
3	C	380	1,140	3.0
4	D	388	1,086	2.8
5	E	415	996	2.4
6	F	346	761	2.2
7	G	380	760	2.0
8	H	277	443	1.6
9	I	304	395	1.3
10	J	415	415	1.0
11	K	305	244	.8
12	L	346	242	.7
13	M	311	187	.6
14	N	415	249	.6
15	O	346	173	.5
16	P	277	139	.5
17	Q	314	126	.4
18	R	277	83	.3
		6,230	9,923	1.529

^{1/} Weekday Data, does not include Saturday

Passenger counts on each run were gathered including boardings and alighting by stop. With this information, the number of passengers on each vehicle could be calculated by time of day and route segment.

Exhibit III-19 is an example of the passenger count form filled out by the surveyors. The forms were typed in advance to include the route name and stops. The schedule times were filled in by hand by the MMTA schedule department as were the block and run numbers. The surveyor filled in the "on" and "off" data by stop and later calculated the total on board passengers which were checked by the MMTA schedule department.

Each surveyor received a notebook each morning which contained the passenger counting sheets and the needed instructions for the day. Passenger counts were then turned in at the end of each day. The survey was conducted in October, a time of year not affected by holidays, vacations, or inclement weather.

CONDUCT ANALYSIS

Three types of analyses were conducted to develop the recommended service cutbacks:

- ridership analysis: by route, route segment, and time of day;
- cost savings estimates: associated with the incremental and cumulative reductions in service; and
- revenue loss estimates: associated with incremental reductions in service.

The analysis techniques used by the MMTA are summarized below:

Ridership Analysis

The data from each route were analyzed by:

- reviewing ridership levels by trip throughout the day; and
- identifying by ranking the routes, time periods, and route segments with the most and least ridership as well as fluctuations throughout the day.

Based on the analysis of ridership, the following decisions were made:

- Routes that generally had high levels of ridership throughout the day and only occasionally had low ridership were identified as candidates for changes in service frequency (headways) during the low ridership periods.

EXHIBIT III-19

PASSENGER COUNT SHEETS

Route _____

Block _____

Run _____

<u>Stop</u>	<u>Schedule Time</u>	<u>On</u>	<u>Off</u>	<u>On Board</u>
1. Northend	6:00 a.m.			
2.				
3.				
4.				
5.				
6.				
7.				
8.	6:15 a.m.			
9.				
10.				
11.				
12.	6:30 a.m.			
13.				
14.				
15.				
16.				
17.				
18.				
19.	6:45 a.m.			
20.				
21.				
22.				
23.				
24. Southend	7:00 a.m.			
	TOTAL			

- Routes that generally had high levels of ridership except during the early morning and evening hours, were identified as candidates for route turnbacks or reduction in the span of service to shorten service hours.
- Routes with ridership that was consistently lower than the systemwide average were identified for more detailed review of patronage characteristics and were considered candidates for route elimination. In general, this review tended to focus on the four routes with fewer than .6 daily passengers per mile.

While decisions for reductions in service largely focused on the routes with fewer than .6 daily passengers per vehicle mile, it was necessary to carefully review the patronage on each route. Even the routes that appeared to have the best performance (i.e., highest daily ridership) had low ridership at points during the day that justified service frequency reductions.

Before routes were recommended for elimination, the route was examined to determine whether segments of the coverage could be served by another route that currently duplicates service. Analyses were also made of the existing patrons to assess the impact of eliminating the service on the community. Special attention was given to routes with low ridership but proportionately high elderly and autoless patrons. This information was gathered through an on-board survey of the low ridership routes.

At the completion of the ridership analysis four routes were identified as candidates for elimination; and five routes were identified as candidates for reduction in service span and turnbacks. Service frequency reductions in the midday and evening off-peak hours were identified for the remaining nine routes which had the highest average patronage for the MMTA.

The final decisions regarding service reduction recommendations were not developed until the analyses of cost savings and revenue loss were completed.

Cost Savings Estimate

The MMTA developed estimates of cost savings associated with proposed reductions in service. The estimates were based on a unit-cost approach which included four variables or factors: vehicle miles, vehicle hours, operators and daily vehicles. This cost analysis technique attributes systemwide costs for providing transit service to the basic characteristics of the transit service provided (e.g., fuel costs are attributed to miles of service operated).

The steps required to develop cost estimates for changes in service levels include:

- Develop unit costs for basic service characteristics - this involves (1) selecting the desired service characteristics; (2) assigning the elements of transit operating expense (cost) as

reported in the Section 15 Reports (or other existing financial statements) to specific characteristics of service and (3) developing the unit costs (expressed as annual costs per unit of service);

- Develop the transit system level of service characteristics - this involves establishing the proposed service changes and defining them in terms of the basic service characteristics used to develop unit costs; and
- Determine the cost of the proposed alternatives - this involves multiplying the unit costs of each service characteristic by the change in the value of each characteristic to develop the cost estimates by route and for the total system.

Identification of Service Characteristics and Allocation of Costs

The MMTA selected the following basic service characteristics to develop unit costs of operation:

- Vehicle Miles: Estimation was straightforward. It included all revenue plus non-revenue miles of service for weekdays, Saturdays and holidays for the year. (Sunday service is not provided). These data were available from Section 15 Form 406 for the motor bus mode on a daily basis. Therefore, it was necessary to convert the data to an annual estimate, by multiplying the number of weekday hours by 260 and adding it to the number of Saturday hours multiplied by 52. Expenses which vary as a function of vehicle miles of service operated were identified. These include tires and tubes, fuel and lubricants, parts, insurance, and vehicle maintenance. Each of these expenses is included on the Section 15 Expense Report 310 for expenses by object class, and function.
- Vehicle Hours: An estimate of the number of vehicle hours operated was developed which included scheduled platform time. This includes elapsed time from pullout to pullin and includes revenue operation, deadhead operation layovers and paid rest breaks. This information was available on Section 15 Form 406. Like the vehicle miles data this information was available on a daily basis; therefore annual estimates were developed. Operator wages were identified as the primary transit system expense that can be attributed to vehicle hours of operation. These expenses are included on the Section 15 Expense Report 310 under the vehicle operations function.

- Operators: The number of operators required to operate the current level of service can be determined through the payroll. Section 15 Form 404 provides an estimate of the number of operators based on full-time operator equivalents (i.e., total operator hours divided by 2,000). This estimate will understate the number of operators if there is extensive use of part-time operators and overestimate the operators if there is considerable use of overtime. Vehicle operator wages attributable to functions other than vehicle operations, other (non-operator) wages and all fringe benefits in the vehicle operations function are attributable to the number of operators since they are affected more by the number of operators than other characteristics.
- Daily Vehicles: The number of vehicles required for daily operation equals the vehicle requirement to meet the peak hour service (i.e., the most vehicles used at any time during the day.) Expenses for servicing and storage of vehicles and many administrative expenses are determined as a result of the number of vehicles in operation rather than the hours or miles of service provided. The major expenses included the non-vehicle maintenance and administrative wages and benefits and materials and supplies. Other expenses that can be attributed to the number of vehicles are services, utilities and certain minor or miscellaneous expenses. These expenses were reported on the Section 15 Report 310.

Exhibit III-20 presents MMTA's Section 15 expense data by function and object class. Exhibit III-21 summarizes MMTA's allocation of operating expenses to each basic service characteristic. This exhibit was developed using the Section 15 data from Exhibit III-20. The allocation of expenses was performed such that all object class expenses within a particular functional area were allocated to one characteristic. In some cases, the object class expenses were added across more than one functional area and allocated to the same characteristic. Once the costs were allocated unit costs were developed as presented in the upper half of Exhibit III-22.

These unit costs were then used in a before and after comparison of service costs for each of MMTA's 18 routes. The before estimate represented the current cost of each route. The after estimate (summarized in the lower half of Exhibit III-22) represented the estimated cost once the proposed service reductions were implemented. Estimates of total system cost were developed by summing the cost for each of the 18 routes following service reductions.

Revenue Loss Estimate

An extremely simple approach was developed to estimate ridership loss that would result from the proposed service cutbacks. The following assumptions were made:

EXHIBIT III-20

MMTA SECTION 15 EXPENSE REPORT BY
OBJECT CLASS AND FUNCTION
FY80

III.50

	Vehicle Operations	Vehicle Maintenance	Non-Vehicle Maintenance	Administration	Total
501.01 Operators Salaries and Wages	\$1,171,200	\$ 17,920	\$ 0	\$ 7,616	\$ 1,196,736
501.02 Other Salaries and Wages	99,552	279,040	23,680	109,888	512,160
502 Fringe Benefits	382,084	89,311	6,100	36,585	514,080
503 Services	7,808	40,960	6,912	92,480	148,160
504.01 Fuel and Lubricants	238,144	2,560	0	0	240,704
504.02 Tires and Tubes	35,136	2,560	0	0	37,696
504.99 Other Materials and Supplies	5,856	181,760	18,240	14,144	220,000
505 Utilities	0	4,480	2,624	34,272	41,376
506 Casualty and Liability Costs	0	21,120	6,080	154,496	181,696
507 Taxes	11,712	640	384	14,144	26,880
508 Purchases Transportation	0	0	0	23,392	23,392
509 Miscellaneous Expense	0	0	0	56,032	56,032
510 Expense Transfers	0	0	0	1,088	1,088
Total	<u>\$1,951,492</u>	<u>\$ 640,351</u>	<u>\$ 64,020</u>	<u>\$ 554,137</u>	<u>\$32,000,000</u>
Percent of Total	61%	20%	2%	17%	100%

EXHIBIT III-21

ALLOCATION OF EXPENSES TO FACTORS USING UMTA
SECTION 15 REQUIRED REPORTING LEVEL DATA

Function and Expense Object Classes		Allocation of Expenses			
		Miles	Hours	Operators	Vehicles
501	Labor				
	Vehicle Operations - Operators		\$1,121,200		
	010 Vehicle Operations - Other			\$25,088	
	041 Vehicle Maintenance	\$279,040			
	042 Non-Vehicle Maintenance				\$23,680
	160 General Administration				109,888
502	Fringe Benefits				
	010 Vehicle Operations			382,084	
	041 Vehicle Maintenance	89,311			
	042 Non-Vehicle Maintenance				6,100
	160 General Administration				36,585
503	Services: Total Services				
	160 General Administration				148,160
504	Materials and Supplies Consumed: Total Materials and Supplies				
	010 Vehicle Operations	279,136			
	041 Vehicle Maintenance	186,880			
	042 Non-Vehicle Maintenance				18,240
	160 General Administration				14,144
505	Utilities: Total Utilities				
	160 General Administration				41,376

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EXHIBIT III-21 (Continued)

Function and Expense Object Classes		Allocation of Expenses			
		Miles	Hours	Operators	Vehicles
506	Casualty and Liability Costs: Total Casualty and Liability Costs	181,616			
507	Taxes: Total Taxes				26,880
508	Purchased Transportation Services				
	160 General Administration				23,392
509	Miscellaneous Expenses: Total Miscellaneous Expenses				
	160 General Administration				56,032
510	Expense Transfers				1,088
	TOTAL	<u>\$1,016,063</u>	<u>\$1,171,200</u>	<u>\$507,172</u>	<u>\$505,565</u>

GRAND TOTAL \$3,200,000

III.52

EXHIBIT III-22

MMTA UNIT COSTS OF TRANSIT SERVICE
FY80

Prior to Service Reduction

	Allocated Expenses		Operating Data		Unit Cost
Vehicle Miles	\$1,016,063	÷	1,944,193	=	\$.52 cost per vehicle mile
Vehicle Hours	1,171,200	÷	148,000	=	\$7.91 cost per vehicle hour
Operators	507,172	÷	97	=	\$5228.58 cost per operator
Daily Vehicles	505,565	÷	52	=	\$9722.40 cost per vehicle
	<u>3,200,000</u>				

Following Service Reduction

	Allocated Expenses		Operating Data		Unit Cost
Vehicle Miles	\$909,882	=	1,749,774	x	\$.52 cost per vehicle mile
Vehicle Hours	1,053,612	=	133,200	x	\$7.91 cost per vehicle hour
Operators	454,851	=	87	x	\$5228.58 cost per operator
Daily Vehicles	456,952	=	47	x	\$9722.40 cost per vehicle
	<u>\$2,875,332</u>				

III.53

- All current ridership would be lost on routes and route segments that were eliminated;
- All current ridership would be lost from the shortening of service span (i.e., routes that cut back service after 7:00 p.m. would lose all of the riders who used the service between 7:00 and 10:00 p.m.; and
- No riders would be lost from changes in service frequency since the riders would simply wait several more minutes for the bus or plan their trip around the revised bus schedule.

Based on this procedure, an estimated 4 to 5 percent of the ridership would be lost if the desired cost reductions were achieved. The accuracy of this estimate was uncertain since it was believed that the first two assumptions would overestimate ridership loss and the third assumption may underestimate the loss.

COMPARE ACTUAL TO PLANNED PERFORMANCE

Based on the ridership loss estimate, the MMTA and its board realized that the proposed service reductions would meet the 10 percent cost reduction target but may exceed the desired amount of ridership loss. A decision was made by the board to move ahead with the service reductions. Since there was some uncertainty about whether the estimates of ridership loss of about 4 or 5 percent were accurate, a decision was made to monitor system ridership in the upcoming year through periodic sampling and operator counts.

Appendix A

APPENDIX A

**REVIEW OF COMMON TRANSIT
RESPONSIBILITIES: BY FUNCTIONAL AREA**

APPENDIX A

REVIEW OF COMMON TRANSIT RESPONSIBILITIES: BY FUNCTIONAL AREA

This Appendix provides definitions and discussion of the transit system functional areas listed on Exhibit A.1. These functional areas are common to most transit systems and are independent of specific organizational structures. Important management concerns including key questions that should be raised in the evaluation and monitoring of each function are presented for each function and subfunctional area.

EXHIBIT A.1

TRANSIT SYSTEM FUNCTIONAL AREA REVIEW

Transportation Operations

- Service Delivery
- Safety and Training

Revenue Vehicle Maintenance

General Maintenance

- Stop Station Maintenance
- Buildings, Grounds and Equipment Maintenance
- Non-Revenue Vehicle Maintenance

Planning and Marketing

- Service Planning and Market Analysis
- Fare Policy
- Scheduling
- Public Relations and Advertising
- Budgeting and Financial Planning

General Administration

- Purchasing
- Inventory Management
- Risk Management and Insurance
- Personnel Management and Labor Relations
- Management Reporting and Administrative Services

Management and Organization

- Organizational Effectiveness
- Management/Decision-Making Process

TRANSPORTATION OPERATIONS

The Transportation Operations function includes those activities that are concerned with the timely, safe, and cost-effective provision of transit services to the general public. The Transportation Operations function has been divided into two subfunctions. These are:

- . Service Delivery; and
- . Safety and Training.

As indicated by their titles, service delivery is related to the provision of transit service according to schedule. Safety and training is related to the provision of safe service and the development of transit vehicle operator skills.

Service Delivery

The subfunction of Service Delivery is concerned with schedule performance, operator courtesy, vehicle operator utilization, and other issues related to the provision of service.

Management and evaluation activities should address Service Delivery from three perspectives: (a) service effectiveness, (b) service efficiency, and (c) productivity.

The service effectiveness perspective involves an assessment of management's actions to provide high quality public transportation service within a framework of established routes, schedules, facilities, and fares. To monitor service effectiveness, management may evaluate transit vehicle activity, adherence to schedules, response time for dial-a-ride, operating safety, and passenger security. Patronage response to transit service is assumed to be monitored by the planning and marketing function.

The service efficiency perspective involves an assessment of management's actions to provide a given level of service at reasonable costs. Efficiency measures are generally expressed as the ratio of operating costs to the amount of service provided. To monitor service efficiency, management would typically evaluate cost per mile or cost per hour and the factors that influence these broad measures.

In general, the level of productivity of the transit service in terms of the amount of service provided (vehicle miles, car miles, or seat miles) for a given number of vehicles and operators is established for fixed-route transit operators as an output of the schedule process. Schedulers develop routes and headways based on market data, vehicle performance characteristics, the size of the available fleet, current labor contract provisions, the economics of providing service in terms of total operating costs and passenger revenue, external financing sources and amounts, and service policy provided by governmental or policy boards. The scheduling activity is further described as part of the planning and marketing function.

Key Questions

The most important issues or questions related to the provision of transit service are as follows:

- . Is service performed as scheduled in terms of completed runs and trips and on-time performance?
- . Are vehicle operators courteous and helpful?
- . Does control exist over the fare collection process --- control over the operator or patron abuse of fare payment requirement?
- . Is actual vehicle operator utilization favorable compared to scheduled utilization (efficiency resulting from dispatching activity)?
- . What operational control and in-service management of incidents and accidents is performed?
- . How timely are responses to service interruptions?
- . What procedures are followed to ensure passenger safety?

Safety and Training

The Safety and Training functional area involves those activities as concerned with providing a safe environment for transit operations as well as those that address the impact of accidents and incidents in transit operations.

Safety Management

Safety Management is concerned with all aspects of safety within the transit property including both prevention of vehicle accidents and passenger security from crime, but the principal emphasis is on safety of vehicle operations in revenue service. Specific activities that are addressed include:

- . Identifying hazards, and loss-producing potential of a given operation.
- . Reviewing reports of fatalities, injuries, and property damage.
- . Providing feedback information concerning the effectiveness of control measures.
- . Compiling and analyzing relevant safety-related information and developing appropriate safety policies and procedures.
- . Coordinating with Training and other functional areas to effect implementation of safety policies and procedures.

To evaluate the performance of Safety Management activities, it is necessary to determine what management actions were taken to: (a) identify accident and loss-producing situations, and (b) develop, communicate, and measure the safety policies and programs.

Training Management

The Training Management activities addressed here focus on the training of revenue vehicle operators. Other aspects of the property's training programs are addressed within the section on Personnel Management. Specific activities that are addressed here include:

- . Conducting training in revenue vehicle operations for newly assigned vehicle operators.
- . Conducting additional refresher training of vehicle operators.
- . Monitoring effectiveness of training programs through coordination with other departments to evaluate:
 - accident rates,
 - operator effects on vehicle maintenance requirements, and
 - types of accidents and associated loss expenses.

To evaluate the performance of Training Management activities, consider the actions taken to: (a) ensure that a comprehensive training program was being conducted, (b) monitor the effectiveness of the training program, and (c) tailor the training program to meet current and changing needs.

Key Questions

In summary, the key questions or issues associated with the Safety and Training subfunction are the following:

- . Are traffic accident and prevention analysis conducted on a continual basis in a thorough and efficient manner?
- . Is an on-vehicle or facility crime analysis and prevention activity conducted on a continual basis in a thorough and efficient manner?
- . Do operations personnel receive training and retraining in transit operations to improve overall operator performance including accident prevention and passenger security?

REVENUE VEHICLE MAINTENANCE

A key functional area in a transit system is maintenance of the revenue vehicle fleet. A "revenue vehicle" is a piece of equipment used to carry passengers. It is also commonly referred to as "rolling stock" or, in the case of ferry systems, "floating stock".

Revenue Vehicle Maintenance activities are concerned with providing reliable, safe, comfortable and attractive transportation vehicles at a reasonable cost. Specific Revenue Vehicle Maintenance activities include: (a) repairing service breakdowns on an emergency basis; (b) conducting a preventive maintenance program; and (c) maintaining cost and service records for vehicles.

To monitoring Revenue Vehicle Maintenance, management may consider both quantifiable and qualitative factors. Quantifiable factors include revenue vehicle breakdown frequency and revenue vehicle maintenance costs. Qualitative factors include attractiveness and cleanliness of the vehicle fleet.

Revenue Vehicle Maintenance activities are discussed below in relation to:

- . Vehicle Effectiveness;
- . Maintenance Activity Effectiveness; and
- . Maintenance Activity Efficiency.

Vehicle Effectiveness

Vehicle effectiveness is concerned with vehicle availability, mechanical reliability, and other similar issues related to the optimal use of vehicles.

Key Questions

The key questions in vehicle effectiveness are:

- . Are vehicles available to perform scheduled and unscheduled service?
- . What is the approach to mechanical reliability problems leading to service interruptions?
- . What is the approach toward achieving levels of service quality as determined by cleanliness, attractiveness and comfort of the vehicle fleet?
- . Is there a balance planned and unplanned maintenance activity and peak service vehicle requirements with minimizing overall fleet size?

Maintenance Activity Effectiveness

Maintenance activity effectiveness is primarily related to providing mechanically reliable rolling stock for use by transportation operations personnel in providing service. This requires that sufficient vehicles be in good operating repair to meet the scheduled requirements and that inservice mechanical failures be limited to an acceptable low level. Included in this subfunction is the servicing and cleaning of vehicles. The basic management approach used by maintenance management consists of a balance between scheduled maintenance and inspections related to an overall preventive maintenance program and unscheduled maintenance as a result of inservice failures.

Key Questions

The key questions or issues in maintenance activity effectiveness include the following:

- . How are vehicle preventive maintenance and inspection programs developed, modified, implemented and evaluated?
- . What is the approach toward quality control of maintenance work?
- . What procedures exist for energy consumption monitoring and evaluation?
- . Do maintenance personnel receive initial training, periodic retraining and remedial training?
- . Are job descriptions adequate?
- . What maintenance program exists for fare collection equipment and radio communications equipment?

Maintenance Activity Efficiency

Maintenance activity efficiency is concerned with the costs and effective utilization of manpower in carrying out planned maintenance as prescribed in a preventive maintenance program and unplanned maintenance resulting from inservice vehicle failures.

Key Questions

The key questions or issues in maintenance activity efficiency include the following:

- . How are vehicles scheduled for normal preventive and unscheduled maintenance?
- . How are maintenance personnel assigned to perform scheduled and unscheduled maintenance and servicing activity?

- . What is the organization of maintenance personnel and maintenance activity into areas of specialization and how does it function?
- . How is repair/maintenance documentation accomplished? Does it include activity job times and costs, vehicle history logs for reference, analysis of preventive maintenance program costs and effectiveness (reliability and availability)?
- . How is coordination with parts inventory and purchasing activity accomplished particularly with respect to parts availability?

GENERAL MAINTENANCE

Ensuring that revenue vehicles are available for service and reliable in operation are key activities in a transit agency. Equally important is the maintenance associated with the physical facilities of the organization other than rolling stock. These include the stations or stops that the vehicle use. Maintenance is also required of the buildings, grounds and equipment used in the daily operation of the transit system as well as for non-revenue vehicles used by management, supervisory and maintenance staff.

The major focus of general maintenance is to provide reliable transit service and auxiliary support services at a reasonable cost. Specific general maintenance activities include: (a) repairing and maintaining transit property (buildings, maintenance and servicing areas); and (b) repairing and providing preventive maintenance to service vehicles. Each of the activities requires organization, management and close supervision over the quality and quantity of maintenance activities to accomplish the objectives of maintaining reliable equipment at the least cost.

The General Maintenance function has been divided into three sub-functions for the transit systems which do not provide fixed rail service. These are:

- . Station/Stop Maintenance;
- . Buildings, Grounds, and Equipment Maintenance; and
- . Non-Revenue Vehicles Maintenance.

Each of these is described in more detail below.

Station/Stop Maintenance

This subfunction relates to the effectiveness of transit maintenance and improvement programs for terminal facilities ranging from bus stops to major transfer terminals. Of particular importance are the preventive maintenance or inspection programs associated with these types of facilities and the efficiency with which they are serviced or cleaned and maintained.

The effectiveness of manpower used in these activities is important not only from the viewpoint of minimizing labor hours to complete tasks but also from the viewpoint of effectiveness in completing service and maintenance tasks.

Key Questions

With the above points in mind, the following summarize the major issues or questions associated with guideway and station/stop maintenance:

- . Are standards, plans, programs, management monitoring, inspection and control activities developed and in operation for bus stops/shelters, and stations as appropriate for the modes operated?
- . Are preventive maintenance and inspection programs periodically updated to reflect changing performance standards (reliability, quality of service, etc.), experience with existing program and economic/cost factors. Are revisions formally published in procedural guides?
- . Does coordination of maintenance programs with replacement/modification activities take place?
- . Is scheduling of manpower and equipment to perform planned and unplanned maintenance, inspection and repair activity performed to make maximum use of available resources?

Building Grounds and Equipment Maintenance

This subfunction is the performance of general maintenance for the transit agency's physical assets not directly involved in providing transit service. Maintenance of administrative buildings, shops and maintenance areas and the upkeep of land owned or leased by the agency is included in this category.

Key Questions

The major questions or issues associated with this subfunction are listed below:

- . Are performance targets, plans, programs, management monitoring, inspection and control activities developed and in operation to maintain buildings and equipment (e.g., hoists, lathes, painting facilities)?
- . Do procedural and policy manuals provide work rules and guidance to prevent industrial accidents?
- . Is compliance with applicable safety and environmental regulations (OSHA, fire prevention, insurance standards, etc.) maintained?

- . Is there a periodic review the adequacy of buildings and equipment in terms of location and function given changes in the quality, type and location of transit service currently provided and planned for the future?
- . How is scheduling of manpower performed to maximize resources used for periodic inspection, preventive maintenance and repair?

Non-Revenue Vehicle Maintenance

This subfunction relates to the maintenance of all non-revenue vehicles such as passenger automobiles for management and on-line supervisors and maintenance vehicles such as tow trucks.

Key Questions

The key questions or issues of this subfunctional area include:

- . Is a preventive maintenance program developed and executed for non-revenue vehicles?
- . Is scheduling of non-revenue vehicle maintenance and unscheduled repair activities coordinated and performed at minimum cost?

PLANNING AND MARKETING

This function is one of the most crucial for a transit agency. In this function are included most of the major policy decisions regarding the provision of transit service. Included, for example, are the decision-making processes associated with the selection of the quantity of transit service to be provided and where it will be provided, the development of detailed schedules, the development of budgets, the development of planning reports and documents for regional review and specification of future directions, the development of fare policy and the analysis of market response to service and development of improvement alternatives.

To assist in focusing on the specific aspects of Planning and Marketing, the functional area has been divided into five subfunctions:

- 4.1 . Service Planning and Market Analysis;
- 4.2 . Fare Policy;
- 4.3 . Scheduling;
- 4.4 . Public Relations and Advertising; and
- 4.5 . Budgeting and Financial Planning.

Each are discussed below.

Service Planning and Market Analysis

The Service Planning functional area includes activities such as intermediate range planning, scheduling, and routing. Intermediate range planning addresses those activities that normally would be included in a five-year operating and capital improvement plan.

The purposes of Service Planning are: (a) to improve the effectiveness of transit services provided to the public consistent with other community goals and values; and (b) to comply with Regional, State and Federal regulations and policies that apply to local transit system plans. The effectiveness of transit services relates to meeting the community's mobility needs and providing a viable alternative to transportation by the private automobile. Complying with regulations means working toward those adopted Regional Transportation Plan goals, objectives, and policies.

Management may consider certain basic Service Planning factors in order to: (a) identify and evaluate transportation planning alternatives; (b) estimate transit ridership; and (c) "size" the transit system in terms of the work force, transit vehicles, and facilities requirements. Different Service Planning factors are appropriate for different modes of service. For example:

- . In a fixed-route transit system, the basic factors include existing and planned vehicle routes and schedules; and
- . In a dial-a-ride demand responsive system, the basic factors include the number of vehicles in service at a given time, dispatching rules, and response time performance.

Key Questions

The focal point of management's effectiveness and efficiency in the service planning and marketing area can be summarized by the following questions.

- . Have goals, objectives, evaluative criteria and performance targets been provided as part of the planning process?
- . Have service performance targets been updated during budget process for use in policy guidance to determine where service should be added or withdrawn?
- . Has transit service been monitored and modified on a detailed ongoing basis to improve performance?

- . Are periodic market analysis and planning studies performed to evaluate new transit markets, revise service "targets", develop alternative plans (including new modes and/or innovative service alternatives such as forms of paratransit) and budgets to meet new "targets" and develop appropriate fare policies and financial plans. Are these analyses and plans published for policy review and decision-making?
- . Has the programming of transit improvements to achieve plans been performed as part of the planning effort in a manner consistent with local goals and objectives?
- . Are the transit systems perspectives included in local and regional transportation studies that impact transit's service and future?

Fare Policy

The Fare Policy subfunctional area includes those activities which are concerned with analyzing fare alternatives, making fare decisions, and implementing fare policies. These activities involve both operating management's tasks and accomplishments and the policy board's evaluations, decisions, and policies.

The purpose of Fare Policy activities is to assure that adequate patronage revenues are generated in consonance with regional transportation goals and objectives. It is generally accepted that the overall fare levels (a) should not place an unreasonable burden on the taxpayers for subsidy support; (b) should not create hardship for low income citizens who are dependent on transit for mobility; (c) should increase the viability of transit as an alternative to the private auto; and (d) should increase to keep pace with inflationary trends.

To evaluate the effectiveness of Fare Policy activities, it is necessary to consider management's and the policy board's actions with respect to consistency of fare policies with regional plans and the adequacy of fare alternative analyses.

Fare Policy is an integral part of the Planning and Marketing function and, as such needs, to be viewed in light of all the areas comprising this functional area. In particular, the review of Fare Structure Management and Marketing and Public Relations should be conducted concurrently in order that the auditor maximizes his efforts to cover these related areas.

Key Questions

The basic issues or questions regarding Fare Policy can be summarized by the following questions:

- . Has a Fare Policy been formally adopted by policy board based on financial and socio-economic considerations that support the goals and objectives of the transit agency?

- . Is Fare Policy reviewed and updated as part of periodic market analysis and planning studies reported in the five-year plan?

Scheduling

The Scheduling subfunction consists of the translation of route definitions and headway specifications into detailed descriptions of transit activity. It includes the description of the exact schedule for each run performed by a vehicle along a route for each day of the week. In developing the schedule, the schedule department attempts to meet the required service levels for each route within the constraints of the number of vehicles available, the number of operators available, and the work rule provisions established by labor contract. Service levels are usually specified by route structure, periods of operation, policy level headways (time spans between buses), and policies with respect to peak loading conditions (usually expressed as load factor, the number of riders divided by the seated vehicle capacity, or a similar index of congestion). The scheduler must therefore develop sets of runs to be performed by single vehicles and then assign vehicle operators to these vehicles in such a manner that work rules are not violated and overtime or premium payments are minimized consistent with the overall objective of cost minimization. Included in the schedule process is the development of extra operator requirements to serve as replacements for normally scheduled operators who do not perform their normally assigned runs.

The schedule process also includes, for purposes of this subfunction, the periodic sign-up of vehicle operators to available runs. Their activity for bus operations is typically known as "pick" or "shake-up". The actual day-to-day dispatching or assignment of extra operators to runs that become vacant due to absences or tardiness is included under the transportation operations function and Service Delivery subfunction.

Key Questions

The key questions to be determined in an evaluation of transit scheduling include:

- . Is schedule-making frequent and timely as well as coordinated with service planning and transportation monitoring and control?
- . Are costs minimized within constraints of labor contracts, service requirements and fleet characteristics; i.e., is labor productivity maximized?
- . Are resources and manpower required to develop new schedules in timely, accurate manner efficiently used?
- . Is schedule-making coordinated with public information, dispatching and operations supervision?

Public Relations and Advertising

The Public Relations and Advertising subfunctional area involves those management activities for promoting the use of public transit services. Specific activities include: (a) advertising the advantages of public transit; (b) coordinating services with large volume users such as schools, large employers, and the central business district; and (c) publishing and distributing schedules of available services.

Effective Public Relations and Advertising requires that management act as an effective communicator to the public in terms of describing the service that is available to potential users, communicating an image to the public at large regarding the role of transit in the community, and reaching "target" or new transit markets as the advertising extension of a market analysis and plan. Effective public relations and advertising also requires that transit management function as an able listener to the complaints and perspectives of the interested public.

There is a close connection between advertising and marketing. The distinction drawn here is that marketing includes the analysis and evaluation of current patronage patterns and the patronage response to service changes, fare levels and changes in completing mode service attributes. From the market analysis, a marketing plan is developed that describes the target markets or market segments to be reached with new or revised service and a communication program. The communication program is designed to inform the public and, in particular, the markets identified in the market analysis process about the service that is available and its advantages.

Public Relations and Advertising activities assist in achieving efficient operations, effective service, and coordination among transportation operators by:

- . Acting upon service complaints promptly, and adequately analyzing service complaint trends.
- . Effectively communicating information about available services and fares to the public.
- . Effectively communicating service changes to specific market segments.
- . Enhancing the image of transit in the community at large through educational and general information advertising.

Key Questions

The following key questions summarize the basic issues involved in the evaluation of the Public Relations and Advertising subfunction:

- . Is the service complaint process developed and implemented such that it is capable of improving service/vehicle operator performance?
- . Are public information systems completely developed producing schedules, route maps and telephone responses to queries?
- . Are communication of new and existing services to market segments pursued in response to changes in service or market or both?
- . Is communication of public image messages to total or selected markets performed?
- . Is communications program effectiveness evaluated to determine cost-effectiveness of investment?

Budgeting and Financial Planning

The Budgeting and Financial Planning activities involve the estimation of the operator's personnel, equipment and facilities, and money needs over the near term. Budgets usually cover a specific fiscal year and the annual budgets are the basis on which allocation of public funds are made.

Financial Planning is a process which embodies the consideration of related financial factors to the extent that a forecast of cash needs is developed for a future period of about five years. As a management process, many of the characteristics of the financial planning process are similar to those of the Budgeting process.

Key Questions

The key questions for evaluating performance in the Planning and Marketing functional area are:

- . Is the budget prepared consistent with adopted goals and objectives and with service plans designed to meet service standards?
- . Does the budget process include development of departmental objectives, measurement criteria and standards in support of one or more basic service plans?

- . Is the budget prepared in sufficient time for full required review and interaction if required?
- . Are long-range financial needs defined during budget process and alternatives reviewed?
- . Are long-range financial needs included in the service planning, service standards and fare policy planning processes?
- . Are long-range financing sources defined and pursued to achieve transit development plans?

General Administration

General Administration includes the support activities within the transit system which are necessary for both the operation and management of the system. While these activities may have only an indirect effect on transit operations, they do contribute to the overall efficiency and effectiveness of transit system operations.

To assist in the managing and evaluating of General Administration, the functional area has been subdivided into five subfunctions. These are:

- . Purchasing;
- . Inventory Management;
- . Risk Management and Insurance;
- . Personnel Management and Labor Relations; and
- . Management Reporting and Administrative Services.

Each of the following sections describes the five components of the general administration function in more detail, and presents the key questions that should be considered by transit management.

Purchasing

The Purchasing subfunction includes those activities, systems, procedures, and decisions involved in the acquisition of equipment, parts and supplies required for the operation of the transit system.

To evaluate performance in this area, it is necessary to determine what management actions have been taken to implement an effective Purchasing program.

Key Questions

The following key questions or issues are the central considerations in evaluating the purchasing function:

- . Is an established purchasing process developed and in place that is safeguarded from improper conduct and abuse?

- . Is competitive bidding vs. sole source procurement policy economically determined?
- . Is inspection of received goods performed for quality assurance and accuracy of invoicing?
- . Are technical specifications prepared at the appropriate level of detail to accommodate competitive bidding and user requirements?
- . Does central purchasing coordinate with other departments or transit agencies to improve economy through large orders?
- . Is the purchasing process coordinated with inventory management through analysis of usage rates and purchase process time to determine order points and appropriate inventory levels?
- . Are qualified bidders lists and histories maintained for competitive bidding?
- . Is purchasing linked to the inventory management process to expedite the acquisition process.

Inventory Management

This subfunction relates to the systems and procedures utilized to manage the operator's inventory of materials and supplies.

Key Questions

The key questions for this area include:

- . Does an inventory management system exist which will provide ready reports on inventory on hand by part, reorder points and quantities, consumption record, etc?
- . Are inventory requisitions and access controlled?
- . Does the inventory system accurately reflect quantities on hand?
- . Are inventory items statistics maintained such as inventory level policy, reorder points, economic order quantities, recent bidders and prices, usage rates, acquisition times, etc.

Risk Management

This subfunction is related to claims processing, accident investigation, and the use of insurance programs to manage the risk of the operator. Included in this subfunction are claims analysis and resulting cost and liability estimating, administration of a worker's compensation system and the analysis of insurance protection.

Key Questions

The following represents the key items to examine in a review of risk management and insurance.

- . Do claims processing procedures exist which provide for accident investigation, evaluation of cause, analysis of claims, development of settlement strategy, and legal processing?
- . Are accident investigations coordinated with vehicle operator training programs and disciplinary proceedings?
- . Is an analysis of alternative insurance programs including self-insurance and excess liability coverage for property damage and liability performed on a periodic basis for insurance/claims financial management?
- . Does a workers' compensation management system exist which provides for verification of accident/injury, administration of benefits, and vocational rehabilitation?
- . Is an analysis of self-insuring and other options performed for funding workers' compensation?
- . Are workers' compensation activity coordinated with payroll, operations and safety?

Personnel Management and Labor Relations

This subfunction includes the full range of human resources management from recruiting and hiring to counseling, training and evaluation. It also includes relations with labor unions including coordination and participation in contract negotiation and participation in day-to-day grievance proceedings, etc. More specifically, this subfunction includes:

- . planning, programming, and administering personnel related programs;
- . evaluating employment needs;
- . evaluating candidates;

- . training employees;
- . analyzing compensation levels;
- . evaluating employee performance;
- . coordination of contract negotiation with labor unions; and
- . mediation and ongoing liaison with unions in daily activities.

It should be noted that personnel costs represent the largest single component of a transit system's annual operating expenditures. Personnel, in addition, are the operator's most important resource.

Key Questions

The basic or key questions to be investigated in this subfunctional area include:

- . Do personnel policies exist for affirmative action; employee recruitment, evaluation and selection; job analysis and descriptions; employee evaluation, counseling, promotion, release?
- . Are personnel plans developed to meet hiring needs due to turnover and/or system expansion?
- . Are personnel data maintained and analyzed for identification of absenteeism trends, reported causes and related events?
- . Has a labor negotiations framework been established between policy boards and general manager?
- . Is a labor negotiations team and process defined to include analysis of current costs associated with pay rates, work rates and fringe benefit costs, the comparison of these costs with other transit agencies and with local wage scales and the planning and development of alternative work rate, payment and fringe benefit alternatives?
- . Are policy and procedures manuals developed for major categories of labor personnel (vehicle operators and maintenance) covering job activity, unallowed activity, disciplinary actions, disciplinary proceedings, grievance procedures, etc?

- . Are policies and procedures properly followed and consistently applied?
- . Are working conditions, equipment and lower level management conducive to productivity and good morale?
- . Do personnel evaluation procedures exist and are they followed as a basis for salary and promotion/demotion actions?

Management Reporting and Administrative Services

The Management Reporting and Administrative Services subfunction involves those activities which are concerned with providing management with the necessary information to plan, operate, and administer the transit organization.

Specific management reporting activities include:

- . incorporating in the management information system the capability to collect data on performance toward established goals;
- . accumulating data from various sources;
- . processing data for presentation in reports; and
- . preparing reports which show planned results and actual accomplishments.

Key Questions

The following are the central questions to be investigated in a review of management reporting and administrative services.

- . Does the management information system contribute to each level of management in terms of timely, accurate, appropriately detailed information required to support management action?
- . How effective is the reporting system in reporting to financing and coordinating agencies?
- . Has an analysis been performed of alternative automated or manual management reporting systems that would reduce costs at existing information output or increase useful information for the same or lower costs?

- . Are data processing applications current with needs and appropriate to hardware environment?
- . Are internal management information systems and external reporting requirements identified, compared to current capabilities, evaluated and included in development programs as appropriate?
- . How effective are the cash management and short-term investment programs (treasury function)?
- . Does security and control exist over fare collection process from fare box/fare card machine/ticket seller to bank?
- . Are internal financial controls (controllershship function) and audit process developed?

Management and Organization

The Management and Organization functional area includes those activities which are concerned with the organization, administration and operation of transit system management. The transit system can operate effectively, efficiently and economically only if it is organized and staffed so as to fulfill its plans, objectives and goals. While the management/organization activities may seem to have only an indirect effect on transit operations, management/organization are critical components upon which the ability to provide transit service is based.

The Management and Organization function is divided into two subfunctions which are described below:

- . Organization Effectiveness; and
- . Management/Decision-making Process

Organizational Effectiveness

Specific organizational effectiveness considerations include:

- . establishing the overall mission which focuses the goals and resulting transit system plans;
- . developing an organization structure which is conducive to and supportive of the transit systems mission, goals, and plans;
- . developing an effective staffing configuration which facilitates the accomplishment of the transit system's detailed action steps as well as its mission;
- . creating an evaluation process and monitoring procedures which allow for timely corrective actions or positive feedback to the appropriate employees/staff; and

- . defining and implementing a process of intra-organization, coordination and control to assure successful delivery of services, maintenance of programmed levels and continued achievement of the transit system's plans, goals and mission.

Key Questions

The key questions to be explored in a review of organizational effectiveness include:

- . Are lines of authority/responsibility reporting coincident, specified, direct and nonduplicative?
- . Is span of control complete and balanced with respect to number and complexity of activities?
- . Are qualifications of management personnel consistent with function and responsibility?
- . Are intra-agency coordination and communication activities defined and are these commensurate with information needs and economically provided?

Management Decision Making Process

In addition to having an effective organization structure, the management process must be developed so that the roles of the policy board and the staff are properly defined and fulfilled. This involves clear demarcation between the roles of policy-making and execution of policy, the effective communication of policy, and the translation of broad policies into specific objectives and plans. This subfunction is also concerned with the placement of decision-making responsibilities at the appropriate management level.

Decision-making encompasses the activities associated with problem-solving by the governing board, top management, and middle management. To assess the decision-making mechanisms and techniques, management must examine the types of decisions made and must review the procedures used to reach the decisions. Evaluation of decision-making in the following area should be considered:

- . established procedures;
- . problem-solving; and
- . management responsibility.

Key Questions

- . Is policy development and execution clearly demarcated between policy board and general manager?
- . Are policy development and plans of agency communicated and coordinated with local, regional and Federal governmental agencies?

- . Are goals and objectives set by policy boards and translated into organizational and suborganizational objectives, performance measures, targets and plans?
- . Are performance expectations and plans integrated into budgeting and financial planning processes at organizational and suborganizational levels?
- . Is decision-making performed at the correct organizational level?
- . Is there a demonstrated ability to efficiently identify and solve nonroutine problems at the appropriate management level?

Appendix B

APPENDIX B

**REVIEW OF UMTA SECTIONS 15 DATA STRENGTHS AND LIMITATIONS FOR USE BY TRANSIT MANAGERS
IN SELF-EVALUATION AND MONITORING AND DEFINITIONS OF PERFORMANCE INDICATORS
DEVELOPED USING UMTA SECTION 15 AND UPTRAN ANNUAL AND
OPERATING ASSISTANCE REPORT DATA**

APPENDIX B

This appendix includes two sections. The first section reviews the strengths and limitations of Section 15 data for use by transit managers in self evaluation and monitoring. The second part includes definitions of a set of indicators that can be developed using data included in the required level Section 15-report and UPTRAN's annual operating assistance report.

SECTION 15 DATA: ITS STRENGTHS AND LIMITATIONS

This section discusses the strengths or benefits of Section 15 data for use in self evaluation and monitoring in terms of "what it offers the transit manager." The limitations of the data base are then discussed, focusing on the level of detail and the scope of the Section 15 reports.

Section 15 Data: What it Offers the Transit Manager

Partially in support of transit system data needs requirements, Section 15 of the Urban Mass Transportation Act of 1964, as amended, required that the Secretary of the U.S. Department of Transportation develop, test, and prescribe a public mass transportation reporting system and a uniform system of accounts and records. Eligibility for UMTA Section 5 operating assistance has been contingent upon satisfaction of Section 15 reporting requirements since July 1, 1978. Among other things, this reporting system is designed to generate much of the information needed to monitor and evaluate overall transit system performance.

Section 15 data can be an important source of information for the transit manager. The data is developed for the transit system's fiscal year and includes, at the required (that is, most simple) level of reporting:

- balance sheet summary;
- sources of capital assistance for the total transit system;
- sources of operating revenue and subsidy including fare and nonfare revenue, and local, state, and federal assistance by source for the total transit system;
- operating expenses for the total transit system by function and object class and by mode operated for multimodal transit systems;
- breakdown of operator hours and wages for both operating and non-operating time for each mode operated;
- fringe benefit and pension summary by expense category and plan for the total transit system;
- daily hours of service provided for each mode operated;

- categories of road calls, accidents, fuel consumption, and employee count for each mode operated;
- service supplied, service consumed, and service personnel on an average weekday, Saturday, and Sunday for each mode operated; and
- revenue vehicle inventory description at year end for the total transit system.

The Section 15 data base serves as a consistent source of information both over time and across transit systems. Therefore, it can be useful to the transit manager in conducting time series analysis and peer comparisons. In the past, efforts to monitor and evaluate transit performance were impacted by the lack of consistent information. Few transit systems used the same data definitions and definitions often changed over time within given transit systems. The Section 15 data base is intended to overcome these barriers.

Section 15 Data: Its Limitation for Transit System Evaluation and Monitoring

Section 15 data will not meet all of the data needs for monitoring and evaluating a transit system. The shortcomings of the Section 15 data base for the transit manager include:

- the data are not sufficiently detailed in some areas; and
- not all data are included.

As stated above, Section 15 data is reported for an entire year, or average (typical) weekday for each transit mode operated. Transit managers often need more frequent and detailed information. An important example is in the area of service consumed; transit route level data is more useful to service monitoring and evaluation than system-wide data.

Section 15 data must be supplemented by the transit system in some areas because data are not sufficiently detailed or are missing as in the following:

- labor utilization and staffing for specific transit system activities, particularly in the maintenance and administrative functions;
- inventory control;
- maintenance effectiveness;
- attendance/absenteeism; and
- marketing activities and effectiveness.

Section 15 data can be viewed by a transit manager as a useful source of information for providing an overview of system performance. More detailed monitoring and evaluation requires additional data.

DEFINITION OF PRIMARY EFFICIENCY INDICATORS-
RELEVANCE FOR PERFORMANCE EVALUATION

INDICATOR	STATISTIC ANNUAL; SYSTEM WIDE	RELEVANCE
*Vehicle Operations Labor Expense Per Vehicle Mile ^{1/}	<u>Total Vehicle Operations Labor Expense</u> Total Vehicle Miles ^{1/}	Represents the salaries, wages and fringe benefits paid to operators, supervisors, and support personnel in the vehicle operations function for each transit vehicle mile operated.
*Maintenance Labor Expense Per Vehicle Mile	<u>Total Maintenance Labor Expense</u> Total Vehicle Miles	Represents the salaries, wages and fringe benefits paid to revenue and non-revenue vehicle mechanics, maintenance support and servicing personnel, and maintenance supervisory personnel for each transit vehicle mile operated.
*Administrative Labor Expense Per Vehicle Mile	<u>Total Administrative Labor Expense</u> Total Vehicle Miles	Represents the salaries, wages and fringe benefits paid to all transit authority employees performing general administration activities (including functions 145-181 identified in Section 15 Uniform System of Accounts and Records) for each transit vehicle mile operated.
*Materials and Supplies Expense Per Vehicle Mile	<u>Total Materials and Supplies Expense</u> Total Vehicle Miles	Represents the expense for all materials and supplies including fuel and lubricants, tires and tubes and other materials and supplies for each transit vehicle mile operated.
*Casualty and Liability Expense Per Vehicle Mile	<u>Total Casualty and Liability Expense</u> Total Vehicle Miles	Represents the expense for transit system insurance program costs, compensation of others for their losses from actions for which the transit system is liable and recognition of corporate losses for each transit vehicle mile operated.
*Other Expense Per Vehicle Mile	<u>Total Other Expense</u> Total Vehicle Miles	Represents the expense for services, utilities, taxes, purchased transportation for each vehicle mile operated.

^{1/} Unless otherwise stated, this indicator and static refers to total vehicle miles including both revenue and non-revenue vehicle miles

*Indicators that can be developed using data from the UPTRAN annual operating assistance report.

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INDICATOR	STATISTIC ANNUAL; SYSTEMWIDE	RELEVANCE
Operator Salaries and Wages Per Operator Hour	$\frac{\text{Total Operator Salaries and Wages}}{\text{Total Operator Pay Hours}}$	Represents the <u>average operator salary and wage</u> . Operator salaries and wages include scheduled and non-scheduled overtime premium hours, but do not include fringe benefits. This indicator is a major factor in explaining the cost of transit vehicle operations.
*Vehicle Operations Salaries and Wages Per Operator Salaries and Wages	$\frac{\text{Total Vehicle Operations Salaries and Wages}}{\text{Total Operator Salaries and Wages}}$	Represents the <u>supervisory and support burden</u> . Total vehicle operations salaries and wages includes vehicle operators, management and support labor. This indicator represents the relative labor costs in the vehicle operation function for operators and all other personnel. It is preferable for this indicator to have a value close to 1 which indicates that most of the labor expense in the vehicle operations function is for the operators, i.e., the employees who provide the transit service.
*Vehicle Operations Labor Expense Per Total Vehicle Operations Salaries and Wages	$\frac{\text{Total Vehicle Operations Labor Expense}}{\text{Total Vehicle Operations Salaries and Wages}}$	Represents the <u>fringe benefit multiplier</u> . This indicator identifies the relative amount of labor costs that are fringe benefits. This is an important factor in explaining total vehicle operations labor expense. The value of this indicator is generally determined by a labor agreement.
*Miles Per Hour	$\frac{\text{Total Vehicle Miles}}{\text{Total Vehicle Hours}}$	Represents <u>average vehicle speed</u> . This indicator is a substitute for the indicator (total platform hours/total vehicle miles) which is a somewhat more useful measure of average vehicle speed since it measures speed during revenue service. This substitute indicator need be developed only if data are unavailable for the speed multiplier.
Hours Per Operator	$\frac{\text{Total Vehicle Hours}}{\text{Total Number of Revenue Vehicle Operators}}$	Provides a measure of <u>operator productivity</u> . This indicator is a substitute for the indicator (total operator pay hours/total platform hours) which is a more precise measure of operator productivity. This substitute indicator need be developed only if data are unavailable for the more precise indicator.
Salary and Wage Per Operator	$\frac{\text{Total Operator Salaries and Wages}}{\text{Total Number of Revenue Vehicle Operators}}$	Represents <u>average operator wage</u> . This indicator is a substitute for the indicator (total operator salaries and wages/total operator pay hours) which measures average operator wage per hour. This substitute indicator need be developed only if data are unavailable for the indicator for average hourly wage.

*Indicators that can be developed using data from the UPTAN annual operating assistance report.

**COMPONENTS OF MAJOR EFFICIENCY INDICATORS:
MAINTENANCE LABOR EXPENSE PER VEHICLE MILE**

INDICATOR	STATISTIC ANNUAL; SYSTEM WIDE	RELEVANCE
Mechanics and Servicing Personnel Per Vehicle Mile ^{1/}	$\frac{\text{Total Vehicle Miles}^{1/}}{\text{Total Number of Mechanics and Servicing Employees}}$	This indicator reflects <u>labor productivity</u> in the maintenance function. The indicator identifies the relation between vehicle utilization (as traveled) and number of vehicle and non-vehicle mechanics and servicing personnel.
Active Vehicles Per Vehicle Mile	$\frac{\text{Total Vehicle Miles}}{\text{Total Number of Active Vehicles}}$	Represents <u>vehicle utilization</u> , in terms of miles per active vehicle. The <u>active bus fleet</u> includes spares. High vehicle utilization is preferable.
Mechanics Per Active Vehicle	$\frac{\text{Total Number of Mechanics and Servicing Employees}}{\text{Total Number of Active Vehicles}}$	This indicator reflects <u>labor productivity</u> in the maintenance function. The indicator identifies the relation between the number of revenue vehicles in active service (including spares) and the number of vehicle and non-vehicle mechanics and vehicle servicing personnel. It is preferable for this indicator to have a value closer to 0 than to 1.
Total Maintenance Employees Per Mechanic and Servicing Personnel	$\frac{\text{Total Number of Maintenance Employees}}{\text{Total Number of Mechanics and Servicing Employees}}$	Represents <u>supervisory and support burden</u> . This indicator reflects the relation between the number of employees in the maintenance function who work on vehicle and non-vehicle maintenance and those who work in a supervisory or support capacity. It is preferable for this indicator to have a value close to 1 which indicates that most of the employees in the maintenance function provide maintenance services.
Maintenance Salaries and Wages Per Maintenance Employee	$\frac{\text{Total Maintenance Salaries and Wages}}{\text{Total Number of Maintenance Employees}}$	Represents the <u>average salary and wage</u> not including fringe benefits maintenance employees including supervisors, support, mechanics, and servicing personnel. This indicator is a major factor in explaining transit maintenance and expense.
*Maintenance Labor Expense Per Maintenance Salaries and Wages	$\frac{\text{Total Maintenance Labor Expense}}{\text{Total Maintenance Salaries and Wages}}$	Represents the <u>fringe benefit multiplier</u> . This indicator identifies the relative amount of labor expense that is made up of fringe benefits. This is an important factor in explaining total maintenance labor expense. The value of this indicator is generally determined by a labor agreement.

^{1/} Unless otherwise stated, this indicator and statistic refers to total vehicle miles including both revenue and non-revenue vehicle miles.

*Indicators that can be developed using data from the UPTRAN annual operating assistance report.

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COMPONENTS OF MAJOR EFFICIENCY INDICATORS:
ADMINISTRATIVE LABOR EXPENSE PER VEHICLE MILE

INDICATOR	STATISTIC ANNUAL; SYSTEM WIDE	RELEVANCE
Administrative Employees Per Vehicle Mile ^{1/}	$\frac{\text{Total Vehicle Miles}^{1/}}{\text{Total Number of Administrative Employees}}$	This indicator measures labor productivity within the administrative function. It reflects the number of administrative employees ^{2/} relative to the amount of transit service provided.
Administrative Salaries and Wages Per Administrative Employee	$\frac{\text{Total Administrative Salaries and Wages}}{\text{Total Number of Administrative Employees}}$	Represents the <u>average wage</u> (not including fringe benefits) of all administrative employees. ^{2/} This indicator is a major factor in explaining administrative expense.
*Total Administrative Labor Expense Per Administrative Salaries and Wages	$\frac{\text{Total Administrative Labor Expenses}}{\text{Total Administrative Salaries and Wages}}$	Represents the <u>fringe benefit multiplier</u> . This indicator reflects the relative proportion of labor expense that is made up of fringe benefits. This is an important factor in explaining total administrative expense.

^{1/} Unless otherwise stated, this indicator and statistic refer to total vehicle miles including revenue and non-revenue vehicle miles.

^{2/} Includes employees working in functions 145-181 identified in Section 15 Uniform System of Accounts and Records.

*Indicators that can be developed using data from the UPTRAN annual operating assistance report.

COMPONENTS OF MAJOR EFFICIENCY INDICATORS:
MATERIALS AND SUPPLIES EXPENSE PER VEHICLE MILE

INDICATOR	STATISTIC ANNUAL; SYSTEM WIDE	RELEVANCE
*Fuel and Lubricant Expense Per Vehicle Mile ^{1/}	<u>Total Fuel and Lubricant Expense</u> Total Vehicle Miles ^{1/}	Represents the <u>expense for fuel</u> (gasoline and diesel) and <u>oil</u> consume in vehicle operations, and revenue vehicle and non-vehicle maintenanc for each for each transit vehicle mile operated.
Average Miles Per Gallon of Fuel	<u>Total Vehicle Miles</u> Total Gallons of Fuel	This indicator reflects <u>fuel efficiency</u> or the <u>average fuel consumpti</u> rate. Gallons of fuel include both diesel and gasoline. This is an important factor in explaining fuel expense. It is influenced largely by vehicle size and to some extent by vehicle maintenance.
Fuel and Lubricant Expense Per Gallon of Fuel ^{2/}	<u>Total Fuel and Lubricant Expense^{2/}</u> Total Gallons of Fuel	Represents the <u>average cost of fuel</u> . ^{2/} This is an important factor wh may serve to explain changes in the expense for fuel over time.
*Tires and Tubes Expense Per Vehicle Mile	<u>Total Tires and Tubes Expense</u> Total Vehicle Miles	Represents the <u>average expense for tires and tubes</u> used by vehicle operations, and vehicle maintenance for each transit vehicle mile operated. It is preferable for the value of this indicator to be close to 0.
*Other Materials and Supplies Expense Per Vehicle Mile	Total Other <u>Materials and Supplies Expense</u> Total Vehicle Miles	Represents the <u>average expense for other materials and supplies</u> in relation to service provided. It is preferable for the value of this indicator to be close to 0.

^{1/} Unless otherwise stated, this indicator and statistic refer to total vehicle miles including revenue and non-revenue vehicle miles.

^{2/} Lubricants are included as part of the expense because Section 15 report on expenses combines fuel and lubricants. Therefore, this indicator will overestimate the cost of fuel.

*Indicators that can be developed using data from the UPTRAN annual operating assistance report.

**COMPONENTS OF MAJOR EFFICIENCY INDICATORS:
CASUALTY AND LIABILITY EXPENSE PER VEHICLE MILE**

INDICATOR	STATISTIC ANNUAL; SYSTEM WIDE	RELEVANCE
Miles between Accidents	$\frac{\text{Total Vehicle Miles}}{\text{Total Number of Accidents}}$	Represents the <u>safety record</u> or <u>accident rate</u> in relation to vehicle miles operated. Accidents include collision, non-collision and station accidents.
Casualty and Liability Expense (\$100,000) Per Accident	$\frac{\text{Total Casualty and Liability Expense } (\$100,000)}{\text{Total Number of Accidents}}$	Represents the <u>average cost for insurance and claims</u> (expressed in (\$100,000) for each accident. It is preferable for the value of this indicator to be low.

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*Indicators that can be developed using data from the UPTRAN annual operating assistance report.

DEFINITION OF SUPPLEMENTAL EFFICIENCY INDICATORS-
RELEVANCE FOR PERFORMANCE EVALUATION

INDICATOR	STATISTIC ANNUAL; SYSTEM WIDE	RELEVANCE
Total Operating Expense Per Vehicle Mile	$\frac{\text{Total Operating Expense}}{\text{Total Vehicle Miles}}$	Represents the total operating expense of a transit system for each vehicle mile operated. It is the sum of the expenses in each functional area of transit operations.
Vehicle Operations Expense Per Vehicle Mile	$\frac{\text{Total Vehicle Operations Expense}}{\text{Total Vehicle Miles}}$	Represents the expense per transit vehicle mile attributable to the vehicle operations function of a transit system. This should be the function with the greatest expenses.
Vehicle and Non-Vehicle Maintenance Expense Per Vehicle Mile	$\frac{\text{Total Vehicle andNon-Vehicle Maintenance Expense}}{\text{Total Vehicle Miles}}$	Represents the expense per transit vehicle mile attributable to vehicle and non-vehicle maintenance function activities of a transit system.
General Administration Expense Per Vehicle Mile	$\frac{\text{Total General Administration Expense}}{\text{Total Vehicle Miles}}$	Represents the expense per transit vehicle mile attributable to general administration function activities of a transit system.

B.9

*Indicators that can be developed using data from the UPTRAN annual operating assistance report.

DEFINITION OF EFFECTIVENESS INDICATORS-
RELEVANCE FOR PERFORMANCE EVALUATION

INDICATOR	STATISTIC -ANNUAL; SYSTEM WIDE	RELEVANCE
*Passengers Per Vehicle Mile	$\frac{\text{Total Passengers}}{\text{Total Vehicle Miles}}$	Represents <u>overall system effectiveness</u> , measured by passenger trips per vehicle mile traveled. It is preferable for this indicator to have a high rather than a low value.
Revenue Capacity Miles Per Vehicle Mile	$\frac{\text{Total Revenue Capacity Miles}}{\text{Total Vehicle Miles}}$	Represents approximate average vehicle size, which is measured by seating plus standing capacity of the active fleet for revenue miles (excluding charter and school bus miles) for each vehicle mile operated. This indicator can assist in explaining the magnitude of other indicators effected by vehicle size.
Passenger Miles Per Revenue Capacity Mile	$\frac{\text{Total Passenger Miles}}{\text{Total Revenue Capacity Miles}}$	Represents the <u>average load factor</u> , which is the utilization of seating plus standing capacity of the active fleet for each revenue mile (excluding charter and school bus miles). It is preferable for this indicator to have a high rather than a low value.
Passenger Miles Per Passenger	$\frac{\text{Total Passenger Miles}}{\text{Total Passengers}}$	Represents the <u>average length of a passenger trip in miles</u> . This is an important indicator of the transit utilization.
*Operating Expense Per Passenger	$\frac{\text{Total Operating Expense}}{\text{Total Passengers}}$	Represents the <u>average operating expense per passenger trip</u> . ^{1/} It is preferable for the value of this indicator to be low rather than high.
*State Operating and Special Fare Assistance Per Passenger	$\frac{\text{Total State Operating and Special Fare Assistance}}{\text{Total Passengers}}$	Represents the <u>average state assistance per transit passenger</u> . ^{2/} This indicator may be considered a measure of the equity of state transit assistance throughout Michigan.
State Operating and Special Fare Assistance Per Capita	$\frac{\text{Total State Operating and Special Fare Assistance}}{\text{Total Population of Area Served}}$	Represents the <u>average state assistance per person in the area served by transit</u> . ^{2/} This indicator may be considered a measure of the equity of state transit assistance throughout Michigan.
*State Operating and Special Fare Assistance Per Vehicle Mile	$\frac{\text{Total State Operating and Special Fare Assistance}}{\text{Total Vehicle Miles}}$	Represents the <u>average state assistance per vehicle mile of transit operated</u> . ^{2/} This indicator may be considered a measure of the equity of state transit assistance throughout Michigan.
Vehicle Miles Per Capita	$\frac{\text{Total Vehicle Miles}}{\text{Total Population of Area Served}}$	Represents a <u>measure of transit accessibility</u> or the amount of transit service available relative to the area population. It is preferable for the value of this indicator to be high rather than low.

Indicators that can be developed using data from the UPTRAN annual operating assistance report.

INDICATOR	STATISTIC ANNUAL; SYSTEM WIDE	RELEVANCE
Passengers Per Capita	$\frac{\text{Total Passengers}}{\text{Total Population of Area Served}}$	Represents the <u>utilization of transit service</u> in terms of the number of trips taken per person in the area served. It is preferable for this indicator to have a high rather than a low value.
*State Operating and Special Fare Assistance Per Dollar of Operating Expense	$\frac{\text{Total State Operating and Special Fare Assistance}}{\text{Total Operating Expense}}$	Represents the amount of state operating and special fare assistance received per dollar of operating expense incurred. ^{1/ 2/} This indication may be considered a measure of the equity of state transit assistance.
*Transit Fare Revenue Per Dollar of Operating Expense	$\frac{\text{Total Transit Fare Revenue}}{\text{Total Operating Expense}}$	Represents the amount of <u>revenue earned</u> for carrying passengers along regularly scheduled routes <u>for each dollar of operating expense incurred.</u> ^{1/} It is generally preferable for this indicator to have a high rather than a low value. However, the value of the indicator reflects local transit fare policy.
*Non-fare Transit Revenue Per Dollar of Operating Expense	$\frac{\text{Total Non-fare Transit Revenue}}{\text{Total Operating Expense}}$	Represents the amount of school bus service revenues, freight tariffs, charter service revenues, auxiliary transportation revenues, subsidy from other sectors of operation, and non-transportation revenue per dollar of <u>transit operating expense</u> incurred.
*Local Taxes Dedicated to Transit Operating and Fare Assistance Per dollar of Expense	$\frac{\text{Taxes Levied Directly by the Transit System}}{\text{Total Operating Expense}}$	Represents the proportion of total transit operations expense financed by tax revenues levied directly by the transit system. In many instances transit systems do not have or have not exercised their authority to levy a tax dedicated to transit financing.
*Local General Fund(s) Revenue Allocated to Transit Operating and Special Fare Assistance Per Dollar of Operating Expense	$\frac{\text{Total Local General Fund(s) Revenue Allocated to Transit Operating and Special Fare Assistance}}{\text{Total Operating Expense}}$	Represents the amount of local operating and special fare assistance received by a transit system per dollar of operating expense incurred. ^{1/} Local assistance includes revenues from the local General Fund(s).
*Federal Operating Assistance Per Dollar of Operating Expense	$\frac{\text{Total Federal Operating Assistance for Transit}}{\text{Total Operating Expense}}$	Represents the amount of Federal operating assistance received by a transit system per dollar of operating expense incurred. ^{1/}

^{1/} Operating expense includes the total expenses for vehicle operations, vehicle and non-vehicle maintenance, and general administration expense as defined in the UMTA Section 15 Report. Reconciling items are not included.

^{2/} State operating and special fare assistance includes all grants and reimbursements from the state to the transit system for operating transit service and to pay the difference between full adult fares and special reduced fares.

*Indicators that can be developed using data from the UPTAN annual operating assistance report.

**DEFINITION OF OTHER TRANSIT PERFORMANCE INDICATORS--
RELEVANCE FOR PERFORMANCE EVALUATION**

INDICATOR	STATISTIC ANNUAL; SYSTEM WIDE	RELEVANCE
*General Administrative Burden	$\frac{\text{Total General Administration Expense}}{\text{Total Vehicle Operations and Vehicle Maintenance and Non-Vehicle Maintenance Expense}}$	Represents the overall expense for general administration in relation to the total expense for the other functional areas of a transit system. It is preferable for this indicator to have a low rather than high value.
Miles between Road Calls for Mechanical Failure	$\frac{\text{Total Vehicle Miles}^{1/}}{\text{Total Road Calls for Mechanical Failure}}$	Represents the frequency of road calls for mechanical failure in relation to vehicle utilization and may reflect the effectiveness of vehicle maintenance activities. Road calls for mechanical failure include interruptions in revenue service caused by failure of some mechanical element of the revenue vehicle. These service interruptions require someone other than the revenue vehicle operator to restore the vehicle to operational condition. They usually require transfer of the passengers to another vehicle.
Miles between Road Calls for Other Reasons	$\frac{\text{Total Vehicle Miles}^{1/}}{\text{Total Road Calls for Other Reasons}}$	Represents the frequency for service interruptions for reasons other than mechanical failure including tire failure, farebox failure, air conditioning system failure out of fuel/coolant/lubricant and causes not included as mechanical failures.
Peak Vehicle Per Active Vehicle	$\frac{\text{Total Number of Peak Vehicles}}{\text{Total Number of Active Vehicles}}$	Represents the <u>spare</u> vehicle fleet. The peak bus fleet is the maximum number of vehicles used at one time during a day. A large spare fleet can explain low average vehicle utilization. A large spare fleet is not desirable; it reflects stockpiling which is not an efficient use of capital resources. The value of this indicator should be closer to 1 than to 0.
Population Density of Area Served	$\frac{\text{Total Population of Area Served}}{\text{Total Size of Area Served (Sq. Mi.)}}$	Represents the average population density of the area served. This is an important indicator since it is generally more costly to provide transit service to a low-density area.
Non-revenue Vehicle Miles	$\frac{\text{Total Vehicle Revenue Miles}}{\text{Total Vehicle Miles}^{1/}}$	Represents the proportion of vehicle miles operated that do not provide revenue service. It is preferable for this indicator to have a value near 1. This means that most of the vehicle miles operated provide revenue service.
*Average Fare Per Passenger	$\frac{\text{Total Transit Fare Revenue}}{\text{Total Passengers}}$	Represents the <u>average fare per passenger</u> . This indicator can assist in explaining the proportion of total transit system revenue received from fares. It may also serve as a test for the accuracy of the passenger sampling method.
General Administrative Burden	$\frac{\text{Total Number of Administrative Employees}}{\text{Total Number of Employees}}$	Represents the <u>Administrative burden</u> in terms of the Administrative staff size in relation to the total transit system labor force. It is preferable that this indicator have a low rather than high value. This implies that labor predominantly provides service and maintains vehicles and facilities.

^{1/} Unless otherwise stated, this indicator and statistic refer to total vehicle miles including revenue and non-revenue vehicle miles.

*Indicators that can be developed using data from the UPTRAN annual operating assistance report.