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LOS ANGELES COUNTY TRANSPORTATION COMMISSION

PERFORMANCE AUDIT PROGRAM

PHASE II

TASK I. AUDIT REPORT

Southern California Rapid Transit District

Submitted By

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PERFORMANCE AUDIT PROGRAM
PHASE II

INTRODUCTION

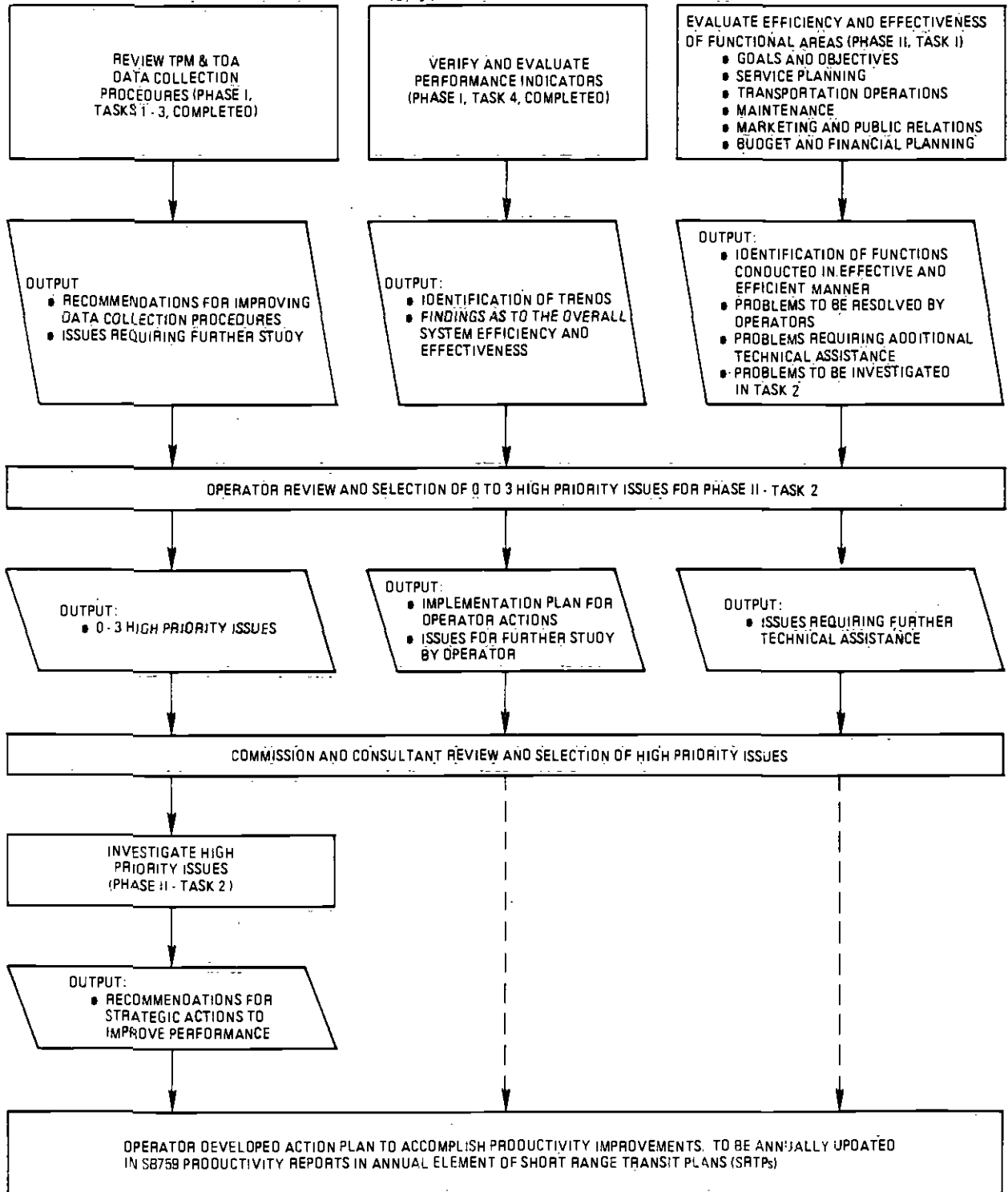
TPM and TDA Performance Audit Program

The Los Angeles County Transportation Commission's (LACTC) Performance Audit Program is designed to serve multiple objectives. These objectives stem from state legislated mandates, Commission adopted policies and programs, and the operator's need for usable results. The interrelated elements of the two-phased Audit Program fit together to provide a comprehensive review of the transit operators' performance as shown by Exhibit 1. The first step in this program was a review of TPM and TDA data collection procedures (Phase I, Tasks 1-3). The products of this effort were recommendations for improving data collection practices and the identification of issues requiring further study. The next step was an examination of each operator's overall system efficiency and effectiveness, as measured by five TDA performance indicators (Phase I, Task 4). The products of this task were interpretations of performance trends and hypotheses as to their contributing factors. This effort concluded Phase I of the Audit Program.

Phase II begins with a diagnostic evaluation of the efficiency and effectiveness of six basic transit functional areas (Phase II, Task 1). The output of Task 1 will be the identification of those functions conducted in an effective and efficient manner and those functions requiring improvement. Task 2 will involve the investigation of designated

EXHIBIT 1

PERFORMANCE AUDIT PROCESS
PHASES I AND II



high priority issues. Together, Phases I and II satisfy the audit requirements of both the locally adopted Transit Performance Measurement Program and the state mandated Triennial Performance Audit.

Phase II Objectives

In compliance with the requirements of the California Public Utilities Code and the California Administrative Code, Task 1 of Phase II has been designed as a broad diagnostic review of the fourteen fixed route and dial-a-ride transit operators receiving funds through the Commission. The intent of Task 1 is to evaluate the efficiency and effectiveness of operator performance in six basic transit functions and to identify areas for productivity improvements. The six examined functional areas are as follows:

1. Goals and Objectives
2. Service Planning
3. Transportation Operations
4. Maintenance
5. Marketing and Public Relations
6. Budget and Financial Planning

Operator performance in each function has been determined by a review of quantitative indicators and through on-site interviews with agency staff. The analyses explore the establishment of overall system goals and objectives; establishment and integration of functional goals and objectives; efficiency and effectiveness of functional performance; progress toward attaining objectives; and adequacy of performance monitoring programs.

Reports have been prepared for the fourteen operators included in the audit program. The reports present audit findings as to overall system and functional performance and are organized by functional area. In addition, problem areas for further study are identified. For each problem area, one of the following actions is recommended:

- The operator should conduct analysis and take actions to resolve problem
- External assistance should be sought
- Issue should be investigated as part of Task 2. These problem areas will focus on those with a high probability of significantly reducing costs and/or increasing effectiveness.

This volume contains the Phase II report for Southern California Rapid Transit District.

PERFORMANCE AUDIT PROGRAM
PHASE II
SOUTHERN CALIFORNIA RAPID TRANSIT DISTRICT

1.0 BACKGROUND

The Southern California Rapid Transit District (RTD) is the largest of Los Angeles County's nine fixed route bus operators. During FY 1981, RTD provided 85 percent of the County's bus miles of service and carried 87 percent of its transit riders. RTD operates 206 regularly scheduled lines in Los Angeles and its surrounding counties. During the peak period, it schedules service for approximately 2,000 buses. According to its own definitions, RTD operates six different types of services: local, express, contract, special, subscription and BEEP (Bus Express Employee Program). In FY 1982 these services carried a total of 352.7 million passengers at an operating cost of \$362.2 million.

1.1 GOALS, OBJECTIVES AND OVERALL PERFORMANCE

The purpose of this section is to examine the degree to which RTD management has established overall system goals and objectives and the extent to which these goals and objectives are being accomplished. In addition, overall system performance is evaluated with the use of six efficiency and effectiveness indicators.

For the RTD organization, the past three-year period has been one of transition. Change came both within the organization and from the external environment. Major internal changes occurred in top management and the agency's overall management approach. John Dyer became General Manager in August 1981 bringing with him many ideas for change - - some of which will be described in this report. For example in the area of goals and objectives, he has re-examined and redefined system goals and policies, and has instituted department level goals and objectives.

Mr. Dyer also initiated a Policy and Management Plan to examine the RTD organizational structure and its management problems. Released in August 1982, the Plan's recommended reorganization structure is currently being implemented and is scheduled for completion in 1983. Before and after charts of the general management structure are presented as Exhibits 1-1 and 1-2. The new structure is based on a series of functional relationships with distinctions made between staff and line functions. Among its other objectives, the new organizational structure is designed to enable RTD staff to be more technically self-sufficient and to be able to coordinate policy development and implementation activities with other local agencies. A second significant point about the organization is that "it converts the RTD from a major bus operator to a major transit development agency which has continuing operational responsibilities" (Policy and Management Plan, August 1982, p. 27). Transition to a multi-modal transportation agency is a major objective of RTD's top management.

EXHIBIT 1-1
SCRTD PERFORMANCE AUDIT

GENERAL MANAGEMENT ORGANIZATION
JULY 1981

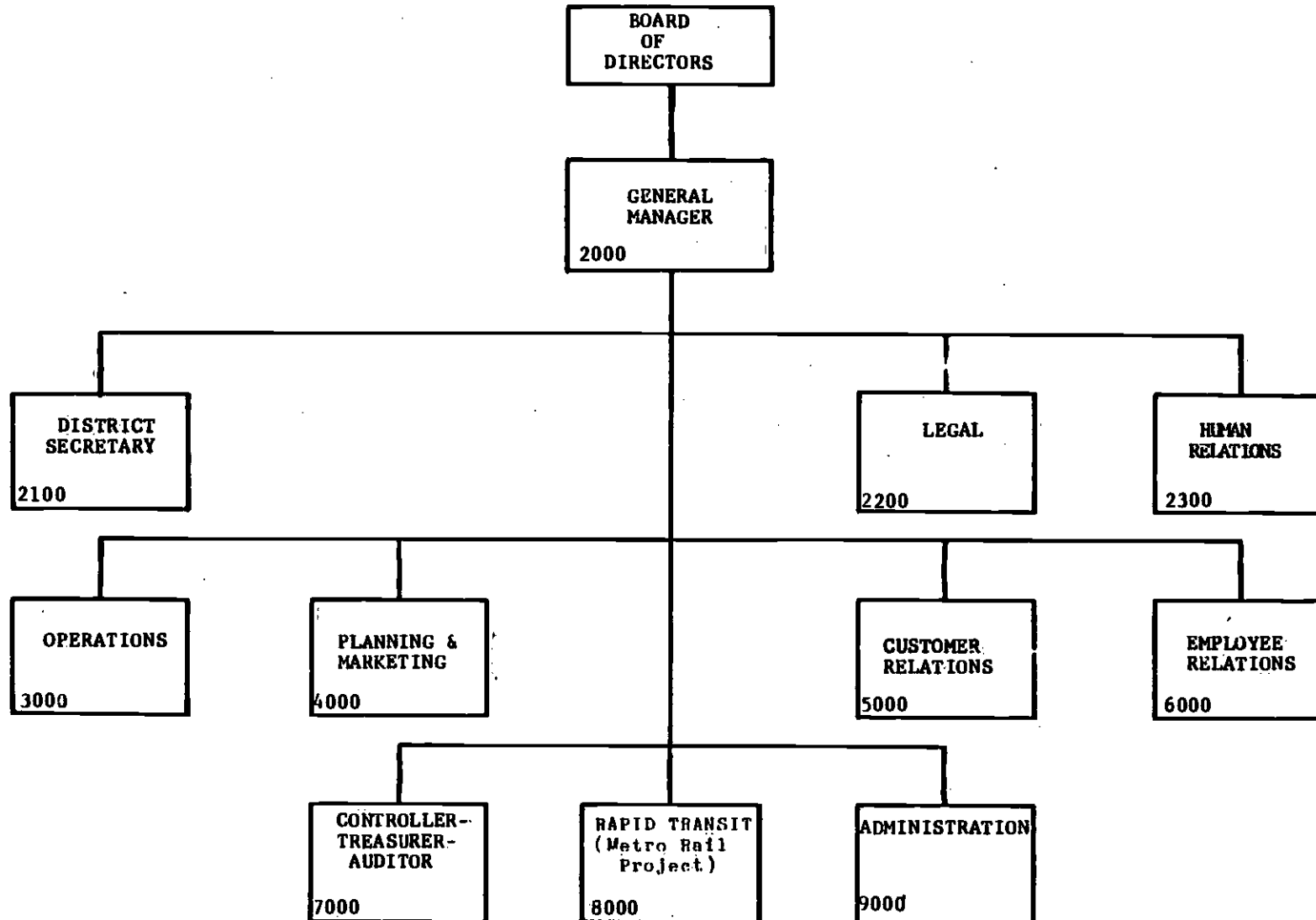
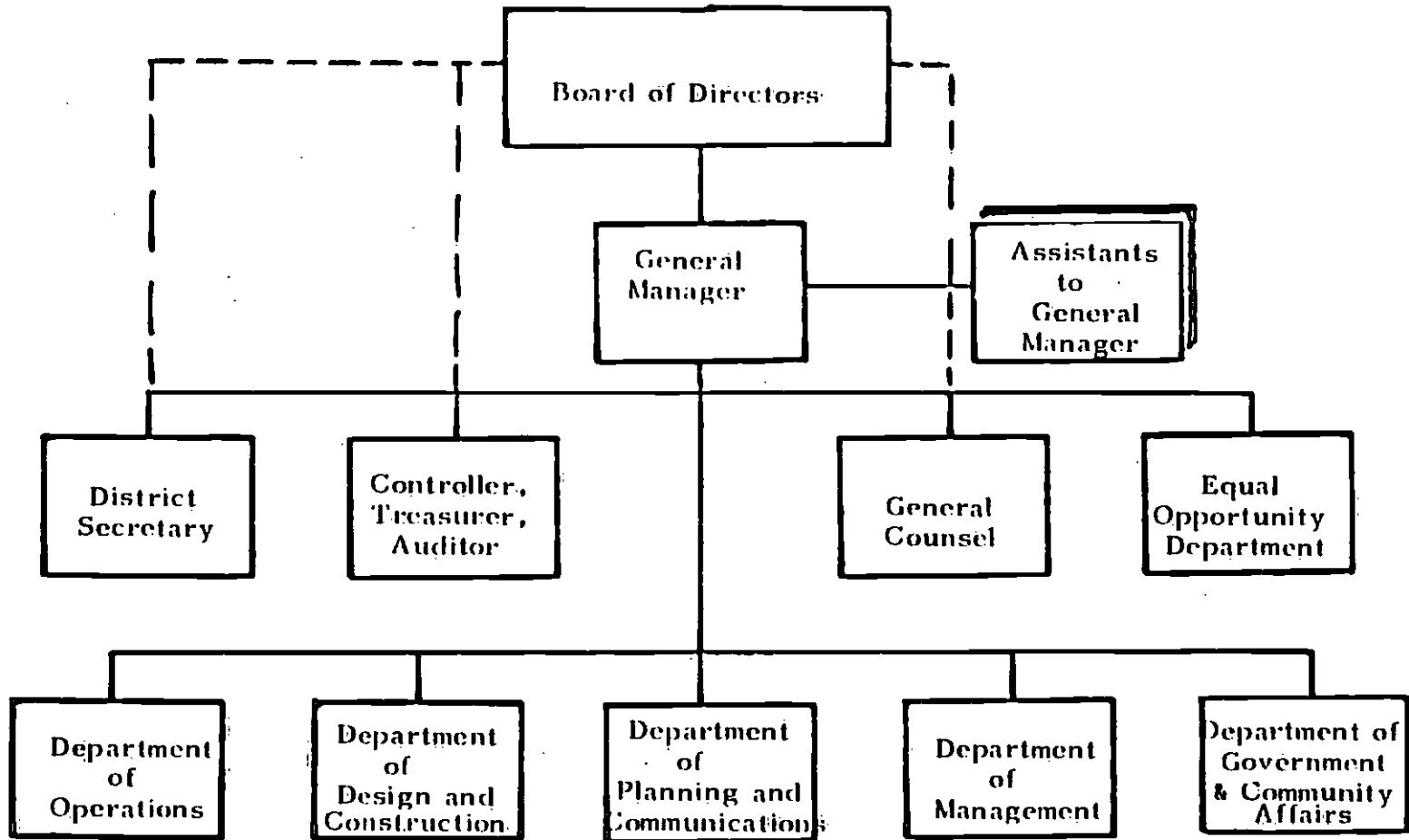


EXHIBIT 1-2
SCRTD PERFORMANCE AUDIT

GENERAL MANAGEMENT ORGANIZATION
AUGUST 1982



External events have also impacted RTD's planning direction and on-going activities. The major external factor has been uncertainty over funding support, at both the federal and state level. In anticipation of funding reductions and as a result of increased operating costs, the base fare was increased from 65¢ to 85¢ in July 1981, and service reductions were instituted. Annual ridership declined over 11 percent at least partially in response to these actions. As the financial picture worsened, plans were made for further service reductions and fare increases. The outlook changed when the one-half cent sales tax was validated in April 1982. RTD entered into an agreement with the LACTC to maintain service levels in effect at the time of the Proposition A referendum, reduced fares to a base level of \$0.50, and added service on overcrowded lines.

Major changes such as these have required the RTD to re-examine its mission and purpose and what it, as an organization, is designed to achieve. The definition of its goals impacts the entire organization - - its structure, operations, planning efforts, facilities expansion, and rapid transit development.

Findings

1. System Goals Have Been Revised to Emphasize the Multi-Modal Nature of RTD Decision-Making

Comprehensive and attainable system goals and objectives are recognized as essential for guiding RTD actions. Top management views them as key inputs to the policy and decision-making process. Over the course of the past year a

set of overall system goals has been formulated, as presented in Exhibit 1-3. These have recently been adopted by the Board of Directors as part of the 1984-88 Short Range Transit Plan. A major departure from earlier statements is the emphasis on the multi-modal nature of RTD decision-making.

This set of goals represents a significant step for the RTD. While they address the need to integrate bus and rail modes, it should be recognized that over the course of the next several years, day-to-day operational priorities rest in bus operations. Thus, in the next step of goal refinement, a greater emphasis should be placed on fine-tuning near and mid-term bus service goals; goals which will assist the agency in developing meaningful objectives and programs for the next five years.

2. Measurable Systemwide Objectives are Not Directly Linked to System Goals

While system goals have been redefined, associated objectives at the overall system level have not been identified, with the exception of the bus service objectives discussed below. Several management objectives and policy and administrative issues related to goal attainment have been identified, yet these fall short of being measurable objectives. Detailed departmental objectives have been developed and will be discussed in a following section.

EXHIBIT 1-3
SCRTD PERFORMANCE AUDIT
SCRTD GOALS AND OBJECTIVES

- a. To operate a safe, clean, convenient and efficient mass transit system for the metropolitan area;
 - b. To develop and operate an integrated fixed-guideway transit system within the urbanized area without detracting from the quality of life and the development of the urbanized area;
 - c. To improve the productivity of both the operations and management sectors of the District;
 - d. To use the SCRTD leadership position to serve as a catalyst for the physical and economic development of the metropolitan area in relation to transportation and access;
 - e. To support and reinforce the centers concept of land development in the Los Angeles region; and
 - f. To undertake short range planning activities to define and integrate the various rail systems analyses underway by SCAG, CALTRANS, and SCRTD.
-

3. Service Goals and Objectives Have Not Kept Pace with the Changing Environment and Are Limited in Scope

While not listed among the agency's transportation goals, the Fiscal Year 1984-1988 and 1983-1987 Five Year Short Range Transit Plans state the overall District service goal as "bringing about the most effective and equitable transit system for the area." "Effective" is defined as the most passenger movement per unit of cost and "equitable" as the fairest distribution of services. District objectives are listed as follows:

- . To fulfill public expectations for service, regarding
 - Reliability
 - Stability
 - Good coverage
 - Good information
 - Convenience and comfort
- . To meet unexpected transportation needs

Measures of performance are identified as:

- . Ridership: to reach a market share of 6 percent of all regional trips by 1990
- . Productivity:
 - Boardings per service mile (no standard identified)
 - Boardings per bus hour
 - .. 20 passengers per hour for local lines
 - .. 250 passenger miles per bus hour for express lines
- . Efficiency: cost per passenger (no standard identified)

Progress toward a ridership objective defined in terms of regional market share is difficult to continually monitor. It would, as stated, be more appropriate as a long-term goal. Ridership objectives should be more amenable to periodic monitoring, such as a specified percent growth in total weekly ridership. Preferably, such ridership targets should be market segment or service specific, such as express service or midday ridership.

The productivity standard of 20 passengers per bus hour may be useful for identifying individually poor performing lines, however, as a systemwide target, it is unrealistically low. In 1982, RTD carried an average 53 passengers per hour.

Cost efficiency measured as cost per passenger combines two separate indicators of performance: cost and ridership. Its performance can either reflect changes in operating costs or changes in ridership, or both. Without more detailed information, one cannot reach any conclusive findings regarding system efficiency. A preferred measure of efficiency is cost per hour which isolates the cost of resources consumed in one unit of output.

Measures of performance for the other objectives are not identified in the SRTP. Of particular note is the lack of an "equity" measure. Subsidy (or deficit) per passenger is a one indicator of transit's equity in service and fare levels. It facilitates cross comparisons among service types (local, express) and user groups (commuters, non-commuters)

The SRTP also includes "Level of Service Policy Guidelines" adopted by the Board of Directors in May 1976. It states that RTD's policy is to maximize transit accessibility and mobility within its service area. Accessibility measures include:

- . Population coverage for local service based on density (headways, distance to nearest line)
- . Line spacing
- . Load factors

Measurable guidelines are provided for each item. While these guidelines may have been appropriate in 1976, they should be re-examined in light of the passage of Proposition A, changing user needs, and available resources.

4. The Implementation of Departmental Goals and Objectives, a Critically Needed Action Has Been Achieved. However, Improvements Are Needed to Make the MBO Approach Useful As a Management Technique

Beginning in FY 1983, all departments were required to submit goals and objectives with their budget proposals. The purpose of this requirement was to link budget allocation decisions to departmental objectives in order to initiate a management by objective decision-making approach. Executive management support for this approach was strong. A new budget manual was prepared, it included detailed definitions and guidelines for assisting the departments in writing their objectives.

Although the FY 1983 Annual Budget did not explicitly identify system goals and objectives from which the departments could formulate their own, the budgetary decision-making process was based on the following priorities:

- Focus on long-term productivity and performance with major investments in capital, hardware and software that will lead to productivity improvements in FY 1984 and 1985
- Improved quality of service of on-street vehicles in terms of cleanliness and performance
- Streamlined organization to make it into multi-modal while avoiding major increases in staff and management personnel

The first year of this program, while a major step toward the establishment of a comprehensive and unified set of RTD objectives, also had several weaknesses. These are in part due to staff inexperience in developing measurable departmental objectives and in part due to management's heightened concern about budget projections and their relationship to program objectives. Observations regarding the initial MBO effort are listed below:

- Absence of priorities for objectives
- Often, too narrow a focus on the function's objectives
- Lack of a connectivity to overall system goals and objectives
- Absence of a time frame for achievement
- Inconsistency in level of detail

- . Mixing of program accomplishments with performance objective
- . Unclear and sometimes unstated measures of performance

The 1984 budget manual addresses these deficiencies in the 1983 program. It promises greater emphasis on goals and objectives as the foundation of resource allocation. Functional and objective priorities are introduced. Departments are instructed to explicitly define performance measures as well as the work plan which will be implemented to accomplish the proposed objective.

5. Performance Monitoring Practices at the Executive Management and Board Level Are Limited in Scope

Information requiring management attention can be categorized as: (1) non-financial, and (2) financial. For ease of presentation, these will be discussed separately.

Each quarter, the Treasurer's office assembles a summary table of District statistics for review by the Executive Staff and Board, as shown by the sample in Exhibit 1-4. Following reporting by exception philosophy, more detailed reports are prepared as necessary. The observations regarding this performance monitoring practice include the following:

- . A hierarchy of information needs by user group have not been incorporated in the current reporting practices. Some items, although suitable for Board review in summary form, need to be disaggregated by division for executive staff evaluation. Candidates include service reliability

EXHIBIT 1-4
SCRTD PERFORMANCE AUDIT

DISTRICT STATISTICS
Quarter Ended September 25, 1982

	<u>THIS QUARTER*</u>	<u>LAST QUARTER</u>	<u>PRIOR QUARTER</u>	<u>LAST YEAR</u>
1. Unlinked trips-thousands per weekday	1,207	1,090	1,139	1,147
2. Average fare paid	29¢	46¢	46¢	45¢
3. Subsidy per rider	74¢	57¢	59¢	54¢
4. Expense Recovery Ratio	27%	43%	44%	45%
5. Peak Buses	1,902	1,906	1,924	1,994
6. Accidents per 100,000 miles	6	5	5	6
7. Scheduled pullouts	174,690	191,071	191,791	201,811
8. Number late/%	1136/.65%	1035/.54%	1068/.56%	1269/.63%
9. Number cancelled/%	122/.07%	63/.03%	16/.01%	63/.03%
10. Complaints per million boardings	18	15	15	15
11. Miles between road calls	2,390	3,353	3,081	1,457
12. Number of bus inspections vs. required inspections	109%	111%	108%	102%
13. Personnel -				
UTU	4,668	4,545	4,596	4,764
ATU	1,693	1,641	1,606	1,566
BRAC	596	624	637	564
Non-Contract	1,106	1,101	1,079	1,027
	<u>8,063</u>	<u>7,911</u>	<u>7,918</u>	<u>7,921</u>
14. Personnel Turnover Rate	10.3%	8.9%	10.1%	9.1%
15. Cash balance, in millions	\$ 144	\$ 97	\$ 108	\$ 124
16. Under (over) budget, cumulative (000)	\$4,515	\$2,175	\$8,723	\$1,474
17. State performance indicators-YTD	\$59.07	\$53.44	\$53.29	\$52.09
Operating cost per vehicle service hour				
Operating cost per unlinked trip	\$ 1.03	\$ 1.03	\$ 1.01	99¢
Vehicle service hours per employee	841	858	855	877
Unlinked trips per vehicle Service hour	57.5	52.2	52.7	52.9
Unlinked trips per vehicle service mile	4.3	3.9	3.9	4.0

*Five-day Strike

and safety data. In addition, explanations for some items should be added to the executive staff report. For example, reasons for bus unavailability and frequency by cause is useful information for executive staff consideration.

- The frequency of reporting should be increased to monthly.
- There are no target values against which actual performance is currently compared.
- Format and organization of the table makes it difficult to see relationships among the statistics and indicators. Graphical representations would assist in the identification of trends.
- There is a lack of integration among departmental and overall system performance measures.

Financial performance is reviewed monthly by the Executive Staff. Monthly financial reports include a brief Revenue and Expense Analysis, an Income Statement, a Summary of Funds, and a Balance Sheet Summary. Again the reporting philosophy is one of report and control by exception. A variance analysis, however, is not documented on the monitoring reports. Rather the Treasurer is responsible for signaling major variances in expenditures versus budget. Special reports are prepared on an as-needed basis. Detailed financial statistics are contained in the Accounting Department's "Blue Books."

Many of the same observations discussed above for non-financial monitoring practices are evident in the financial

reports. In addition, the following limitations have been identified:

- Lack of departmental or function accountability
- Difficulty in identifying variances from budget
- Lack of formal documentation and resultant dependence on the Treasurer's additional reports
- Projections of anticipated revenues and expenditures are not provided.

6. To Date, A Regular, Uniform Program for Monitoring Departmental Performance Against Objectives Has Not Been Established

The 1983 Budget Manual stated that during the year, progress towards meeting each department's objectives should be measured and evaluated. The proposed mechanism was to be a Quarterly Performance Report submitted by the departments to the General Manager. The Performance Report was to be useful from the field supervisory level up to the highest level of executive management, with information sorted as needed depending on the type of evaluation being performed. A first "Quarterly" review was underway in January 1983.

Departments currently complete narrative quarterly reports of progress for submittal to executive staff members. These are, for the most part, descriptive of the work accomplished during each quarter.

7. An Examination of Overall Performance Indicators for the Period 1979-1982 Reveals Worsening Trends in Many Vital Signs

- . Growth in Operating Cost per Vehicle Service Hour Continues to Outpace General Price Inflation, but in 1982, the Gap Narrowed

Between 1979 and 1982 operating costs per vehicle service hour increased by 51 percent; during the same period, the LA CPI increased 37 percent as shown by Exhibit 1-5. Between 1978 and 1982, total operating costs increased 80 percent from \$200.9 million to \$362.2 million for an average annual rate of growth of almost 16 percent as shown by Exhibit 1-6. During the same five year period, service as measured by vehicle service hours increased a modest 1 percent. An analysis of trends in key operating cost categories highlights those functional areas which are driving overall system costs upward. Discussions of trends in particular cost categories, particularly those related to the maintenance function, are provided in subsequent sections of this report.

Trends in personnel levels are also presented in Exhibit 1-6. Staffing levels in General Administration show the largest gain; between 1981 and 1982 an additional 146 full-time equivalent employees were added. These figures exclude estimates of rapid rail capital labor but include transit police. More detailed analysis of personnel records is needed to determine the particular functions in which general administration employment increased.

- . Productivity per Employee Continues to Decline

Over the four year period 1979-1982, vehicle service hours increased very modestly, and in 1982 actually decreased. Estimates of employee

EXHIBIT 1-5

SCRTD PERFORMANCE AUDIT
OVERALL PERFORMANCE INDICATORS

	Fiscal Year			
	1979	1980	1981	1982
<u>Efficiency Indicators</u>				
Operating Cost per Vehicle Service Hour	\$36.06	\$40.65	\$48.88	\$54.48
Percent Change from Previous Year		13.0%	20.0%	11.0%
Vehicle Service Hours per Employee Pay Hour ^(a)	0.46	0.44	0.41	0.39
Percent Change from Previous Year		(4.0%)	(7.0%)	(5.0%)
<u>Effectiveness Indicators</u>				
Ratio of Operating Revenue & Local Subsidy to Operating Cost	0.44	0.41	0.46	0.52
Percent Change from Previous Year		(7.0%)	12.0%	13.0%
Operating Cost per Unlinked Passenger	0.67	0.76	0.84	1.03
Percent Change from Previous Year		13.0%	11.0%	23.0%
Unlinked Passengers per Vehicle Service Hour	53.80	53.30	58.30	53.00
Percent Change from Previous Year		(1.0%)	9.0%	(9.0%)
Deficit per Unlinked Passenger	0.37	0.45	0.45	0.50
Percent Change from Previous Year		22.0%	0.0	11.0%
Los Angeles CPI		+17.0%	+7.5%	+9.0%

(a) Excludes Metro Rail capital labor

EXHIBIT 1-6
 SCRTD PERFORMANCE AUDIT
 TRENDS IN COST CATEGORIES

	<u>Fiscal Year</u>					<u>Average Annual Percent Change</u>	<u>1981-1982 Percent Change</u>
	<u>1978</u>	<u>1979</u>	<u>1980</u>	<u>1981</u>	<u>1982</u>		
Operating Cost Categories (\$000)							
Labor and Fringes							
Operations		\$125,753	\$130,157	\$152,209	\$159,746	+8.3%	+5.0%
Maintenance		37,324	45,821	59,813	67,846	+22.0%	+13.4%
General Administration		16,360	18,970	23,016	28,857	+20.8%	+25.4%
Subtotal	\$159,484	\$179,437	\$194,948	\$235,038	\$256,449	+12.6%	+9.1%
Services	\$ 3,527	\$ 3,598	\$ 4,319	\$ 7,600	\$ 8,265	+23.7%	+8.8%
Materials and Supplies							
Fuel and Lubricants	9,324	11,287	21,251	29,206	29,763	+33.7%	+1.9%
Other	9,484	14,235	18,767	26,848	30,441	+33.8%	+13.4%
Utilities	1,184	1,183	1,393	2,179	2,678	+22.6%	+22.9%
Casualty and Liability	9,495	17,791	23,052	25,783	25,920	+28.5%	+0.5%
Leases and Rental	1,832	1,602	3,113	5,055	5,907	+34.0%	+16.9%
Other	6,580	1,936	1,956	1,282	2,791	-19.3%	+117.7%
Subtotal	\$ 41,426	\$ 51,632	\$ 73,851	\$ 97,953	\$105,765	+26.4%	+8.0%
Total Operating Costs Less Depreciation and Amortization	\$200,910	\$231,069	\$268,799	\$332,991	\$362,214	15.9%	+8.8%
<i>Los Angeles CPI</i>						10.6%	+9.0%
Personnel							
Transportation		5,138	5,513	5,338	5,235	+0.6%	-1.9%
Maintenance		1,421	1,521	1,927	1,970	+11.5%	+2.2%
General Administration (a)		441	472	617	763	+20.1%	+23.7%
Total Personnel		7,000	7,506	7,882	7,968	+4.4%	+1.1%
Total Vehicle Service Hours (000)	6,560	6,408	6,612	6,813	6,649	+0.3%	-2.4%

(a) Excludes estimates of rapid rail capital labor and includes transit police in full-time equivalents.
 SOURCE: Section 15 Reports.

pay hours, however, exhibit a trend in the opposite direction. Between 1979 and 1982, employee pay hours increased a total of 21 percent. Over this time period RTD experienced a 15 percent decline in vehicle service hours per employee pay hour. Productivity by major function will be discussed in forthcoming sections of this audit report.

. RTD's 11 Percent Drop in Ridership during 1982 Adversely Impacted All Measures of Service Effectiveness

Performance as measured by operating cost per passenger, passengers per vehicle service hour, and deficit per passenger worsened between 1981 and 1982. The only indicator showing improved performance was the ratio of operating revenue and local subsidy to operating cost; its improvement was primarily due to a substantial fare increase. Operating cost per unlinked passenger has consistently risen each year, however, between 1981 and 1982 it jumped 23 percent as a result of increasing costs (9 percent) and declining ridership (-12 percent). Passenger productivity which showed strong gains in 1981 retreated to 1980 levels. Deficits per passenger reflect the rise in costs, the drop in ridership and the increase in fares.

1.2 SERVICE PLANNING

The objective of this section is to evaluate the manner and extent to which management seeks to improve the effectiveness and efficiency of its transit service by developing transit plans that are responsive to user needs. This evaluation encompasses planning, service analysis, and scheduling activities.

Description of Function

One function keenly aware of RTD's transition to a multi-modal organization is Planning. Its responsibilities include conducting on-going analyses of the bus system, performing a wide variety of short and long range planning studies, and providing analytical support to other units of RTD. During FY 1983 it also assumed responsibility for the rapid rail project's planning efforts and established a computer-based information support group. To conduct this assortment of activities, the planning staff has been reorganized into four sections: Bus Planning, Advanced Planning, Information Support, and Special Projects. The professional planning staff, including managers and metrorail staff number approximately 39; support personnel number 13.

The Service Analysis and Schedules Department, as its name implies, is responsible for preparing schedules and driver work assignments. In support of both scheduling and planning activities, the department also collects, processes, and analyzes passenger and service data. The department is currently divided into four sections: Scheduling, Checking, Service Analysis and Administrative services. According to the 1982 Policy and Management Plan, the Service Analysis Section is slated for the Department of Planning and Communications; whereas, Scheduling is to move over to Operations. During FY 1983, the department was budgeted for 11.5 persons of whom 15 percent were in Service Analysis, approximately 40 percent in Scheduling, 35 percent in Checking and 10 percent in Management and Administration.

Planning and Scheduling functions encompass a wide assortment of activities which affect the efficiency and effectiveness of the service operated. Limited audit resources necessitated the selection of a few key areas for examination. The issue areas included in this audit report are the following:

- Goals and Objectives
- Data Collection
- Service Monitoring and Short Range Service Planning
- SRTP Development
- Scheduling Efficiency

Findings

1. Service Planning Functional Goals and Objectives Should Support and Be Directed at Achieving Overall System Productivity Goals.

Productivity of service has and will continue to be a primary concern of the RTD in the next two to three years. Planning, Service Analysis and Scheduling functions play key roles in moving the organization toward achievement of its productivity goals. Although the scope and horizon of planning activities have broadened, the planning function remains responsible for "the efficiency of service allocations in such a manner as to provide maximum benefit for the bus riding public."⁽¹⁾ As stated in Section 1 of this report,

(1) Annual Budget FY 1983, P. 76

the RTD through the planning department, has articulated service goals and quantifiable ridership, productivity and efficiency objectives.⁽²⁾ Weaknesses in this set of measures include the following:

- With the exception of boardings per service hour, target levels are not clearly identified
- Existing target levels for boardings per service hour have little meaning on a systemwide basis. The standard is 20 passengers per hour; the actual average performance is 53 passengers per hour
- Objectives and performance standards included in the Fare Reduction Program agreement with the LACTC are not clearly identified or integrated with existing objectives
- The service deployment objective of allocating service 55 percent on the basis of ridership and 45 percent on the basis of population is outdated. The current distribution is 60/40
- Equity objectives and standards are not formally stated, except for service deployment policies
- Planned service actions are not directly linked to service objectives.

Many Planning Department goals and objectives as stated in the FY 1983 budget focus on the completion of projects and programs rather than the end state to which they are aimed; i.e., improved efficiency and effectiveness. In addition, the impact or contribution of each objective to the department's, and indeed the system's overall performance should be assessed

(2) SRTP FY 1984-1988, pp. 29-32.

and priorities assigned. For example, the installation of UTPS will impact service planning effectiveness more significantly than the Information Center's cataloging of 1,600 reference titles during the next fiscal year.

The Service Analysis and Scheduling Department's FY 1983 objectives explicitly state targeted performance levels. These include:

- Scheduled pay hour to platform time ratio of 1.2
- Deadhead as a percent of platform time - 7 percent
- Ratio of average maximum loadings to average occupancy during peak periods of 2.0

Other objectives concern matching service levels to the available work force and data processing functions. These topics will be discussed in the following pages.

2. The Service Analysis Section Is Facing Increasing Demands for Accurate and Current Information

The purpose of the service analysis section is to provide the most up-to-date, comprehensive and accurate data to scheduling and planning functions. Phase I of this audit program reviewed several of RTD's data collection efforts and offered recommendations for improvement. The major strength of RTD's data collection program is that service, cost and use statistics are electronically processed and maintained for individual lines by day of week. The result is a disaggregate, yet integrated, data base.

Three field data collection techniques are continuously performed: (1) ride checks for comprehensive line data; (2) point checks for maximum load counts; and (3) fare surveys for input to the systemwide patronage and revenue model. As of January 1983 the average ride check was ten months old, however, the variance around that average is large, as discussed in the Phase I report. Processing of ride check data has been a problem. The department's stated objective was to reduce processing time to ninety days; as of January, turn-around time stood at 150 days.

The information collected, processed and reported by the Service Analysis section is used for several purposes, as outlined below:

- Scheduling
 - Justification for service changes
 - Monitoring and planning Proposition A service
 - Input to Service Adjustment Reports which are submitted to the Commission for Proposition A funds

- Planning
 - TDA, TPM,, Section 15 reporting
 - Line monitoring
 - Service planning studies, e.g., sector planning and special studies

- Management
 - Policy guidance
 - Financial planning and budgeting

Increasing demands for information warrant a comprehensive assessment of the agency's information needs as well as the capabilities and limitations of its current data collection and processing systems. Evaluative efforts should be coordinated with the newly formed Information Support section in Planning. Opportunities for improved statistical analyses, sampling strategies, and processing and verification procedures should be explored.

3. Planning Efforts Should Continue to Monitor and Analyze Service Effectiveness and Efficiency

Over the past three years, RTD has made significant progress in implementing its critically needed sector improvement program (SIP) begun in 1975. The purposes of this service planning program have been to simplify the route structure, improve accessibility within sectors, initiate new regional links, and institute a systematic line numbering system. The RTD reports that service effectiveness as measured by passengers per vehicle service hour has increased by 30 percent over that of the previous network. The final phase of the 1980 SIP is expected to be implemented in the summer of 1983.

In addition to its sector planning studies, RTD reviews the performance of its operating lines. It has established 20 passengers per bus hour as an effectiveness standard for local service and 250 passenger miles per bus hour as the standard for express service. A line-by-line analysis indicates that in FY 1982, 28 lines were in non-compliance with productivity standards. While the number of lines in non-compliance has fallen - - in 1981 there were 34, and in 1980 there were 38,

it still represents approximately 15 percent of the system's lines.

Planning staff members are assigned lines within a service sector. It is their responsibility to monitor line performance, to study poor performers, and to recommend remedial actions. Currently, a line review is prompted by one of the following actions:

- alignment change
- schedule change
- new ride check
- outside inquiry from supervisor or customer

Data for the review is retrieved from Performance Trends reports and more detailed Line Profiles, both of which are generated by Service Analysis. Remedial actions taken include realignment; changes in service type - i.e., switch from subscription service to express; or recommendations for additional study where the problem is not limited to a single line but rather extends to a particular service area or group of lines.

Progress made on improving line productivity is difficult to examine without going down to the line level of detail since comprehensive sector studies were suspended in 1982. RTD service is too widespread and extensive to review total system performance in summary form.

While the RTD is restricted from increasing levels of bus service that will incur additional operating costs beyond

agreed amounts, the Proposition A agreement does allow and encourage planning improvements. Service economies do not need to wait for FY 1985-1986, when operating funds will be reduced. RTD has retained its flexibility to redeploy service wherever possible to improve the match between supply and demand. A more systematic approach to line performance monitoring could improve the planning staff's ability to respond to this mandate.

4. Participation by a Cross-Section of Top Managers in the Development of the SRTP Facilitates Its Use As the Agency's Action Plan

RTD's SRTP consolidates a myriad of planning and policy issues generated within the organization as well as those generated by external agencies, e.g., the LACTC. The document is prepared by the Planning Department with direct oversight and involvement of executive staff. The process begins with the Planning Department reviewing past performance, programs underway and the agency's Transportation Improvement Program (TIP). Interviews are conducted with members of the Executive staff and Interdepartmental Task Force (ITF) which is responsible for the approval of all service changes. Operations, maintenance, planning and finance functions are represented on the ITF. Proposed issues and policy statements developed by planning staff are submitted to executive staff for review and comment. Following executive staff approval, a workshop session is conducted for Board members. Upon Board approval of major issues and policy statements, the planning staff with assistance from the Treasurer's Office, prepares the SRTP document.

Once adopted by the Board, the SRTTP becomes the key working document for the development of the operating budget. Budgeting activities will be discussed in Section 6 of this report.

Although the SRTTP addresses many of RTD's planning, capital and operational needs with recommended actions, the process is not fully integrated with RTD's other service and financial planning activities. For example, it is not clear how the programs which are recommended in the SRTTP are related to actions proposed in the annual operating budget. Other limitations of the SRTTP process include:

- Cost/benefit analyses of recommended programs are not documented
- Priorities are not established
- Programs are not linked to the achievement of specific agency goals and objectives
- Accomplishments and results of prior years' programs are not compared to planned progress.

5. Scheduling Efficiency Has Gradually Improved over the Last Three Years

The final step in the scheduling process is the development of driver assignments, or runcutting. A commonly applied measure of scheduling efficiency is the payhour to platform hour ratio. This measure indicates the number of hours paid for each hour of driving time, and is the maximum level of efficiency achievable by the Transportation Department as drivers are actually dispatched on daily assignments.

The reduction in the payhour to platform hour ratio over the last three fiscal years, as shown in Exhibit 1-7, indicates that scheduling efficiency has improved. The overall ratio has been reduced to 1.202 pay hours per platform hour in 1982, from 1.238 in 1980. Most of this improvement has been achieved by reducing scheduled overtime and spread premium pay. Part of this improvement is due to higher usage of part-time drivers in the last two fiscal years; other improvement can be attributed to better construction of split runs.

In this fiscal year to date, scheduling is maintaining a 1.20 payhour to platform hour ratio. It should be noted that implementation of new service enabled by Proposition A should be carefully monitored to ensure that the performance improvement trend does not stagnate.

1.3 TRANSPORTATION OPERATIONS

The basic role of the Transportation Department is to manage daily service delivery. The purpose of the following analysis was to assess how efficiently the Transportation Department discharges this responsibility, and to investigate the department's performance results over the last three years.

Description of the Function

The Transportation Department consists of five functional units which are responsible for the daily and on-going activities required to support and provide service delivery.

EXHIBIT 1-7
 SCRTD PERFORMANCE AUDIT

SERVICE PLANNING INDICATORS

	Fiscal Year		
	1980	1981	1982
Peak Vehicles per Base Vehicle ^(a)	1.66	1.61	1.54
Percent Change from Previous Year	4.4%	(3.1%)	(4.5%)
Vehicle Service Hours per Total Vehicle Hour	0.90	0.93	0.91
Percent Change from Previous Year		3.3%	(2.2%)
Scheduled Operator Pay Hours to Platform Hour Ratio	1.238	1.211	1.202
Scheduled Pay Hours by Category as a Percent of Platform Hours			
Report	1.77%	1.66%	1.68%
Turn-In	0.89%	0.83%	0.84%
Travel	2.86%	2.78%	2.84%
Scheduled Overtime	13.78%	12.11%	12.30%
Spread	4.42%	3.54%	3.27%

(a) Source: TDA/TPM Reporting and Section 15

The Director of Transportation has overall responsibility for organizing, coordinating and directing the activities of the department. The six functional units reporting to the Director are as follows:

- . Division Operations encompassing all drivers and division-based supervisory personnel, is responsible for daily dispatching activities and first-line driver supervision
 - Each of the twelve divisions report to one of two transportation superintendents
 - A division transportation manager is responsible for all activities at one location
- . Vehicle Movement Control, encompassing all street and radio supervisors, is responsible for maintaining scheduled operations; responsibility is vested in the Superintendent of Transportation Services
- . Driver Instruction is the responsibility of the Superintendent of Instruction, and provides initial and on-going training to vehicle operators
- . Maintenance of Bus Stops and Zones is the responsibility of the Stops and Zones Supervisor, who also hears second step grievances
- . Administrative Services, which includes budgeting, manpower planning and performance monitoring, are the responsibility of the Administrative Service Coordinator.

The Transportation Department is responsible for a number of activities which collectively determine overall performance. The performance audit findings which follow first

present the department's objectives and how they are monitored, then discusses the audit findings in the following areas:

- . Cost per unit of service
- . Operator productivity and unscheduled labor cost
- . Absenteeism
- . Part-time driver utilization
- . Safety and service reliability

Findings

1. Transportation Management Is Supported by a Comprehensive Set of Goals and Objectives

Each of the functional areas within the Transportation Department has developed goals and objectives appropriate to its sphere of control. While each of the functions has been accustomed to supporting higher levels of management with information for some time, the process of establishing objectives in a formal sense is still evolving. As a result, the objectives tend to be more refined in functions where quantification comes naturally (e.g., division operations). In other areas, objectives tend to relate to completion of programs or be expressed as a performance range rather than a target.

Monitoring systems are in-place to regularly track progress against most objectives, but time frames vary among the five functional areas. Division operations, for instance, monitors progress against objectives on a weekly basis, systemwide and for each division. While the objectives are set

on a fiscal year basis, year-to-date performance reporting is compiled on a calendar year basis. Similarly, Instruction relies upon some calendar year data to support performance monitoring (e.g., accidents). All functional areas report their progress on a quarterly basis to the Director of Transportation.

2. Transportation Cost per Unit of Service Grew above the Rate of Inflation between 1980 and 1981, Reflecting Wage Rate and Fuel Cost Growth

Transportation cost can be expressed as a rate by calculating its ratio to service hours - - cost per service hour. Three measures of transportation cost are expressed in this manner in Exhibit 1-8. Vehicle operations cost is a broad measure of resources expended while vehicles are in service - - transportation personnel wages and benefits; fuel and fuel taxes; materials and supplies; and miscellaneous services purchased to support vehicle operations. Operator, or driver, wage cost and benefit cost are respectively the largest components of vehicle operations cost. Comparing the rates of cost growth among these three measures helps isolate the contributing factors. Between 1980 and 1981, growth in wage rates and fuel cost accounted for most of the growth in vehicle operations cost, as explained below.

EXHIBIT 1-8
 SCRTD PERFORMANCE AUDIT
 TRANSPORTATION FUNCTION INDICATORS

	Fiscal Year		
	1980	1981	1982
<u>Cost per Unit of Service</u>			
Vehicle Operations Cost per Service Hour	\$23.41	\$27.29	\$29.33
Percent Change from Previous Year		16.6%	7.5%
Operator Wage Cost per Service Hour	\$11.86	\$13.37	\$14.63
Percent Change from Previous Year		12.7%	9.4%
Operator Benefits Cost per Service Hour	\$5.39	\$6.33	\$6.39
Percent Change from Previous Year		17.4%	0.9%
LA CPI		8.0%	9.0%
<u>Operator Productivity and Unscheduled Labor Cost</u>			
Pay Hour ^(a) to Service Hour Ratio	(c)	1.32	1.33 ^(d)
Percent Change from Previous Year			3.1%
Unscheduled Overtime Hours as Percent of Platform Hours	5.30%	3.99%	4.18%
Percent Change from Previous Year		(24.7%)	4.8%
Unscheduled Guarantee Hours ^(b) as Percent of Platform Hours	4.24%	5.10%	4.88%
Percent Change from Previous Year		20.3%	(4.3%)

(a) Total driver pay hours exclusive of paid leave

(b) Colloquially known as "shine out," represents time paid when no work was available

(c) Inconsistencies in platform hours between 1980 and the remaining two years prevent 1980's inclusion in the payhour to platform hour analysis

(d) Minimum ratio is 1.0

. Vehicle Operations Cost per Service Hour Increased by \$5.92 between 1980 and 1981, for a Compounded Annual Growth Rate of 11.9 Percent.

- Excluding fuel, the annual growth rate was 10.9 percent
- Over this period, hourly wage rates increased by 10.6 percent, compounded
- There was negligible real cost growth

. Operator Wage Cost per Service Hour Increased by \$2.77 over the Three Year Period, with Wage Rates Alone Accounting for \$2.65 of This Increase

- Top wage rates grew by 11.3 percent between 1980 and 1981; 9.9 percent between 1981 and 1982
- Cost per service hour in 1982 would have been \$14.51 if only wage growth alone were considered

. Operator Benefits Cost per Hour Grew below the Rate of Inflation

- There was an increase of only \$1 per service hour over the three year period, or a compounded growth of 8.9 percent
- This trend reflects some decline in absenteeism and perhaps a lower proportion of paid leave

3. Operator Productivity and Unscheduled Labor Cost Improved between 1980 and 1981, and Were Stable in 1982

Operator productivity and unscheduled labor cost reflect how efficiently drivers are being utilized to fill all scheduled work. Productivity is measured by the payhour to platform hour ratio, and reflects how many hours must be paid for one hour of driving time. Payhours are expressed exclusive of paid leave (e.g., sick leave, vacation). Platform hours express time spent by operators on-board a vehicle, and include revenue, layover and deadhead time.

Operator productivity is influenced by both the scheduling and transportation functions. A more direct measure of Transportation's performance in managing manpower levels is the ratio of unscheduled pay hours to platform hours. Unscheduled overtime represents the frequency with which operators must be used on their day off, or in addition to their regular assignment, to cover open runs - - in other words, operator demand exceeds operator availability. Conversely, unscheduled guarantee measures the frequency with which operator supply is greater than operator demand. Because operators are guaranteed eight hours daily pay, wage cost is incurred even when no work is available.

RTD's performance in operator productivity, unscheduled overtime and unscheduled guarantee as displayed in Exhibit 1-8 is summarized below for the three year period commencing fiscal year 1980.

. The Payhour to Platform Hour Ratio Was Relatively Stable between 1981 and 1982

- A slight decline in productivity occurred, partially attributable to higher training costs
- The trend from 1980 is unclear, as inconsistent relationships exist between two data sources measuring the level of service
 - .. Platform hours, reported via Section 15, show 1982 service levels to be 5.7 percent higher than for 1980
 - .. Service hours, reported via TPM submissions to the Commission, show an increase of only 0.5 percent
 - .. If a payhour to platform hour ratio is calculated, there is a marked increase in productivity between 1980 and 1981 - - 1.39 to 1.32
 - .. If a payhour to service hour ratio is calculated, the exact opposite could be concluded - - productivity declines to 1.49 from 1.43

. Unscheduled Overtime Declined in 1981, Then Rose in 1982

- Absenteeism, discussed in the following section, was lowest in 1981
- Higher manpower levels were maintained in 1981
- Manpower deficits occurred in late FY 1982 as RTD planned for a July service cut, as Proposition A passage was given little hope, resulting in additional overtime

. Unscheduled Guarantee Has Generally Increased over the Last Three Years

- It is the only pay category proportionally higher in FY 1982 than FY 1980
- Unscheduled guarantee cost per platform hour has increased by 16 percent since FY 1980, after adjusting for wage increases
- RTD carries surplus operators to minimize absenteeism and thereby minimize unscheduled overtime.

4. Driver Absenteeism and Other Lost Time Has Declined But Still Remains at a High Level

While attendance among RTD drivers is generally improving, lost time has continued to be a costly problem. In 1982, it is estimated that driver absenteeism cost RTD a minimum of \$7.5 million, and possibly as much as \$12.5 million. If RTD could reduce sick leave and requested time off by 30 percent, an annual savings of \$2.1 to \$3.2 million could be realized. These figures include direct compensation, or paid leave, cost as well as the indirect costs of maintaining a back-up work force to ensure schedule reliability. Although the exact cost of absenteeism could be a point of debate, there is no doubt that it contributes heavily to unproductive expenditure of resources. Lost time is highest among full-time drivers, as shown in Exhibit 1-9.

Full-time drivers, on average, spent about 32 person days away from driving duties in calendar year 1982, exclusive of holidays and vacation. This lost time can be broken down into three general classes, and explained as follows.

EXHIBIT 1-9
 SCRTD PERFORMANCE AUDIT

DRIVER ABSENTEEISM AND OTHER LOST TIME
 (Days Per Person Per Year)

<u>Lost Time Category</u>	<u>Full Time Drivers</u>			<u>Part Time Drivers</u>		
	<u>1980</u>	<u>1981</u>	<u>1982</u>	<u>1980</u>	<u>1981</u>	<u>1982</u>
Sick Leave	20.53	14.98	17.67	3.58	4.91	1.68
Military Leave	0.26	0.30	0.27	0.11	0.17	0.10
Absent Without Pay (AWOP)	2.64	2.05	1.90	1.06	1.11	0.98
Suspended	1.45	1.09	1.04	1.08	0.72	1.39
Requested Off	7.38	9.27	7.64	1.04	0.91	2.26
Other Positions	2.60	2.30	3.37	0.00	0.00	0.00
TOTAL	34.86	29.99	31.89	6.87	7.82	6.41
Average No. of Drivers	4,253	4,315	4,168	278	384	348

. Sick Leave, Including Industrial Injuries, Has Accounted for 50 to 59 Percent of Lost Time between 1980 and 1982

- Sick leave was lowest in 1981; its rise in 1982 was principally due to summer manpower shortages due to the implementation of Proposition A service
- Sick leave has historically risen at RTD when manpower levels became tight, as fewer opportunities existed for requested time off

. Requested Time Off and Use of Operators for Other Positions Has Accounted for 29 to 39 Percent of Lost Time over the Same Period

- Both categories largely represent voluntary management actions to provide time off or alternate duties for drivers
- In 1982, time lost in these two categories represented an equivalent of 210 extra operators

. All Other Absences Have Declined to 10.1 Percent of Total Absences, from 12.5 Percent in 1980

- Absent without pay - - AWOP - - decreased by 28 percent between 1980 and 1982
- Lost time due to suspensions has also decreased
- Military leave has remained at an insignificant level - - less than one percent of total absences

Part-time drivers lose only about one-fifth as much time as their full-time counterparts. In 1982, each part-time driver lost, on average, only 6.41 days of work. This marked difference in attendance from full-time drivers is largely explained by two factors

. Part-Time Drivers Are Financially Penalized for Lost Time

- In contrast to full-time drivers, part-timers receive no pay for lost time, excluding pay for occupational injuries
- Part-timers have no opportunity to recoup lost wages through overtime work

. Part-Time Driver Performance Was, Until Recently, a Major Criterion for Approval of Transfer to Full-Time Ranks

RTD's Transportation Department is aware of these attendance problems and is actively engaged in bringing them under control. In focusing on sick leave alone, however, opportunities for improving upon the larger picture of manpower availability may be foregone.

5. Part-Time Driver Utilization Has Not Yet Been Maximized

Part-time drivers represent an opportunity for cost savings which should be fully exploited. RTD has never reached maximum part-time driver levels, in part due to the

uncertainty regarding approval of Proposition A. Nonetheless, RTD has been afforded the opportunity to have 15 percent of its driver work force allocated to part-timers as a result of a November 1982 arbitration decision. The minimum threshold of full-time drivers associated with the 15 percent part-time limit is thus a new target upon which RTD can focus.

The cost advantages of part-time drivers, RTD's history of their utilization and a definition of new target levels are discussed below.

. Part-Time Drivers Currently Represent a Cost Savings of About 49 Percent Per Platform Hour Relative to the Average Full-Time Driver

Part-timers always cost less money per platform hour than full-timers. For the type of work which can be optionally assigned to either driver group - - open trippers, or short pieces of work - - the total savings attributable to part-timers depends on how closely the trippers, when combined, compare to the 8 pay hours guaranteed to a full-time driver. An example of these comparative costs is given in Exhibit 1-10. Part-time drivers are seen to be less expensive in all three cost categories, as follows:

- Wage cost is lower due to a lower average wage rate and inapplicability of an 8 hour guarantee
- Benefits cost is lower due to ineligibility for all categories of fringe benefits except FICA and legislated benefits (e.g., workers compensation)
- Relief cost (i.e., cost of a replacement operator when original operator unavailable) is lower due to much lower absence rate of part-timers and ineligibility for vacations.

EXHIBIT 1-10
 SCRTD PERFORMANCE AUDIT

COMPARATIVE COST OF FULL-TIME AND PART-TIME DRIVERS
 (Annual Cost for One Weekday Assignment.)

<u>Cost Category</u>	<u>Methodology</u>	<u>FT Driver Cost</u>	<u>PT Driver Cost</u>
Wages(a)	(Pay Hours) * (Average Wage Rate)	\$23,234	\$16,999
Benefits(b)	(Wages) * (Fringes Multiplier)	\$11,152	\$ 1,139
Reliefs(c)	(Percent Hours Lost) * (Pay Hours) * (Average Wage Rate) * (Fringes Multiplier)	\$ 1,673	\$ 275
TOTAL ANNUAL COST		\$36,059	\$18,413
COST PER PLATFORM HOUR		\$ 19.81	\$ 10.12

Assumptions:

- (a) 2,080 pay hrs. for FT drivers (8 hr. daily guarantee), avg. wage is \$11.17;
 1,820 pay hrs. for PT drivers (pay hr. equal platform hrs.), avg. wage is \$9.34
- (b) RTD estimates fringes at 48% or wages for FT drivers, 6.7% for PT drivers
- (c) FT drivers unavailable for 39.07 days annually (31.89 days (re: Ex. 1-9) minus 3.37 days at other positions, minus 3.82 day requested off, plus 14.37 days holiday and vacation. PT drivers unavailable for 6.41 days annually (re: Ex. 1-9), FT drivers used for their relief.

- Over the Last Three Calendar Years, Part-Time Employees Have Not Exceeded 8.8 Percent of the Driver Work Force

Prior to December 1982, part-timers could comprise a maximum of 10 percent of the work force, or 11.1 percent of full-time drivers. Part-time driver utilization over the last three calendar years is summarized in Exhibit 1-11. Part-time drivers have represented the following average annual percentages of RTD's driver work force:

- 6.14 percent in 1980
- 8.17 percent in 1981
- 7.71 percent in 1982

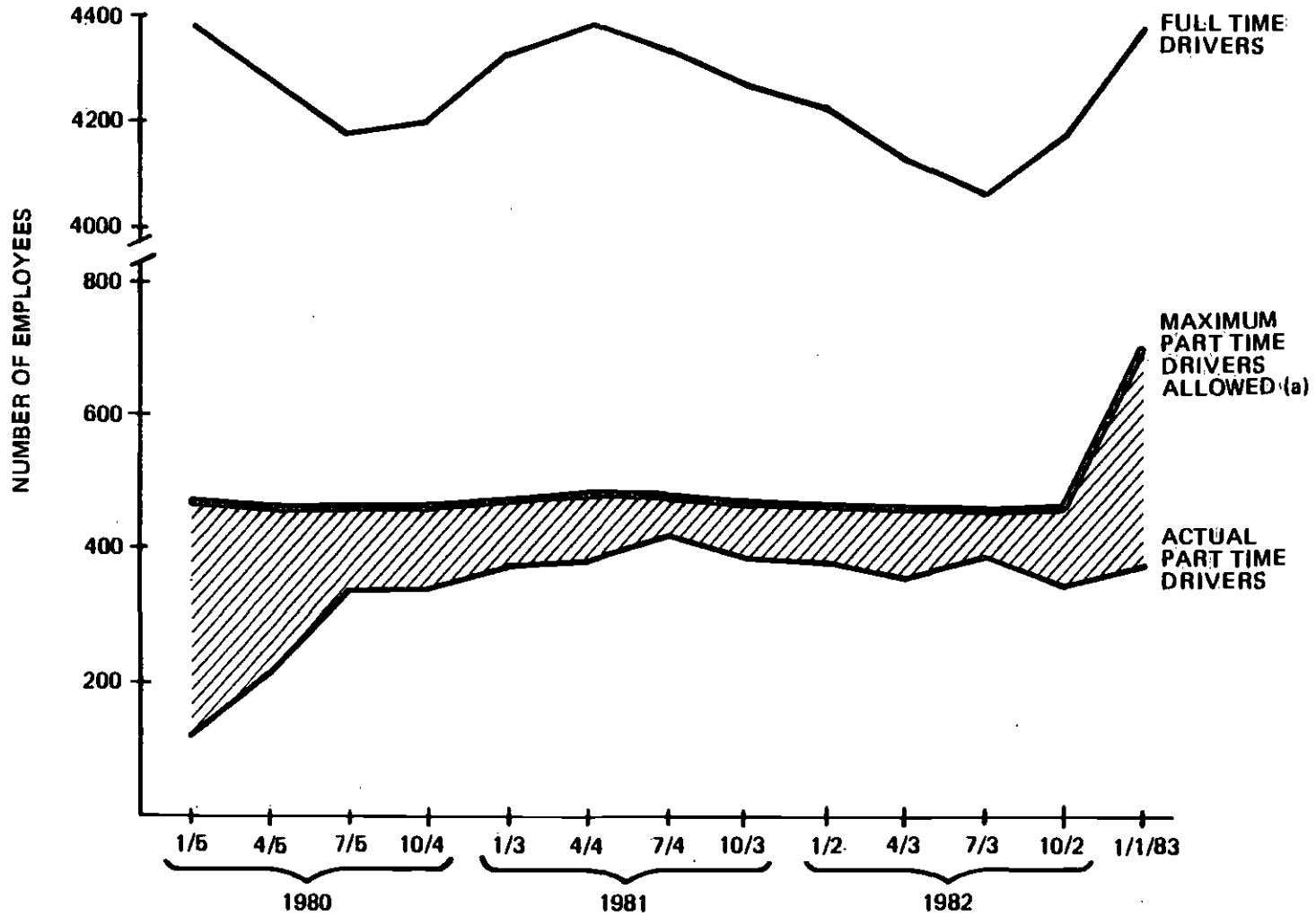
- Progress Toward Maximum Utilization Was Interrupted by Uncertainty Regarding Proposition A

- Both full-time and part-time driver ranks were reduced by attrition through June 1982
- Over 300 part-time drivers were converted to full-time ranks between July and December 1982 to help staff Proposition A service.

- The November 1982 Arbitration Award Guarantees 4,298 Full-Time Drivers If RTD Is to Achieve a 15 Percent Part-Time Driver Level - - 759 Drivers

The arbitration award set thresholds for part-time driver utilization which must be accompanied by increases in full-time driver levels. These levels are relative to the number of full-time drivers on-board as of June 1, 1982 - - 4,088 drivers - - and were all exceeded by the time the arbitration award was effected.

EXHIBIT 1-11
 SCRTD PERFORMANCE AUDIT
 PART-TIME DRIVER UTILIZATION



(a) Arbitration award on 11/30/82 established a new maximum level for part time drivers -- 15% of all drivers

- RTD was authorized a 14 percent part-time level as of January 1, 1983, if the June full-time driver base was increased by 160 (this had occurred in mid-November)
- The 160 additional full-timers are guaranteed over the length of the contract
- RTD was authorized a 15 percent part-time level when full-timers were increased by 210 (i.e., to 4,298)
- The 4,298 full-time driver level is guaranteed as long as RTD maintains a 15 percent part-time level
- At the 4,298 level, a maximum of 759 part-time drivers is allowed
- At any full-time level above 4,298, the number of allowable part-timers is 0.1765 of full-timers.

Currently, RTD employs 4,357 full-time and 499 part-time drivers. Their plan is to hire part-timers only until the maximum threshold is reached.

6. Transportation Safety and Service Reliability Have Consistently Registered Favorable Performance

Accident prevention and on-time dispatching performance have high priority within RTD's Transportation Department. Both of these areas are monitored daily and are formally included in Transportation's performance evaluation activities. RTD's safety and service reliability performance over the last three years is given in Exhibit 1-12.

EXHIBIT 1-12
SCRTD PERFORMANCE AUDIT

TRANSPORTATION, SAFETY AND SERVICE RELIABILITY

	<u>1980</u>	<u>1981</u>	<u>1982</u>
<u>Safety</u>			
Total Accidents Per 100,000 Miles	14.00	13.70	12.20
Chargeable Accidents Per 100,00 Miles	7.3	5.8	5.1
<u>Service Reliability</u>			
Percent of Runs Cancelled	0.07%	0.02%	0.03%
Percent of Runs Late	0.07%	0.07%	0.09%

Accident frequency has steadily declined over this three year period. Total accidents, measured in terms of frequency per 100,000 miles traveled, declined by 13 percent between 1980 and 1982. Chargeable accidents - - those for which a driver is held responsible - - declined by about 30 percent over the same period.

Service reliability, as measured by runs dispatched on time, has been maintained at a high level. Over the period from 1980 to 1982, overall reliability varied between 99.8 and 99.9 percent. Out of 2.5 million runs scheduled in the period studied, some 1,950 runs were late in leaving their home division. Only 983 runs were cancelled due to operator unavailability.

1.4 MAINTENANCE

The objective of this analysis was to evaluate the manner and extent to which maintenance management seeks to improve the quality of its transit service by effectively and efficiently discharging its day-to-day responsibilities. This evaluation encompasses the bus maintenance function and related activities (i.e., purchasing).

Description of Function

The Maintenance Department is responsible for the upkeep of all RTD vehicles, facilities and properties. The department is comprised of Maintenance General, the administrative branch of the Department; Central Maintenance, where unit overhaul and heavy repair are conducted; the Operating

Divisions where inspection and running repair are performed; Instruction, responsible for employee training; and Division 4 where new coaches are received and processed and the reserve fleet is maintained. Overall, there are 12 operating divisions, and one central maintenance facility, spread across the Los Angeles area. A maintenance staff of approximately 2,019 employees is responsible for upkeep of RTD's revenue fleet of 2,948 buses, non-revenue vehicles, and fixed facilities.

Maintenance-related functions encompass a wide assortment of activities which significantly impact the efficiency and effectiveness of service operations. The audit findings are presented in the following areas:

- . Goals and Objectives
- . Performance Monitoring
- . Service Reliability
- . Vehicle Availability
- . Maintenance Cost
- . Labor Utilization
- . Materials Management
- . Operating Procedures
- . Fleet Size and Mix

Findings

1. Maintenance Management Is Guided by a Sound Foundation of Goals and Objectives

Formulating goals and objectives for the purpose of directing functional activities is not new to maintenance

managers. The Maintenance Department has utilized formal goals and objectives in this manner for the last four years. Written goals are updated annually and encompass the long term (e.g., three years), the intermediate term (i.e., one year), and the short-term (e.g., three to six months). Annual and short-term goals are generally supported by clearly measurable objectives. Overall, goals and objectives are comprehensive - explicitly addressing all major responsibilities of the maintenance function.

Maintenance goals and objectives form a pyramid structure; each manager uses objectives directly related to his level of responsibility for performance in a specific area. In Fiscal 1982-1983 this pyramid structure is arrayed as follows:

- . The Director of Operations evaluates 12 goals and 11 objectives;
- . The Director of Maintenance reviews 12 goals and 43 objectives;
- . The Division Managers review about 2-5 goals and 8-12 objectives each.

The formalized goals and objectives significantly impact policy and resource allocation decisions at each of these hierarchical levels. The specific goals and objectives monitored by the Director of Operations, and subsequently by the General Manager and Board of Directors, are presented in Exhibit 1-13.

EXHIBIT 1-13
SCRTD PERFORMANCE AUDIT

PRIORITY MAINTENANCE GOALS AND OBJECTIVES
FISCAL 1982-1983

GOALS

- To maintain the active fleet and reserve fleet in the most cost-effective manner assuring that all scheduled runs will be filled.
- To ensure that all buses assigned to scheduled runs are clean and well maintained thus assuring the District's patrons of a rapid, efficient and quality level level of service.

OBJECTIVES

- To maintain miles between maintenance road calls at 3,500 miles.
- To improve articulated road call mileage by 30%.
- To achieve 90% reliability on wheelchair schedule compliance except AMG's which will be 75%.
- To reduce air conditioning, hot engine and electrical road calls by 10%.
- To wash all buses thoroughly every other day and clean interiors daily.
- To increase paint production to 40 complete buses per month.
- To successfully implement VMS/MMS systems and build management skills in effective utilization of these new tools.

EXHIBIT 1-13 (Cont'd)
SCRTD PERFORMANCE AUDIT

PRIORITY MAINTENANCE GOALS AND OBJECTIVES
FISCAL 1982-1983

OBJECTIVES (Cont'd)

- To expand the farebox rehabilitation and security effort to include rekeying of all vaults and rehabilitation of existing fareboxes.
- To establish in-house oil and fuel analysis capability by January, 1983.
- To increase miles between oil changes to 18,000 (or as deemed appropriate through oil analysis).
- To maximize training programs to increase productivity; VMS/MMS training, upgrading of mechanical work force to tie promotion to successful completion of training, and provide first line supervisor training at General Motors Training Center.

SOURCE: Annual Budget FY 1983

2. Although Disaggregate Information Is Available, the Maintenance Management Reporting System Does Not Sufficiently Accommodate Stratified Management Needs

The Maintenance Department currently utilizes a combined system of manual and automated data processing for use in managing activities. Generally speaking, maintenance information is available at a high level of disaggregation. While the detailed data does correspond with the needs of maintenance supervisors and Division Managers, it does not always correlate with the stratified responsibilities of the Division Superintendents or the Department Director.

Maintenance performance information generally ascends the hierarchical levels in a piecemeal fashion. This severely limits a manager's ability to efficiently analyze the trend of interrelated statistics and performance levels (e.g., the relationship between mechanic productivity and service reliability, or the relationship between overtime hours worked and employee absenteeism). It should be noted, however, that information of this nature is currently provided, though infrequently, in response to special information requests. The data, however, must be manually processed.

RTD is currently pursuing actions to alleviate many maintenance information problems. The Maintenance Department recently completed installation of the automated Vehicle Maintenance System (i.e., VMS) as part of the TRANS-MIS program. This system will substantially improve maintenance support data accuracy and availability. VMS allows for continuous tracking of performance and productivity at various levels of disaggregation. RTD could logically extend the VMS program to encompass the abstracting of detailed data to portray overall

maintenance trends in a report for the Superintendents of Divisions and the Director of Maintenance.

3. RTD's Service Reliability Has Improved over the Audit Period

The reliability of revenue service at RTD has improved significantly, as shown in Exhibit 1-14. Key indicators of service reliability include mean miles between mechanical failures, preventive maintenance performance, and service cancellations. The trend of each of these measures is as follows:

- Mean miles between mechanic failures (i.e., road calls chargeable to vehicle maintenance) has improved substantially, with a 62 percent increase in miles between 1981 and 1982.
- Cancelled runs due to vehicle unavailability have experienced a major decline in the last three years. The percent of late runs due to maintenance has also declined.
- Preventive maintenance (i.e., inspection) performance has improved over the audit period. The magnitude of inspections performed ahead of schedule has decreased slightly. The average number of monthly vehicles overdue for inspection has dropped 63 percent since 1980.

Improvement in each of these areas has resulted in a higher level of transit service reliability for RTD's patrons.

EXHIBIT 1-14
SCRTD PERFORMANCE AUDIT

SERVICE RELIABILITY

	Fiscal Year		
	1980	1981	1982
Mean Miles Between Mechanical Failures ^(a)	2,169	2,157	3,494
Percent Change from Previous Year	(17.00%)	(0.60%)	62.00%
Runs Cancelled ^(b)	948	67	7
Percent of Total Runs Cancelled	0.11%	0.01%	0.00%
Runs Late ^(b)	6,037	4,252	3,854
Percent of Total Runs Late	0.68%	0.49%	0.47%
Ratio of Vehicle Inspections Performed to Inspections Scheduled ^(c)	N.A.	1.12%	1.10%
Average Monthly Revenue Vehicles Overdue for Inspection ^(d)	165	85	60

(a) UMTA Section 15 Reports, includes road calls due to mechanical failures

(b) Data from Statement of Operating Personnel

(c) Data was extrapolated from HUB Reports H5002021 and H5003021

(d) Data was extrapolated from H1004021 and H5003021; FY 1980-81 figure is actual, FY 1979-80 and FY 1981-82 figures were estimated based on six months' data

N.A. Data are not available

4. Indicators of Vehicle Availability and Age Exhibit Notable Improvement over the Audit Period

Several indicators of vehicle availability have improved over the last three years, as shown in Exhibit 1-15. Specific indicators have changed as follows:

- . Revenue vehicles out of service for repairs have shown substantial improvement in both absolute numbers (from 190 vehicles in February 1980 to 87 vehicles in January 1982) and the duration of vehicle downtime (from an average of 6 weeks per vehicle in February 1980, to less than 2 weeks per vehicle in January 1982).
- . Revenue vehicles out of service due to parts unavailability have declined substantially, from 13 in February 1980 to 3 in January 1982.

The average revenue vehicle age has declined from 12.5 years in 1980 to 8.5 years in 1982. This figure drops to 6.4 years if reserve vehicles are excluded.

5. Maintenance Costs Have Been Increasing at a High Rate over the Study Period

Both labor and materials cost have increased well in excess of inflation since 1979. The vehicle maintenance labor cost per mile has increased 72 percent from June 1979 to June 1982; and materials cost per mile (excluding fuel and lubricants cost) has increased 133 percent over the same period. In contrast, the local consumers price index (i.e., CPI) experienced an increase of 37 percent between June 1979 and June 1982, as shown in Exhibit 1-16.

EXHIBIT 1-15
 SCRTD PERFORMANCE AUDIT

MAINTENANCE FUNCTION INDICATORS OF VEHICLE AVAILABILITY AND AGE

	Fiscal Year			
	<u>1979</u>	<u>1980</u>	<u>1981</u>	<u>1982</u>
Revenue Vehicles Out of Service for Sample Month ^(a)				
Number of Buses	N.A.	190	145	87
Average Number of Weeks	N.A.	6	9	2
Number of Buses Awaiting Parts	N.A.	13	6	3
Average Fleet Age (Years)	12.1	12.5	9.6	8.5

(a) Sample months are as follows: February 1980, January 1981 and January 1982

N.A. Information not available

EXHIBIT 1-16
 SCRTD PERFORMANCE AUDIT

MAINTENANCE FUNCTION INDICATORS
 Cost Per Unit of Service

	Fiscal Year			
	1979	1980	1981	1982
Labor Cost per Vehicle Mile ^(a)	\$0.36	\$0.43	\$0.53	\$0.62
Percent Change from Previous Year		19.4%	23.3%	17.0%
Materials Cost per Vehicle Mile ^(b)	\$0.09	\$0.13	\$0.19	\$0.21
Percent Change from Previous Year		44.4%	46.2%	10.5%
Total Maintenance Cost per Vehicle Mile ^(c)	\$0.50	\$0.63	\$0.80	\$0.91
Percent Change from Previous Year		26.0%	27.0%	13.8%
LA CPI		17.0%	7.5%	9.0%

-
- (a) Includes vehicle maintenance only
 - (b) Excludes fuel and lubricants
 - (c) Includes vehicle and non-vehicle expense

SOURCE: UMTA Section 15 Reports

The dramatic cost increase in maintenance labor and materials costs over the audit period reflect the cost of the effort to improve revenue vehicle availability and reliability. The increase in labor cost per mile is the combined result of a growing maintenance staff and declining miles of operation. The increase in non-fuel materials costs is primarily an attribute of increasing fleet size and complexity. Even in this light, materials cost growth appears excessive.

6. Maintenance Staffing Level Has Increased Substantially Over the Audit Period

Maintenance staffing growth has exceeded revenue equipment growth in recent years. Between 1979 and 1983 the maintenance work force grew by approximately 40 percent, as shown in Exhibit 1-17. This expansion occurred in response to the increasing size and sophistication of the bus fleet which had not been addressed in prior years. While over the same period, equipment growth was only 13 percent, in previous years (i.e., 1972 to 1979) equipment growth exceeded the rate of staff increases.

7. Labor Utilization Is a Significant Problem in the Maintenance Department

Two key measures of labor utilization, absenteeism and industrial injuries, exhibit poor performance at RTD.

EXHIBIT 1-17
 SCRTD PERFORMANCE AUDIT
 MAINTENANCE STAFFING LEVELS

<u>Staffing Level</u>	<u>Fiscal Year</u>				
	<u>1979</u>	<u>1980</u>	<u>1981</u>	<u>1982</u>	<u>1983(a)</u>
Supervision	109	115	169	157	158
Support Services	165	176	228	207	193
Mechanics	792	849	1,099	1,167	1,204
Servicers	<u>355</u>	<u>381</u>	<u>431</u>	<u>439</u>	<u>464</u>
TOTAL	1,421	1,521	1,927	1,970	2,019
Percent Change Over Previous Year		7.0%	26.7%	2.2%	2.5%

(a) Manpower Status Report, February 1983

SOURCE: UMTA Section 15 Reports

. Maintenance Employee Absenteeism Remained High over the Audit Period

Maintenance employee absenteeism was estimated at an average of more than 21 days per employee in Fiscal 1982. While this figure represents only slight increase over the previous two years, it accounts for a substantial cost to the Maintenance Department. In the three year period beginning in January 1980 and ending in December 1982, not one division attained the formal goal of 12 days absent per employee, as shown in Exhibit 1-18. Absenteeism varies substantially between divisions, from an estimated low of 18 days lost per employee at Division 8, to a high of about 25 days at Division 18. The potential cost savings of attaining the goal of 12 days absent per maintenance employee per year is estimated at \$1.5 to \$2.0 million.

. Industrial Injuries Are Also High at SCRTD

Industrial injuries have also far exceeded established goals. In 1982, maintenance industrial injuries were estimated at almost 18 per 100,000 employee hours as compared to a goal of 2 injuries per 100,000 hours. Again, performance varies substantially between divisions with an estimated high of 32.5 injuries per 100,000 work hours at Division 1, to a low rate of 8.8 injuries at Division 18.

While these statistics may suggest that the established goals for absenteeism and industrial injuries are too ambitious, performance in each of these areas continues to be poor.

EXHIBIT 1-18
SCRTD PERFORMANCE AUDIT

MAINTENANCE ABSENTEEISM AND INDUSTRIAL INJURIES

<u>Division</u>	<u>Absent Days per Maintenance Employee</u>			<u>Industrial Injuries per 100,000 Employee Hours</u>		
	<u>1980</u>	<u>1981</u>	<u>1982(a)</u>	<u>1980(b)</u>	<u>1981</u>	<u>1982(a)</u>
1	19.8	20.7	23.1	21.4	23.5	32.5
2	32.7	23.3	24.7	20.0	12.4	15.8
3	19.5	18.6	20.6	24.6	11.2	10.1
5	16.0	18.8	21.6	19.5	11.1	12.8
6	16.1	21.3	18.7	29.3	12.0	12.7
7	22.1	21.5	21.2	27.1	31.3	24.8
8	16.1	17.2	18.0	17.9	19.3	9.9
9	17.6	17.2	18.7	24.3	13.0	16.3
12	21.2	19.9	19.2	11.5	16.9	31.3
15	15.9	13.7	22.3	14.7	17.9	21.8
18	23.1	24.7	25.7	19.9	11.8	8.8
Systemwide	20.0	19.7	21.1	20.9	16.4	17.9
Goal	12.0	12.0	12.0	0.0	0.0	2.0

(a) Estimated from 5 month's data

(b) Data adjusted to reflect injuries per 100,000 pay hours

SOURCE: Division Performance Scoreboard

8. Existing Materials Management Activities Offer Significant Opportunity for Improvement

Responsibilities for maintenance materials management are somewhat fragmented, resting with both the Purchasing and Maintenance Departments. Purchasing is responsible for ordering parts, managing inventories, operating Central Stores and delivering parts to divisions. Maintenance is responsible for notifying Purchasing of upcoming campaigns, and for management and distribution of materials at the divisions. This creates a disjunct in responsibility and control over inventories. This problem has been recognized by RTD, and a major reorganization is planned for July 1983 which will place responsibility for parts management and control under Purchasing to provide centralized control over materials management.

Current materials management practices and cost trends - maintenance materials cost increased 133 percent over the last three years - - indicate a potential for over-stocking at RTD. Primary inventory control at RTD is managed through utilization of a manual cardex system. The system is cumbersome and does not facilitate the abstraction of important cost efficiency information. While it is adequate for monitoring parts falling below reorder levels, it does not promote monitoring of "slow movers" or obsolete parts. Parts which are stocked, but infrequently used, have a high carrying cost in both parts expense and storage space used. The current system for physical inventory doesn't adequately assess slow-movers either; only 10 percent of the total inventory is examined annually.

It should be noted that RTD has begun the process for converting the manual inventory control system to a broad-based materials management system utilizing the Sperry Univac 1103 computer. As part of the TRANS-MIS data processing program, automated materials procurement, inventory control, accounts payable, vehicle maintenance and administrative systems will be integrated to enhance materials management control. Completion of this system is about 18 months away. Internal estimates of potential savings from improved inventory control by this system range from \$780,000 to \$2 million.

Another problem with materials management concerns the lack of physical control at divisions. One weakness is parts room staffing at divisions. The parts issuance rooms are staffed only during two shifts on weekdays and one shift on weekends. The remaining shifts utilize an open-door policy, which may result in a dearth of accurate records and potential theft during those periods. Another weakness lies in data processing capabilities. Currently, no system is in place to routinely compare work orders and parts issuance forms to ensure that records correspond in regard to which vehicles are receiving what parts.

9. SCRTD Has Made Progress in Formalizing Maintenance Operating Procedures, But Key Weaknesses Continue to Exist

RTD has documented some important standard operating procedures to guide maintenance activities in specific functional areas. However, important procedures for guiding repetitive mechanical and servicing functions are not documented. The following discussion focuses on procedures

for work scheduling, supervision and recordkeeping, maintaining and servicing, and training.

. Procedures for Scheduling Work Are Informal

Maintenance work within the divisions (i.e., inspections, running repairs and component change-outs), are scheduled by the division manager and line supervisors. The process basically entails matching daily manpower with daily work loads. Division managers have a high degree of autonomy in executing this function. There are, however, no documented procedures for guiding the assignment of work at divisions.

Component overhaul and heavy repairs at the Central Maintenance Facility are scheduled based on a weekly meeting by maintenance managers and key supervisors. The total backlog of each major component is identified, and the previous week's actual production is compared to the established goals in a weekly production report. Using this information, managers establish priorities and formulate goals delineating production amounts to be completed, by component, in the coming week. While the process is not documented, it is well established, with the management group convening weekly to schedule production at the shops.

. Supervision and Recordkeeping Procedures Are Documented

Documented procedures do exist for the supervision and recording of many maintenance activities. Formalized procedures for supervisors encompass actions related to employee tardiness, attendance, safety, occupational injuries and elimination of late and cancelled pull-outs. Written procedures for completing supervisory reports and mechanic work records are also in-place. Included among these procedures

are standard guidelines for submitting purchase requisitions, mechanic's work documentation, accident reports, equipment damage reports, expense reports and warranty claims. These procedures serve to ensure consistency in record-keeping between divisions.

. There Are No Standard Operating Procedures or Time Standards for Mechanic and Servicer Work

RTD does not have formalized standard operating procedures in effect at the mechanic and servicer level that describe exactly how specific jobs are to be performed. Existing informal procedures for mechanics and servicers are the result of supervisory direction during on-the-job training that employees receive. Consequently, RTD does not have formalized time standards in effect for completing common repairs, overhauls or inspections.

. Maintenance Has Made Progress in Formalizing Training Procedures, Although Additional Work Is Needed

Maintenance has made significant progress in formalizing procedures for training maintenance employees, particularly in first line supervisory and management training. RTD has a formalized manual of management procedures encompassing a broad spectrum of managerial responsibilities including employee counseling and motivation, grievance procedures, conflict resolution, budgeting, performance appraisal and many others. The management guidebook is used in conjunction with internal and university-sponsored management courses.

While some internally prepared handouts are used in training service attendants and mechanics, formalized procedures are limited in scope.

Slide presentations, classroom discussion, and on-the-job training establish informal (i.e., undocumented) procedures for conducting work assignments. It should be noted, however, that RTD's mechanic training program is rigorous, including both mini-courses on small repairs and detailed training programs for mechanic certification. The training staff has been responsive to immediate training needs at RTD, and their timely response to specific maintenance problems has helped improve overall system performance.

10. Issues Related to SCRTD's Fleet Size and Mix Warrant Additional Management Attention

In particular, management should focus more attention on realizing potential efficiencies by reducing the spare ratio as fleet defects are repaired, and by planning bus mileage accumulation to avert future problems with overhauls. Each of these topics is further discussed below.

. RTD's Revenue Vehicle Spare Ratio Has Increased in Response to Problems with the Existing Fleet Mix

For the purposes of this analysis, the spare ratio is measured as the ratio of active vehicles less peak requirements to peak vehicle requirements. RTD's spare ratio has increased from 18.4 percent in 1979, to the current rate of 22.5 percent. The increase was in response to the changing fleet mix, which has been characterized by increasing sophistication and decreasing reliability. In an effort to further evaluate the appropriateness of the current spare ratio, the spares by coach type were examined. The results, shown in Exhibit 1-19, are discussed below

EXHIBIT 1-19
 SCRTD PERFORMANCE AUDIT

SPARE RATIO BY COACH TYPE

<u>Coach Type</u>	<u>No. of Vehicles in Fleet</u>	<u>Spare Ratio(a)</u>
"Standard" - New Look	272	15.0%
"Reserve" Fleet	417	15.0%
"Standard" including AVM	33	20.0%
GMC RTS II-04	975	20.0%
Neoplan-Double Deck	22	25.0%
Articulated	30	26.0%
Grumman-Flexible '870	999	35.0%
AM General	<u>200</u>	35.0%
 TOTAL FLEET	 2,948	 22.5%

(a) Spare ratio determined on January 1, 1983

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- "Standard" new look vehicles have a "normal" spare factor of 15 percent
- "Reserve" vehicles chiefly used for driver instruction, have a "normal" spare factor as well
- "Standard" vehicles with the automatic vehicle monitoring (AVM) system require slightly higher spares (i.e., 20 percent) because of reliability problems with AVM
- RTS II-04 spare factor of 20 percent results from ongoing repair of fleet defects (e.g., warranty work on rear door, electrical systems, etc.)
- Neoplan-double deck spare factor of 25 percent results from design deficiencies (e.g., electrical systems) which has increased failure rates significantly
- M.A.N.-articulated vehicles require a higher spare ratio (i.e., 26 percent) to accommodate the continuing engine overhaul program and general design deficiencies
- Grumman-Flexible '870 has been plagued with excessive equipment failures (e.g., suspension, power train, passenger comfort system) and require a high spare factor, currently at 35 percent
- AM General spare factor of 35 percent results from mechanical faults in A/C system and wheelchair lift apparatus; equipment is currently undergoing retrofit programs for A/C and engine system problems.

Even with current fleet deficiencies, RTD may have some opportunity to reduce the overall spare ratio, and subsequently reduce operating costs of vehicle maintenance. This opportunity should be examined in depth as current fleet defect programs are completed.

In an effort to identify system use of spare revenue vehicles, an examination of vehicle disposition was conducted; the results are shown in Exhibit 1-20. The figure disaggregates vehicles owned into those vehicles available and unavailable for revenue service. Unavailable vehicles are either part of the reserve fleet or are out of service for major repair. Available vehicles are used in peak service, extra Proposition A service, inspection, research and development, training and so on. Actual "extra" vehicles are minimal in number.

The Distribution of Bus Fleet Age Signifies Potential Future Problems in Major Vehicle Overhaul Programs

RTD averages about 48,000 miles per active revenue vehicle per year. Bus engines generally undergo major overhaul at 250,000 miles; although new vehicle models may require shorter overhaul intervals. In this light, the distribution of bus fleet age appears favorable for the immediate future, exhibiting a relatively constant influx of vehicles coming due to major overhaul.

However, more than 40 percent of the fleet is 3 years old or less, as shown in Exhibit 1-21. Thus, in 2 to 3 years, an overwhelming surge of vehicles could come due for major overhaul simultaneously. This may impact both staffing and vehicle availability in the future. Mechanic staff size is determined in accordance with "normal" work loads, although actual work requirements may fluctuate significantly. Because of lengthy training and certification requirements for mechanics, staff size cannot be increased immediately to respond to temporary work load increases. The potential problems with future vehicle overhaul programs is magnified by the provision of the current ATU contract which disallows maintenance subcontracting.

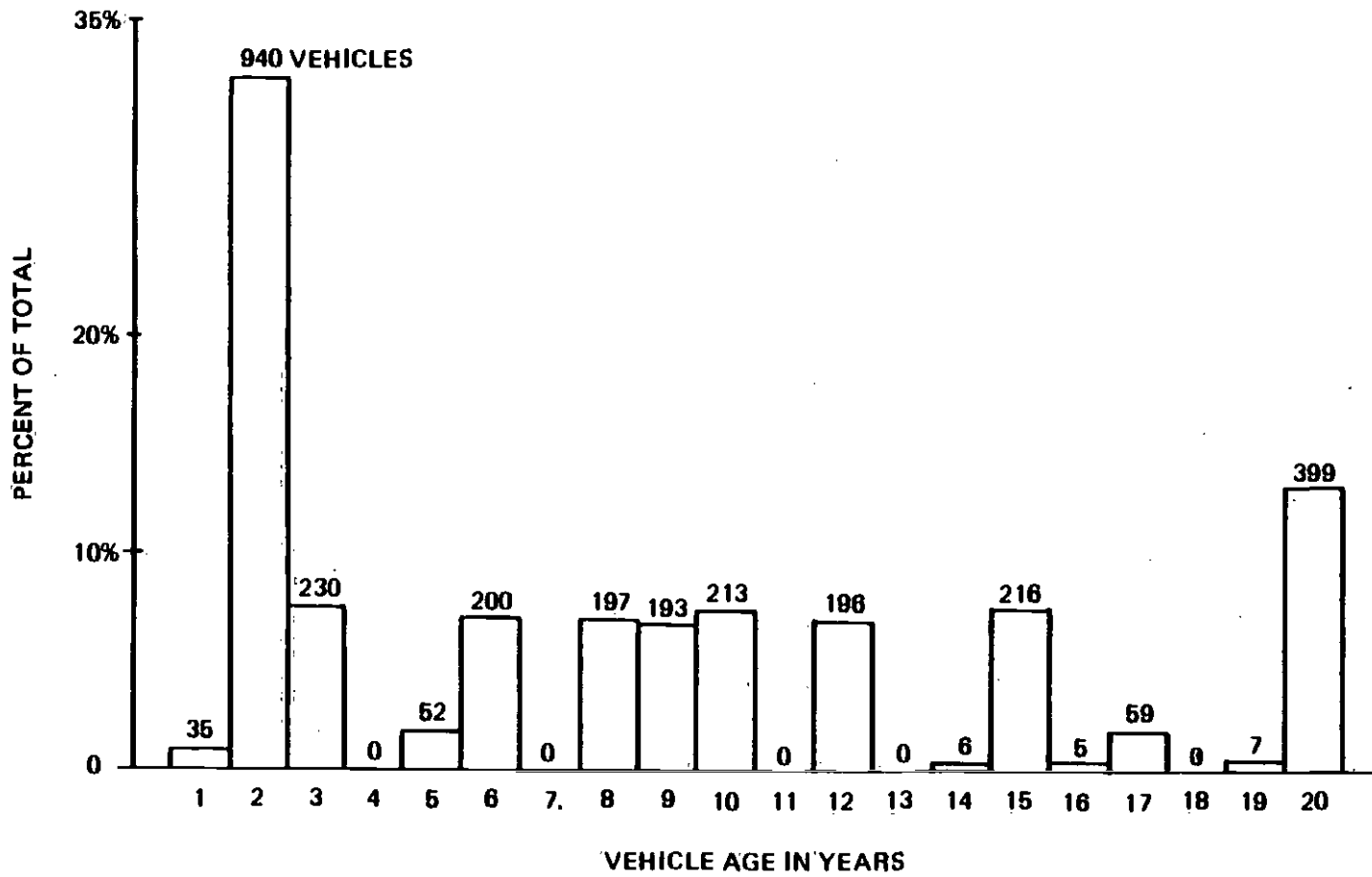
EXHIBIT 1-20
 SCRTD PERFORMANCE AUDIT
 SAMPLE OF COACH AVAILABILITY

TOTAL 2932	UNAVAILABLE 531	RESERVE 366	
		OUT OF SERVICE FOR REPAIRS 166	IN OR FOR SHOP 65
			BRAKE RELINE: 25
			WARRANTY REPAIR 25
			MAINTENANCE CAMPAIGNS 20
			ACCIDENT REPAIR 30
	AVAILABLE 2401	PEAK REQUIREMENT 2043	
		INSPECTION 74	
		WHEEL CHAIR LIFT P.M. 20	
		INVOLVED IN R&D 5	
		IN TRANSIT BETWEEN DIVISIONS 20	
		FOR ROAD CALLS 90	
		RUNNING REPAIR 90	
		NEW BUS PREPARATION 35	
		EXTRAS FOR CONTINGENCY 24	

*Distribution of Buses Owned By SCRTD
 on a Weekday in December 1982*

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EXHIBIT 1-21
SCRTD PERFORMANCE AUDIT
DISTRIBUTION OF BUS FLEET AGE



SOURCE: Coaches Owned by SCRTD, January 1, 1983

1.5 MARKETING AND PUBLIC RELATIONS

The objective of this section is to evaluate the manner and extent to which management addresses the effective and efficient conduct of marketing and public relations activities.

Description of Function

Marketing and public relations functions are conducted by the Marketing and Communications Department and the Telephone Information and Passenger Services Sections of the Customer Relations Department. The Marketing and Communications Department is responsible for planning and executing the District's media relations, promotional, advertising, prepaid sales, and market research programs. Passenger Services receives and processes passenger inquiries and complaints. The Telephone Information Center responds to callers' requests for route, schedule and fare information.

Findings

1. Progress Toward Achieving RTD Marketing Objectives Is Routinely Monitored

The Marketing Department's FY 1983 budget identifies a set of goals and objectives for achievement. Emphasis is placed on prepaid sales as evidenced by the department's objective to increase sales of monthly passes to 100,000 units, a 15 percent increase over FY 1982 levels. Other items addressed include the distribution of information literature, number and content of news coverage, reduction in production costs, and responsiveness of the market research unit. It is expected that in the second year of program budgeting, these

objectives will be refined to more comprehensively address marketing functions and to provide better policy direction for marketing plan development.

Quarterly progress reports submitted to the Executive Staff report on functional performance measured against the objectives presented in the budget and provide explanations of major operating expense variances. In addition, quarterly reports submitted to the Board of Directors provide detailed descriptions of the activities of the Marketing and Communications Department, including the topics of passenger communications, advertising, promotional programs, media relations, employee relations and prepaid sales.

2. The Focus of the Marketing Program Has Changed As a Result of Proposition A

Prior to the establishment of the \$0.50 base fare, the overall objective of the marketing program was to regain ridership lost as a result of the fare increase and service cuts. Marketing and advertising activities had been geared toward increasing ridership on all routes in all service periods. As a result of Proposition A, these activities have been retargeted to specific user groups to increase overall system effectiveness. Target groups include off-peak riders, the Spanish community, and new pass purchasers. This refocusing of marketing efforts is reflected in the significant reduction of the advertising budget from the FY 1982 level of \$765,000 to \$100,000 in FY 1983.

The Marketing and Communications Department prepares a three year Marketing Plan which provides policy direction and

identifies major opportunities for increased ridership. RTD's recent period of funding and service level uncertainty limited the document's usefulness as a three year planning tool. Efforts should now be directed at improving the Plan's value for longer term guidance by integrating the marketing planning process with that of the agency's overall goals and objectives and planned service levels.

3. Marketing Research Conducts a Wide Variety of Marketing and Passenger Studies

Marketing research activities investigate methods by which service and passenger information can be improved to attract riders. Activities include market segmentation analyses, attitude and service awareness surveys, fare alternative surveys, energy crisis impacts and an analysis of user understanding of the system's timetables. Findings of marketing research studies are acted upon as evidenced by a 1981 Service Awareness and Transit Ridership Study which revealed that 40 percent of regular pass users were Spanish-speaking. As a result of that finding, advertising in Spanish was significantly increased.

4. In FY 1982, Prepaid Sales Represented 40 Percent of Fare-box Revenue

In a period of five years, prepaid sales have increased from \$20 million to \$65 million per year. The program's success is in part due to its extensive distribution system. There are almost 250 pass sales outlets located in a variety of easy access stores, educational centers, banks and customer

service centers. RTD currently pays a 3 percent commission rate to its vendors. Activities to expand the pass program support the Board's stated prepayment policy.

5. The Major Causes of Customer Complaints Continue to Be Pass-Ups, Operator Discourtesy, Unsafe Operations and No-Shows

The Passenger Service Section closely monitors the level and cause of customer complaints. Monthly reports tabulate the number of phoned and written-in complaints by division, by cause and further stratify complaints by line and by individual operator badge number. These reports are sent to the General Manager's office.

Between 1981 and 1982 the total number of complaints received per 100,000 passengers jumped over 20 percent as shown in Exhibit 1-22. Between 1980 and 1981 the largest increase occurred in complaints regarding pass-ups. As a result of the large number of complaints regarding operator discourtesy, RTD has implemented a driver courtesy and sensitivity training program.

6. The Telephone Information Center Has Cost-Effectively Improved Responsiveness to User Inquiries

Between 1980 and 1982 the response rate to telephone calls received increased from 68 to 88 percent, and the average delay time per call dropped from 4 to 2 1/2 minutes as shown in Exhibit 1-23. These improvements have been achieved without any increase in operating costs, which actually

EXHIBIT 1-22
SCRTD PERFORMANCE AUDIT

CUSTOMER COMPLAINTS

	<u>1980</u>	<u>1981</u>	<u>1982</u>
Total Complaints	5,549	5,400	5,827
Complaints Per 100,000 Passengers	1.6	1.4	1.7
Type of Complaints Registered in December of Audit Year			
Percent Pass-Ups	18%	25%	N.A.
Percent Discourtesy	11%	16%	N.A.
Percent Unsafe Operations	17%	18%	N.A.
Percent No-Shows	13%	12%	N.A.
Other	41%	29%	N.A.

N.A. Data not available

EXHIBIT 1-23
SCRTD PERFORMANCE AUDIT

SERVICE INFORMATION

	<u>1980</u>	<u>1981</u>	<u>1982</u>
Number of Calls Received	3,794,026	3,415,979	3,313,349
Percent Answered	68%	61%	88%
Average Delay	4 Min.	5 Min.	2 1/2 Min.
Average Calls Per Agent Per Hour	20	20	25
Average Staff	105	94	96

decreased 32 percent between 1980 and 1982. In addition, productivity increased 25 percent from 20 to 25 calls per agent per hour. The major factor contributing to improved performance was the installation of the Automatic Call Distributor, a computer system for efficiently distributing incoming calls to information clerks. Expansion of the Computerized Customer Information Services to all service areas is expected to further enhance the productivity and effectiveness of the Telephone Information Center.

1.6 BUDGETING AND FINANCIAL PLANNING

The objective of this section is to evaluate the manner and extent to which the budgeting and financial planning process reflects the goals and objectives of the transit system's operations.

Description of Function

Prior to 1982, the responsibility for budgeting and financial planning was vested with the Controller-Treasurer Unit, with additional support coming from the Accounting and Fiscal Department and Management Services. In January 1982, Management Services assumed the responsibility for the preparation and review of the operating budget. Capital budgeting, financial planning, and cash management remained with the Treasurer's Office until later that year when the Office of Management and Budget (OMB) was created. The spans of control and working procedures between OMB and other financial-related departments are currently in the process of being defined.

Findings

1. The Budget Process Has Been Revised to Reflect a Management by Objective (MBO) Approach

Prior to FY 1983, and with the exception of 1979, RTD undertook an incremental line item approach to preparing its annual operating budget. Beginning in FY 1983, however, the budget process was significantly expanded and revised to reflect management's desire to use the budget as an evaluative tool for guiding resource allocation decisions. Major improvements include:

- Departmental statements of goals and objectives
- Line item justifications
- Requirements for detailed Program Improvement Requests should departments request additional personnel, programs, services or equipment
- Three-year budget item comparisons.

As discussed in Section 1, significant progress has been made in developing a comprehensive approach to integrating system goals, objectives, priorities and the budgeting process. However, critical steps need to be implemented to make the MBO system fully operable and useful for management decision-making.

2. The Treasurer's Office Pursues an Aggressive Revenue-Enhancement Program

The Treasurer's Office goals and objectives identify several programs for maximizing the return on RTD's financial and capital resources. Briefly, these include:

- Revenue Anticipation Notes - While awaiting the receipt of federal subsidy money, the RTD borrows money at 6 percent interest by selling tax-free notes and earns 10 percent on savings.
- Cash Investment Program - RTD employs a cash manager to conduct an aggressive cash investment program. RTD's objective is for uninvested funds amount to less than 2 percent of available cash resources.
- Sale and Leaseback Agreements - RTD maintains a policy of selling the depreciation benefits of its equipment to private corporations. A four million dollar benefit was realized from the sale and leaseback of 700 buses to ARCO.
- Equipment Trust Certificates - RTD borrows money at a tax-free rate to provide the 20 percent local funding for vehicle purchases. In this manner, it can continue to earn higher interest rates on its available cash reserves.

3. Security in Cash Handling Continues To Be a Problem

Without a system of checks and balances between cash fares deposited in the farebox and cash collected and counted from the vaults, it is difficult to measure the success of cash handling security programs. Registering fareboxes can provide such a check and balance system. Another approach is to use passenger information collected and analyzed from

quarterly fare surveys as an estimate of cash fares to provide a cross check against daily cash totals.

Although the base fare has been reduced to \$0.50, approximately \$11,000-\$15,000 in dollar bills are deposited into the fareboxes daily. Of that amount, 1,000 are torn bills. Paper currency must be manually sorted and counted - - a timely and costly activity. RTD should anticipate increased cash handling problems once the Proposition A fare reduction program ends in 1985.

1.7 FUNCTIONAL AUDIT CONCLUSIONS AND RECOMMENDATIONS

Over the past three years, RTD has witnessed its operating costs increase at a rate greater than that of general price inflation, its overall productivity per employee continued to decline, and in 1982 its ridership drop 11 percent. Task 1 findings identified several areas of notable functional strengths as well as those factors contributed to RTD's financial and operational problems. RTD's major accomplishment has been the introduction of a program budget and a management by objective approach to decision making. In addition, by 1982 several specific functional cost and labor productivity indicators evidenced a turnaround or leveling off in their negative trend. Areas identified for improvement include labor utilization, manpower planning, vehicle utilization and scheduling, and materials management.

This section presents recommendations for addressing many of the issues identified as efficiency and effectiveness problem areas.

1. System and Departmental Goals and Objectives Should Be Refined and Integrated to Strengthen Their Role in Guiding Resource Allocation Decisions

The primary purpose of RTD's new departmental goals and objectives program is to provide management with a tool for its resource allocation decision-making. For this approach to fulfill its mission, several refinements in the first year's program are needed. Key among them is the need for departmental goals and objectives to be mutually supportive and for them to be directly linked to overall system goals. Secondly, priorities need to be assigned, timetables for achievement established, impacts fully assessed, and action plans or programs linked to the achievement of specific objectives. Many of these refinements are currently underway during the second year of program budgeting.

2. An Integrated Management Information Reporting System Should Be Developed to Monitor RTD Performance in a Manner Supportive of Board, Management and Staff Level Decision-Making Needs

The purpose of an information system is to support resource allocation decisions, improve management's ability to define problems, and provide feedback on the effectiveness of decisions. Although Task 1 of this audit program did not examine RTD information systems in depth, several of its findings strongly suggest the need for a thorough review of the agency's information needs by level of responsibility and by function, including that of service planning, scheduling, transportation operations, maintenance and finance/budgeting. Decreasing financial resources and increasing organizational demands for information are additional reasons for such a

review. Furthermore, the in-progress installation of an extensive Transit Management Information System (TRANS-MIS I and II) emphasizes the timeliness for an information assessment. The automated TRANS-MIS will provide the capability to generate enormous quantities of data. RTD, however, must determine how to convert the data into information useful for operational and policy-making purposes.

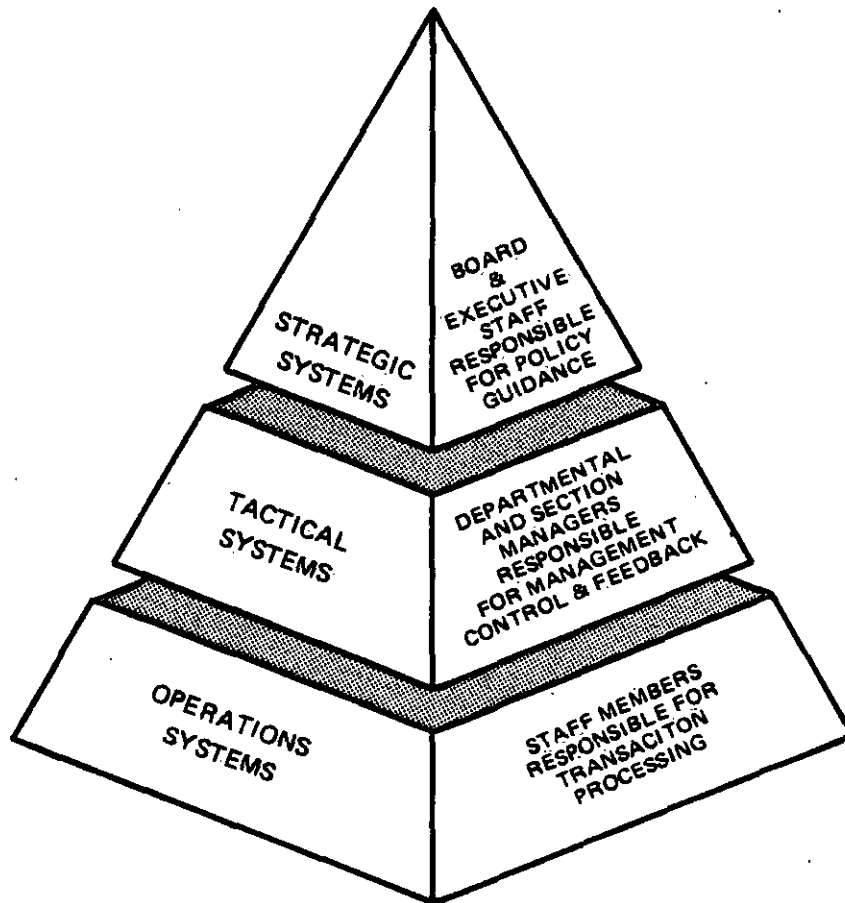
The hierarchical relationship between its strategic, tactical, and operational information systems is illustrated by Exhibit 1-24. Four points can be concluded from this abstraction which influence systems development:

- The level of detail and frequency of data required vary with the user's intent;
- Strategic systems, tactical systems, and operational systems must be integrated to most effectively serve resource allocation decisions;
- The strategic and tactical plans serve as screens for data reported upward from lower levels - - only relevant information is required; and
- Information which is not essential for monitoring and managing performance need not be systematized.

The illustration intentionally implies an information pyramid. Information at each management level is networked or integrated with that below it.

Implementation of a well structured information system will strengthen RTD's ability to cohesively examine and monitor its progress toward internally generated goals, objectives and standards of performance as well as its ability to

EXHIBIT 1-24
SCRTD PERFORMANCE AUDIT
INFORMATION SYSTEM HIERARCHY



respond to changes in its external environment. It is recommended that as a first step, RTD's current information system program be evaluated in Task 2 of the Performance Audit.

3. RTD Should Examine Staffing Levels in General Administration Functional Areas

General Administration functions as a whole registered the largest gain in staffing levels during the audit period, up by 73 percent between 1979 and 1982. Most recently in 1982, 146 full-time equivalent employees were added and total labor and fringes increased 25 percent. These estimates exclude rapid rail capital labor. Analysis is needed to determine the specific departments and functions contributing to the significant escalation in General Administration costs and justifications for staffing increases.

4. The Transportation Department Should Develop a New Manpower Planning Process Which Regularly Projects and Refines Manpower Levels

RTD currently relies upon a static procedure (i.e., 1.32 drivers per scheduled weekday assignment) to establish manpower requirements, and seeks to attain a surplus above that level to minimize sick leave and unscheduled overtime. While it is necessary to minimize these two components of cost, the foundation of the methodology is insensitive to changes in part-time driver levels, the composition of work assigned to the extraboard (i.e., spare drivers used to fill open work), fluctuations in absence rates and disproportional changes among weekday, Saturday and Sunday service levels. The current methodology also does not fully account for fringe

benefit cost. This cost component is of particular importance in evaluating the efficiency of carrying surplus operators to achieve reductions in wage and paid leave cost.

A redefinition of the manpower planning process is necessary which encompasses the following characteristics:

- . Sets targets for part-time driver levels, initially based on maintaining the minimum full-time driver level of 4,298 drivers
 - . An automated tool for regularly projecting full-time and part-time driver levels, based on a full work week, whose product establishes a basis of communication for hiring and training needs, in regard to:
 - Attrition rates
 - Scheduled and unscheduled work
 - Cost trade-offs between overtime wages, guaranteed wages and benefit costs
 - Absence rates
 - Vacation schedules
 - . Establishes policies for granting requested leave and for non-driving use of operators.
5. RTD Should Develop and Implement a Maintenance Labor Management Program

RTD should formulate and implement a labor management program which aggressively pursues the reduction of

absenteeism and industrial injuries in Maintenance. The incidence of absence and injuries-on-duty appears excessive, although it should be noted that industrial injuries experienced a slight decline over the audit period. Maintenance management should conduct a detailed analysis of the characteristics of absenteeism and injuries and identify the reasons why current management actions have been ineffective in reducing the frequency of each. The examination should also delineate managerial practices which serve to minimize absenteeism and enhance safe operations at individual divisions.

6. RTD Should Develop Standard Operating Procedures and Job Standards at Mechanic and Servicer Levels

While RTD has made significant progress toward formalizing procedures at supervisory and management levels, standard operating procedures are limited in scope at mechanic and servicer levels. RTD should develop formal (i.e., documented) operating procedures and job standards (i.e., time and quality criteria) guiding the conduct of maintenance jobs. Implementation of this strategy can result in several key improvements for RTD maintenance. Formal job standards will aid management assessment of work loads and subsequent determination of manpower levels required to complete work. Job standards also provide a yardstick for individual performance appraisal and assessment of systemwide progress, if used with reasonable discretion. Standard operating procedures will improve and expedite mechanic and servicer training programs. Documented procedures also serve to guide the conduct of maintenance work in an effective and efficient manner.

7. RTD Should Accelerate Implementation of Materials Management Reorganization to Reduce Inventory Cost and to Gain Better Control over Security and Distribution

RTD is already aware of the existing problems in inventory cost and parts disbursement control, and has developed key strategies to reduce current deficiencies. Two primary plans include: a reorganization of parts disbursement functions at divisions; and development of an automated system supporting materials management and inventory control. The reorganization (parts disbursement functions at divisions will report to Purchasing rather than Maintenance) is scheduled for July 1983, and the materials management system is expected to be fully operational in August 1984. RTD should expedite implementation of these plans, to the extent possible, and monitor progress in inventory cost and security control over materials.

8. RTD Should Evaluate Strategies to Reduce Fleet Size to Realize Potential Maintenance Cost Efficiencies

RTD currently maintains an active fleet exceeding peak vehicle requirements by approximately 22.5 percent. In addition, RTD has to maintain and service a small number of reserve vehicles which are periodically used for training purposes. Maintaining and servicing these vehicles is accomplished at a substantial cost to the system.

It is recognized that the existing spare ratio is the result of acquiring complicated equipment which is experiencing substantial reliability problems. However, as current fleet defects are resolved and retrofit programs completed,

RTD should investigate strategies to minimize maintenance expenditures by reducing the active fleet size.

9. RTD Should Develop a Program to Schedule Major Drive Train Overhaul Activities in the Next Two to Three Years

The maintenance analysis revealed that more than 40 percent of the bus fleet is currently three years old or less. While the age distribution does not create any problems in the immediate future, major problems could occur as these vehicles come due for drive train (i.e., engine and transmission) overhaul in two to three years. RTD should develop a program for scheduling new vehicles in a manner which would stagger the accumulation of miles to prevent a surge of buses from requiring overhaul simultaneously. Additionally, management should pursue actions to acquire union approval of a reasonable level of maintenance subcontracting in the near future.